

# SNOW COVER ATLAS OF THE INDUS BASIN

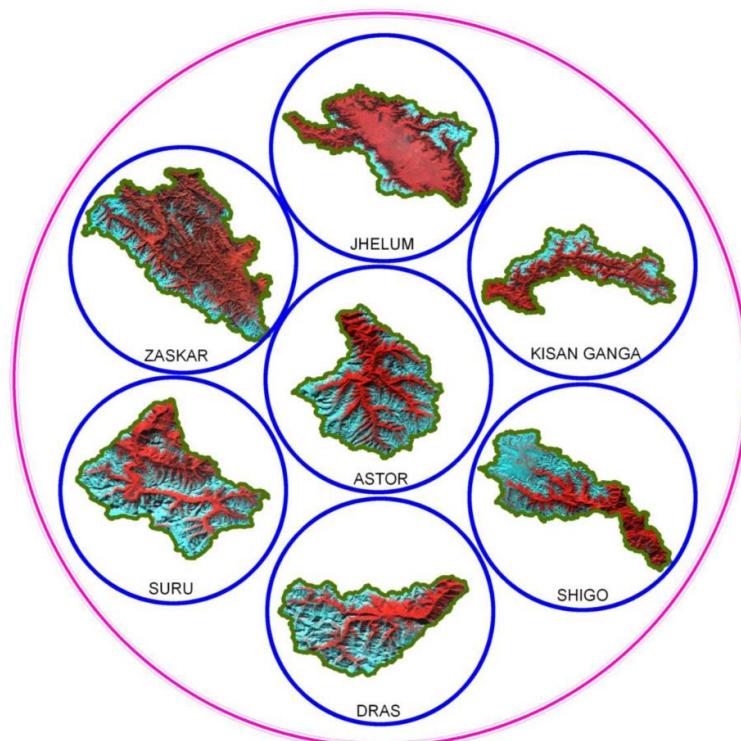
Sub-basins: Jhelum, Kisan ganga, Astor, Shigo, Dras, Suru and Zaskar

(Integrated Studies of Himalayan Cryosphere

A Project of Indian Space Research Organisation)

Year 2015-2016

Volume I



Prepared by  
Space Applications Centre (ISRO)  
Ahmedabad-380015  
July 2017

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**2015-16**

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**SPACE APPLICATIONS CENTRE (ISRO), AHMEDABAD - 380015****DOCUMENT CONTROL AND DATA SHEET**

Report Number	SAC/EPSA/GHCAG/CSD/SGP/SN/ 117 /2017
Month and year of publication	July 2017
Title	Snow cover Atlas of the Indus basin
Type of Report	Scientific Report
No. of pages	177
No. of figures, Charts & Tables	128, 21 & 14
Authors	B. P. Rathore, S. K. Singh, I. M. Bahuguna, and A. S. Rajawat
No. of References	9
Originating Unit	Cryosphere Sciences Division, Geo-Sciences, Hydrology, Cryosphere Sciences and Applications Group, Earth, Ocean, Atmosphere, Planetary Sciences and Applications Area, Space Applications Centre (ISRO), Ahmedabad-15
Abstract	This atlas gives subbasin-wise distribution of snow cover in the Indus basin from October 2015 to June 2016. The subbasins included in this report are Jhelum, Kisan ganga, Astor, Shigo, Dras, Suru and Zaskar. The areal extent of snow cover was estimated in fully automatic mode using Normalized Difference Snow Index (NDSI) based algorithm. For this purpose, AWIFS sensor of Resourcesat satellite was used. This atlas gives snow cover products, statistics and seasonal snow depletion curve. It is expected that this data will be useful for hydrological and climatological applications.
Key words	Snow cover, NDSI, AWIFS, depletion curve, Jhelum, Kisan ganga, Astor, Shigo, Dras, Suru and Zaskar basins.
Security Classification	Unrestricted
Distribution	Among concerned

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## **1. Introduction**

Snow covers almost 40 per cent of the Earth's land surface during Northern Hemisphere winter. This makes albedo and areal extent of snow as important component of the Earth's radiation balance (Foster and Chang, 1993). In addition, large areas in the Himalayas are also covered by snow during winter. Area of snow can change significantly during winter and spring. This can affect stream flow for rivers originating in the higher Himalayas. All the rivers originating from higher Himalayas receive almost 30-50 % of annual flow from snow and glacier melt run off (Agarwal et al., 1983). In addition, snow pack ablation is highly sensitive to climatic variation. Increase in atmospheric temperature can influence snowmelt and stream runoff pattern (Kulkarni et al., 2002). Therefore, mapping of the areal extent and reflectance of snow are important parameter for various climatological and hydrological applications. In addition, extent of snow cover can also be used as input for numerous other applications.

Mapping and monitoring of seasonal snow cover using field methods are normally very difficult in a mountainous terrain, like the Himalayas. Therefore, remote sensing techniques have been extensively used for snow cover monitoring. Snow cover monitoring using satellite images were started by using the TIROS-1 satellite from April 1960 (Singer and Popham 1963). Since then, the potential for operational satellite-based mapping has been enhanced by the development of higher temporal frequency and satellite sensors with higher spatial resolution. In addition, satellites with better radiometric resolutions, such as NOAA have been used successfully for snow mapping (Hall et al., 1995). This is possibly due to the distinct spectral reflectance characteristics of snow in visible and near infrared regions. India has launched series of Indian Remote Sensing satellite (IRS) to study the different earth resources. Previously launched satellites have flown with many sensors having different spatial, temporal and spectral resolutions. Recently launched RESOURCESAT-1 satellite has three different sensors namely LISS III, LISS IV & AWIFS with different spatial, temporal and spectral resolutions as desired for different applications. AWIFS (Advanced Wide Field Sensor) is an advanced version of earlier Indian satellite sensor WiFS (Wide Field Sensor) with improved spectral and spatial resolutions maintaining the same repetitivity. There are a series of other polar orbiting satellites, like Landsat, NOAA and MODIS etc., which have provided information on different aspects of

snow. Geo-stationary satellites also proved their utility in mapping/monitoring the snow-covered regions. Information generated from satellite observations has been extensively used for snowmelt runoff modeling (Kulkarni et al., 1997).

## **2. Study Area:**

This Atlas gives distribution of snow cover in seven subbasins of the Indus basin. These are Jhelum, Kisan ganga , Astor, Shigo, Dras, Suru and Zaskar sub basins. Locations of these basins are shown in Figure 1.

## **3. Data used:**

AWiFS data from October 2015 to June 2016 were used in this study.

## **4. Normalised Difference Snow Index (NDSI):**

In general, the reflectance of snow is high at the red end of the visible spectrum. It tends to decline in the near-infrared region until 1090 nm, where slight gain in reflectance occurs and gives a minor peak at approximately 1090 to 1100 nm. One of the important difficulties in snow cover monitoring is the presence of cloud cover. Cloud has strong reflectivity in visible, NIR and SWIR regions while snow absorbs in SWIR, and this difference can be utilized for snow/cloud discrimination. Normalized Difference Snow Index (NDSI) utilize the normalized ratio of green and SWIR and is used as an automated approach for snow mapping addressing the shadow and cloud problems in snow bound areas.

Normalized Difference Snow Index was calculated using the ratio of green wavelength (band 2) and SWIR (band 5) of AWiFS sensor:

$$\text{Normalized Difference Snow Index (NDSI)} = (\text{band}2 - \text{band}5) / (\text{band}2 + \text{band}5) \quad ..(1)$$

To estimate NDSI, DN numbers were converted into reflectance. This involves conversion of digital numbers into the radiance values, known as sensor calibration, and then estimation of reflectance from these radiance values. Various parameters needed for estimating spectral reflectance are maximum and minimum radiances and mean solar exo-atmospheric spectral irradiances in the satellite sensor bands, satellite data acquisition time, solar declination, solar zenith and solar azimuth angles, mean Earth-Sun distance etc. (Markham and Barker, 1987; Srinivasulu and Kulkarni, 2004).

## **5. Snow cover monitoring algorithm**

An algorithm is developed to provide changes in the areal extent of snow (Kulkarni et. al., 2006). Snow extent is estimated at an interval of 5-days and 10-days, depending upon availabilities of AWiFS data. In 5-daily product, snow extent is generated scene-wise. In this product, snow and cloud extents are given. Estimate of cloud is important because, at times, snow is covered by cloud and this may be classified as non-snow area, leading to erroneous conclusions. In 10-daily product, three scenes are analyzed, if available. For example, 10 March product data of 5, 10 and 15 March was used. If any pixel is identified as snow on any one date then this pixel will be classified as snow on final product. This provides snow cover at an interval of 10 days, an important requirement in hydrological applications. Therefore, this product is generated basin-wise. Since this product is using three scenes, probability becomes high that at least in one scene, pixel may be cloud-free and this helps in overcoming problem associated with snow under cloud cover. If three consecutive scenes are not available, then all available scenes in 10 days window was used in the analysis. Differentiation between water and snow is difficult using NDSI image. In addition, separation of snow and water pixels is also difficult based on reflectance due to mountain shadow. Therefore, in the present algorithm, water bodies are marked in pre-winter

season and are masked in the final products during winter. Flow diagram of the algorithm is given in Figure 2.

## **6. Results and discussions**

In this atlas, basin-wise snow cover statistics, maps, and seasonal depletion curves have been provided from October 2015 to June 2016. Snow ablation pattern varies from basin to basin, depending on area altitude distribution in the basins. Accumulation and ablation pattern in Astor and Dras is same. Accumulation and ablation pattern in Shigo and Suru is also same. In all the five basins accumulation starts from mid of November and ablation starts from mid of March. In Zaskar basin accumulation starts from December onwards ablation starts from April month. Accumulation starts from mid of December in Jhelum basin. Maximum snow was observed in end of February and ablation starts from March itself. It may be due lower altitude and latitude.

## **Acknowledgements**

This investigation was carried out under Integrated studies of Himalayan Cryosphere, at Space Applications Centre (ISRO), Ahmedabad. The authors are grateful to Shri Tapan Misra, Director, Space Applications Centre, Ahmedabad for continuous guidance and encouragement during the investigation. Authors would like to thank Dr. Rajkumar Deputy Director, EPSA, SAC for their suggestions and comments on the manuscript.

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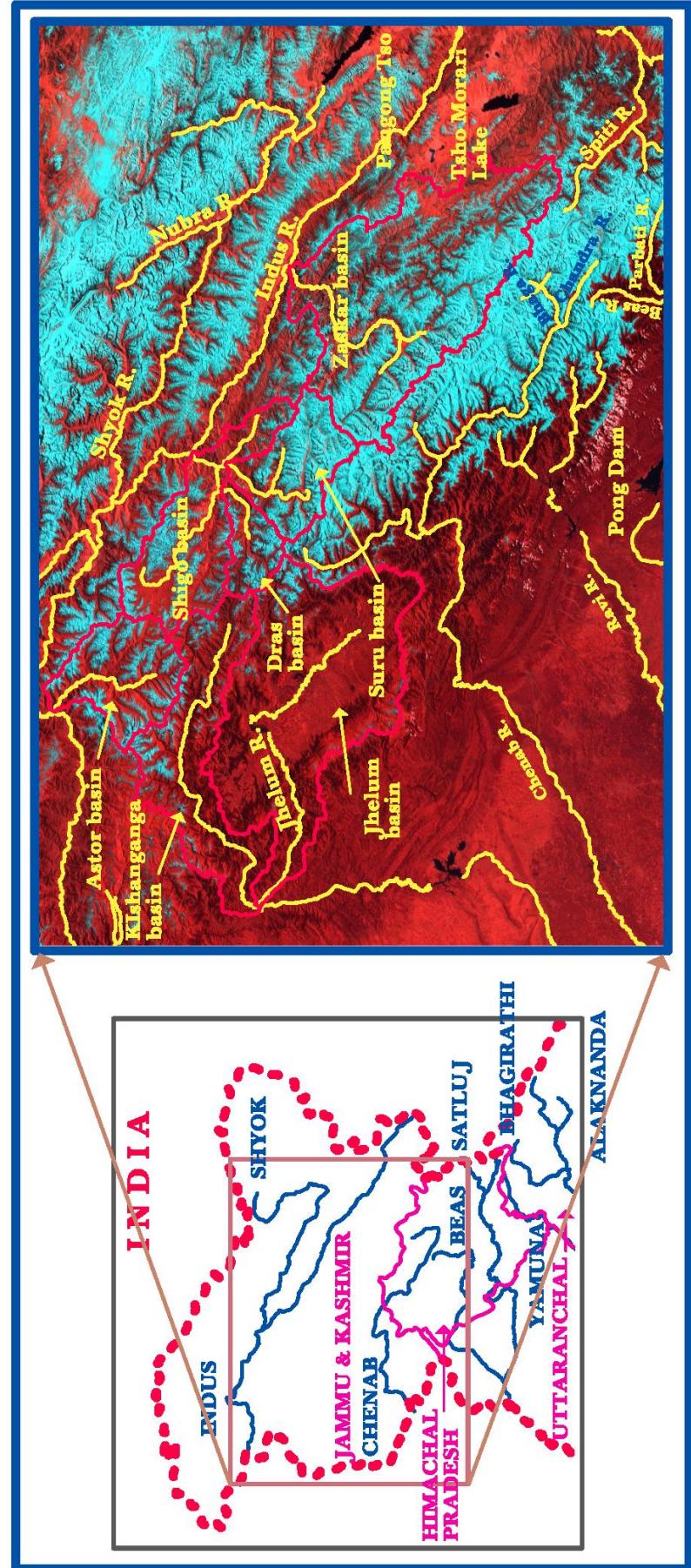
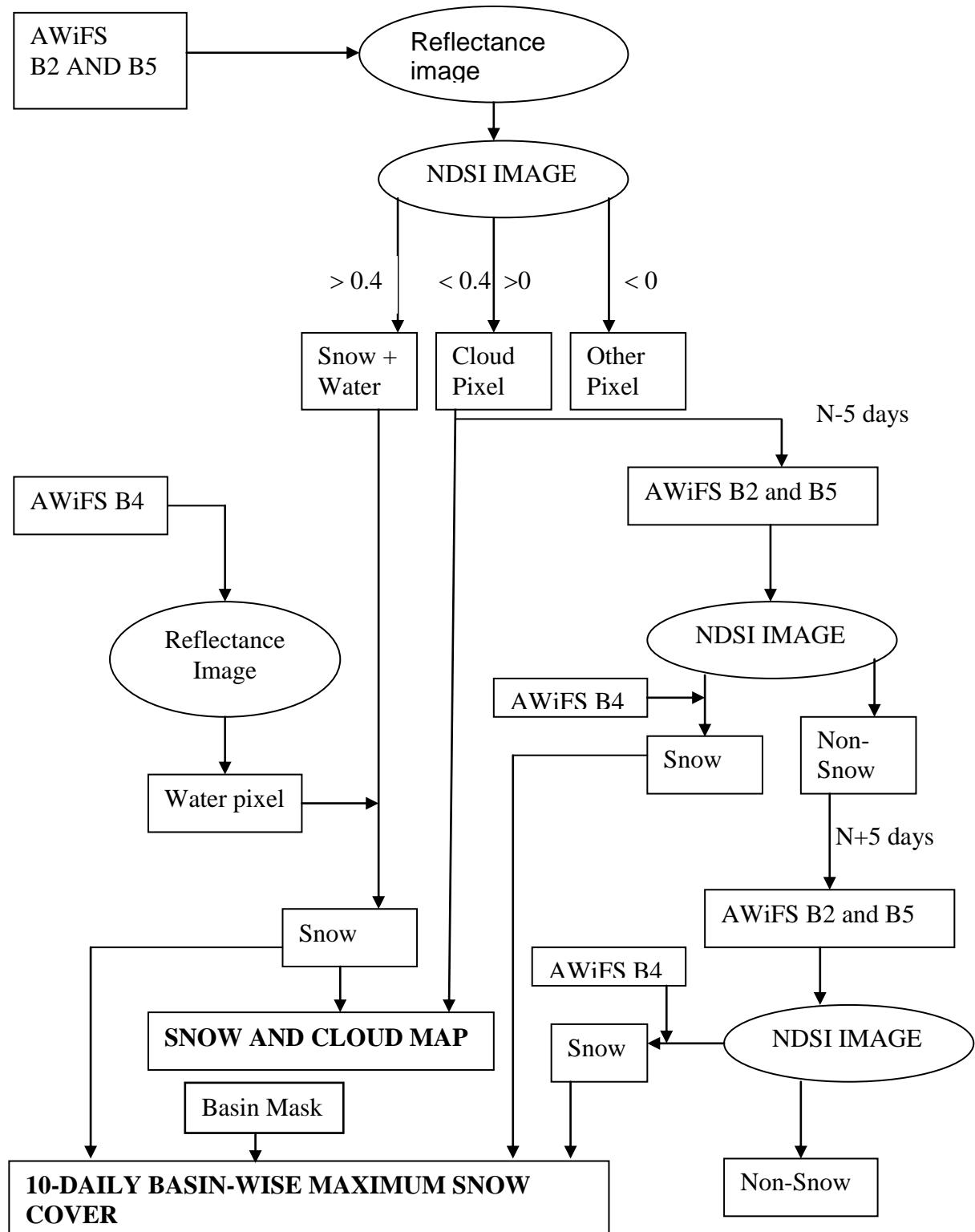


Figure 1: Location map of Jhelum, Kisan ganga, Astor, Shigo, Dras, Suru and Zaskar sub-basins (Part of Indus basin)



**Figure 2: Algorithm for snow cover mapping using AWiFS data**

# *JHELVUM SUB-BASIN*

### AREAL EXTENT OF SNOW (5 DAILY)

**BASIN NAME: JHELUM**

**BASIN AREA: 14472sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
<b>October 2015</b>							
<b>1</b>	01-Oct-15	4491	31	<b>2</b>	03-Oct-15	3724	26
<b>November 2015</b>							
<b>3</b>	01-Nov-15	3169	22	<b>5</b>	08-Nov-15	4552	31
<b>4</b>	06-Nov-15	3933	27	<b>6</b>	15-Nov-15	1849	13
<b>December 2015</b>							
<b>7</b>	04-Dec-15	2678	19	<b>9</b>	07-Dec-15	2584	18
<b>8</b>	05-Dec-15	2869	20				
<b>January 2016</b>							
<b>10</b>	02-Jan-16	4282	30	<b>12</b>	19-Jan-16	4025	28 (c)
<b>11</b>	05-Jan-16	3970	27 (c)				
<b>February 2016</b>							
<b>13</b>	05-Feb-16	2822	19 (c)	<b>16</b>	17-Feb-16	6229	43
<b>14</b>	10-Feb-16	7439	51 (c)	<b>17</b>	26-Feb-16	4645	32
<b>15</b>	12-Feb-16	7452	51				
<b>March 2016</b>							
<b>18</b>	04-Mar-16	2054	14 (c)	<b>19</b>	07-Mar-16	3107	21 (c)
<b>April 2016</b>							
<b>20</b>	14-Apr-16	3993	28	<b>21</b>	27-Apr-16	2413	17 (c)
<b>May 2016</b>							
<b>22</b>	01-May-16	3039	21	<b>24</b>	06-May-16	2663	18 (c)
<b>23</b>	02-May-16	3039	21				
<b>June 2016</b>							
<b>25</b>	04-Jun-16	1475	10	<b>29</b>	14-Jun-16	737	5 (c)
<b>26</b>	08-Jun-16	983	7	<b>30</b>	18-Jun-16	312	2 (c)
<b>27</b>	09-Jun-16	866	8	<b>31</b>	19-Jun-16	291	2
<b>28</b>	13-Jun-16	521	4 (c)	<b>32</b>	23-Jun-16	216	1 (c)

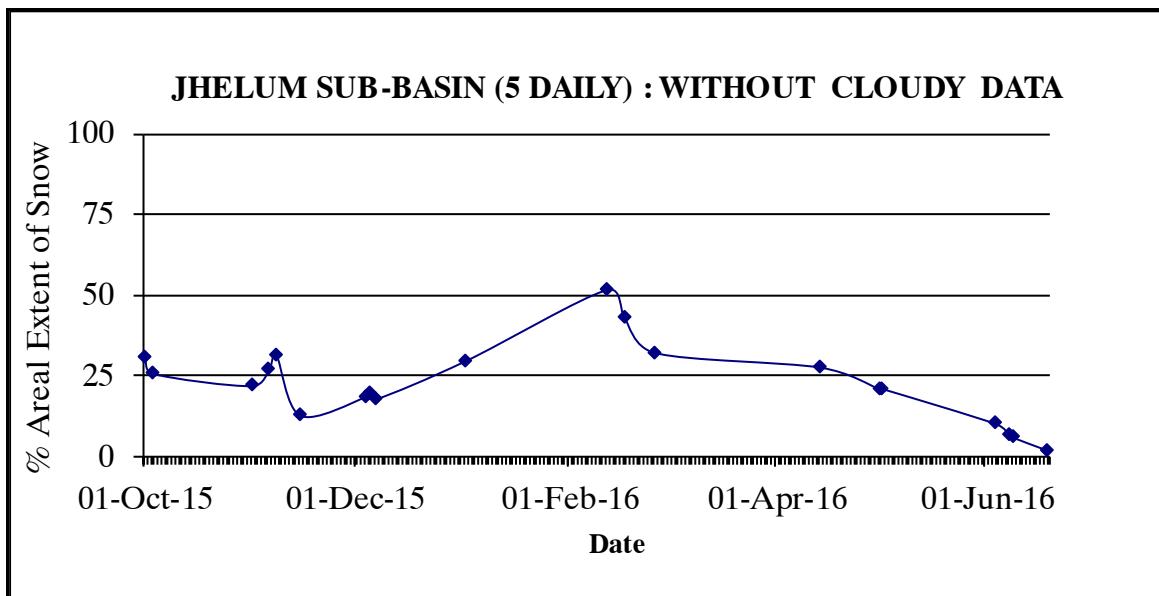
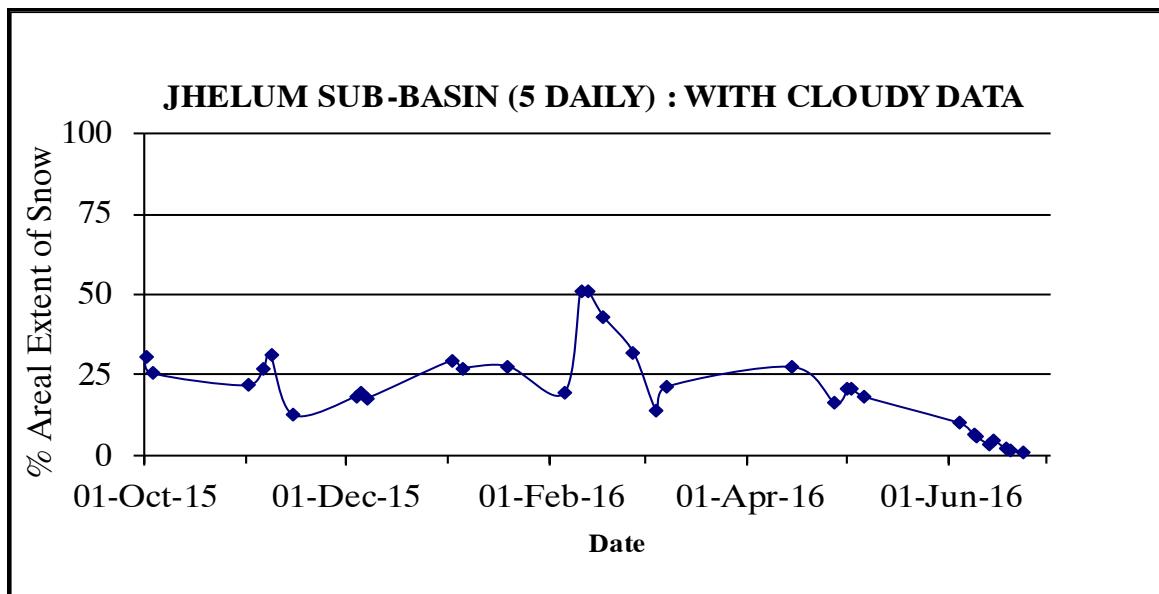
**AREAL EXTENT OF SNOW (10 DAILY)**

**BASIN NAME: JHELUM**

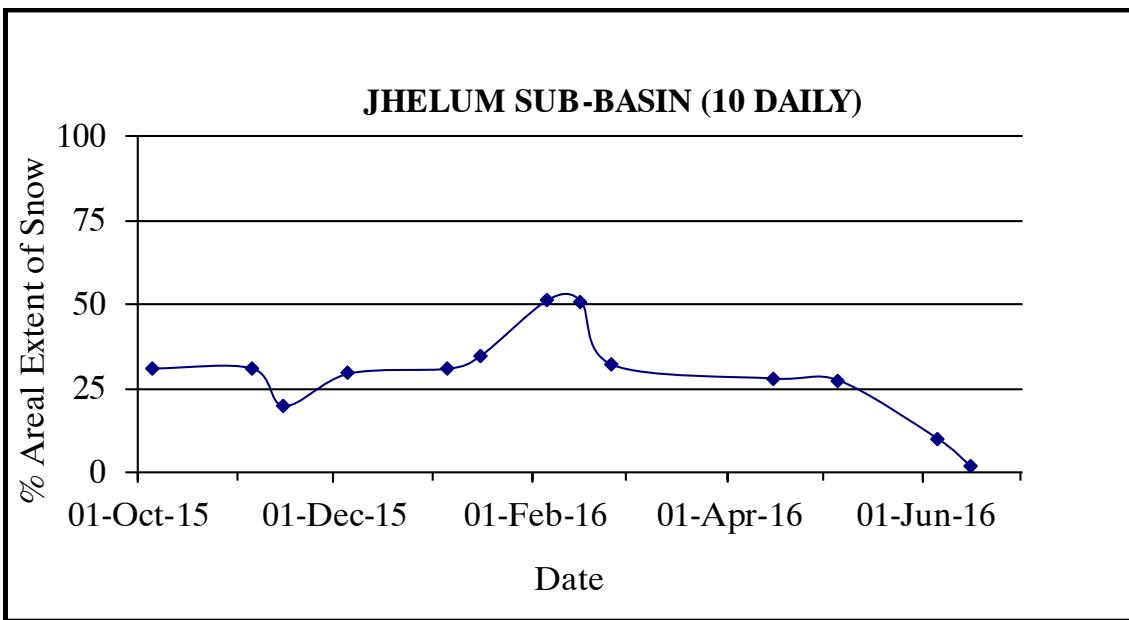
**BASIN AREA:14472 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
<b>October 2015</b>				<b>November 2015</b>			
<b>1</b>	05-Oct-15	4491	31	<b>2</b>	05-Nov-15	3883	31
				<b>3</b>	15-Nov-15	2984	20
<b>December 2015</b>				<b>January 2016</b>			
<b>4</b>	05-Dec-15	2869	29	<b>5</b>	05-Jan-16	4263	31
				<b>6</b>	15-Jan-16	4476	35
<b>February 2016</b>				<b>March 2016</b>			
<b>7</b>	05-Feb-16	5031	51				
<b>8</b>	15-Feb-16	7452	51				
<b>9</b>	25-Feb-16	4587	32				
<b>April 2016</b>				<b>May 2016</b>			
<b>10</b>	15-Apr-16	3893	28	<b>11</b>	05-May-16	2975	27
<b>June 2016</b>							
<b>12</b>	05-Jun-2016	3977	10				
<b>13</b>	15-Jun-2016	105	2				

### SNOW COVER DEPLETION CURVE

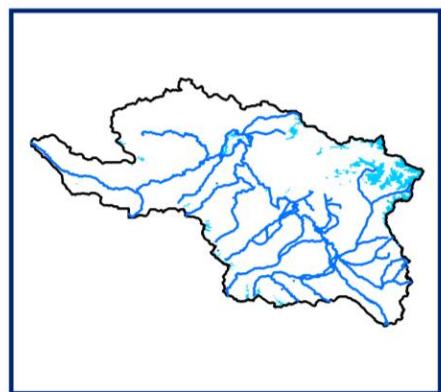


## SNOW COVER DEPLETION CURVE

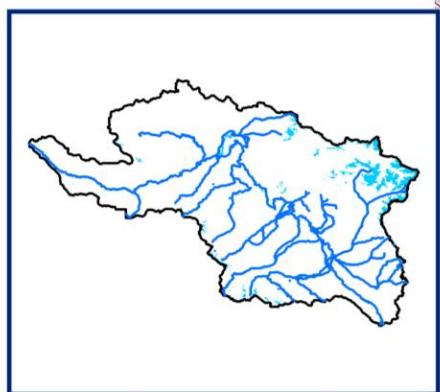


# *SNOW COVER MAP*

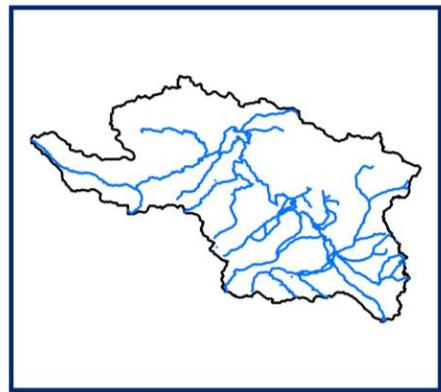
**SNOW COVER MAP : JHELUM SUB-BASIN**



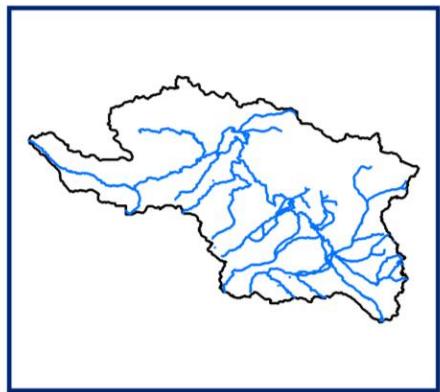
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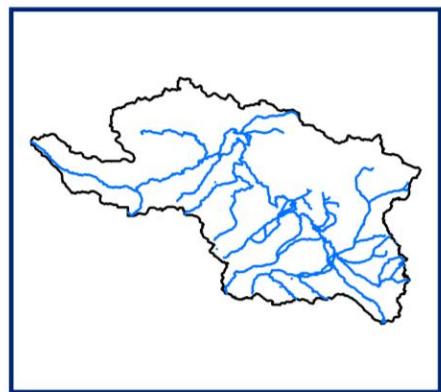
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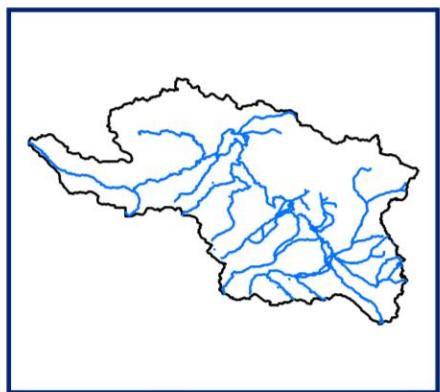
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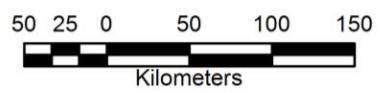
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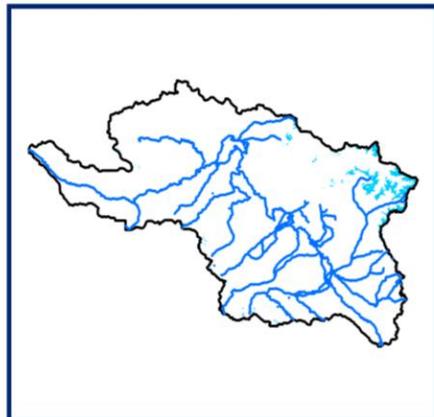
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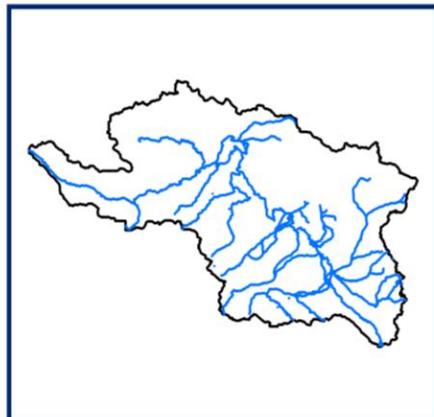
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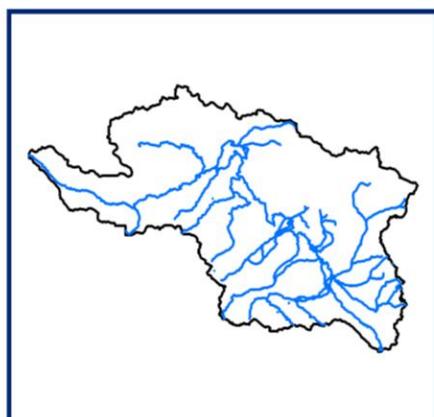
## 10 DAILY SNOW COVER MAP : JHELUM SUB-BASIN



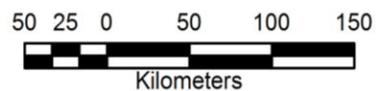
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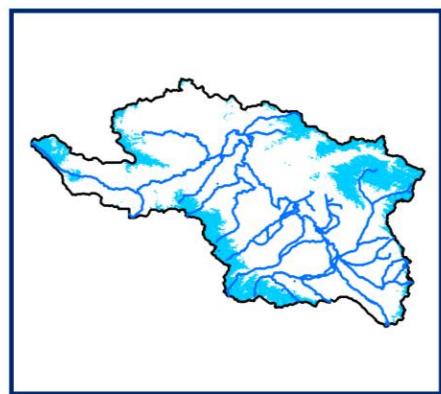
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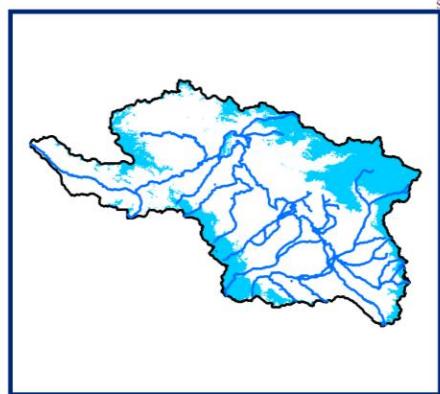
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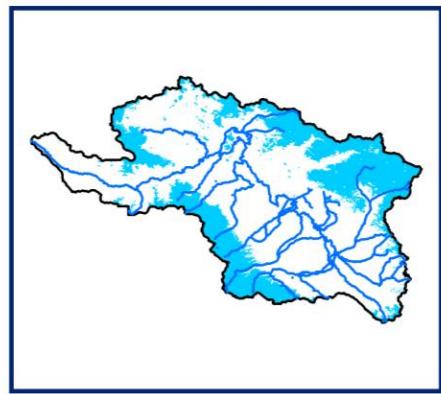
**SNOW COVER MAP : JHELUM SUB-BASIN**



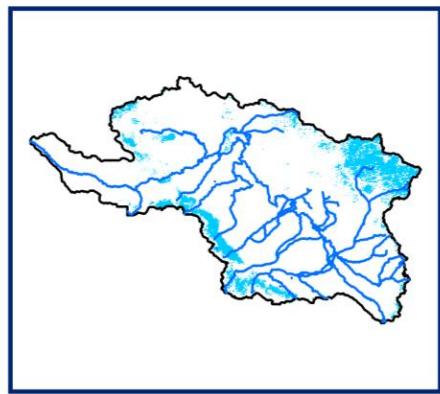
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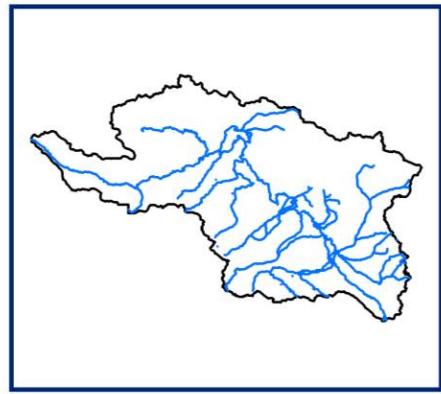
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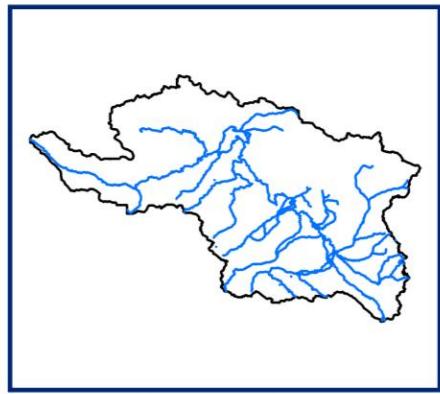
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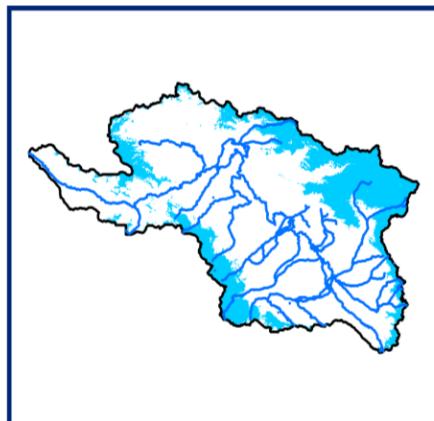
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## 10 DAILY SNOW COVER MAP : JHELUM SUB-BASIN

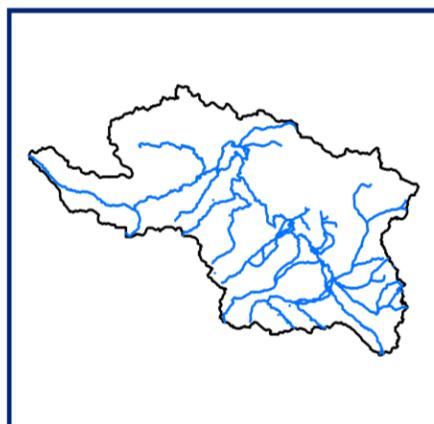


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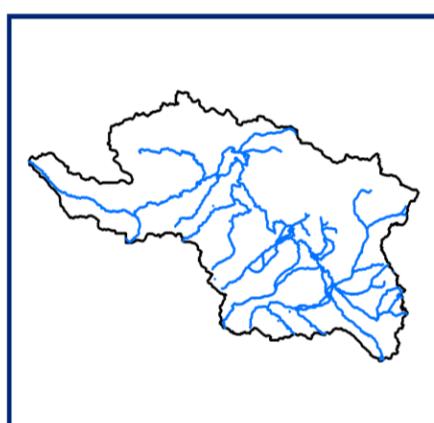
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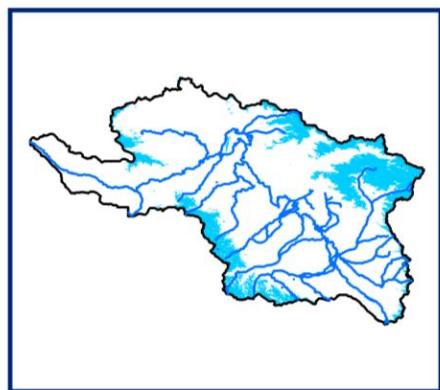
SNOW

A legend entry consisting of a small blue square followed by the word "SNOW".

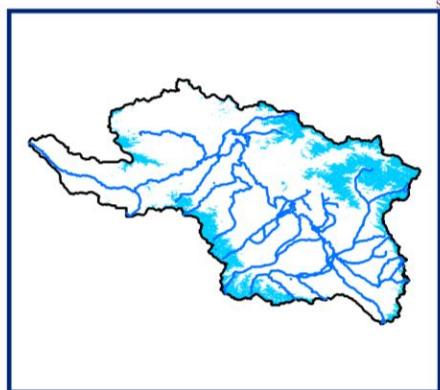
50 25 0 50 100 150  
 Kilometers

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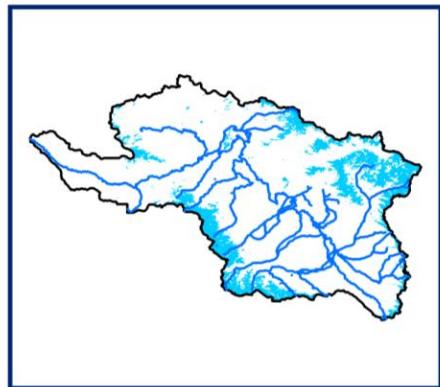
**SNOW COVER MAP : JHELUM SUB-BASIN**



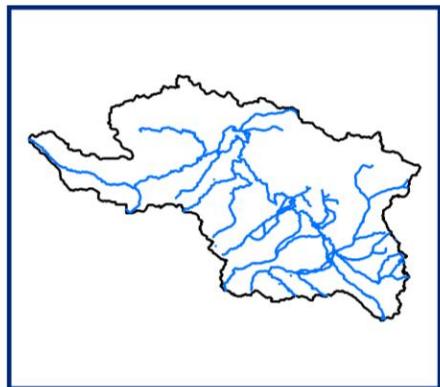
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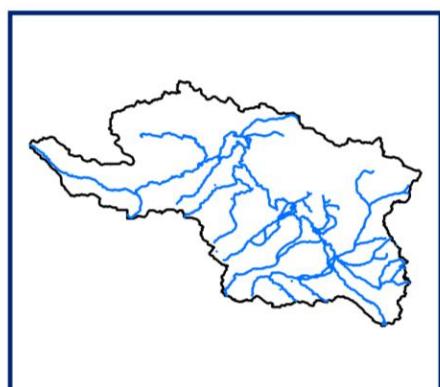
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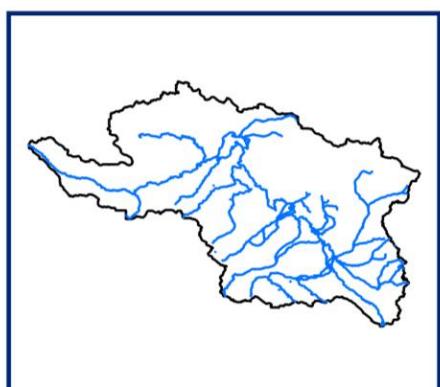
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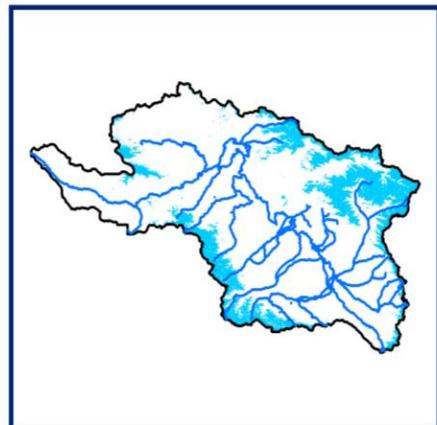


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 **SNOW**

50 25 0 50 100 150  
  
Kilometers

## 10 DAILY SNOW COVER MAP : JHELUM SUB-BASIN

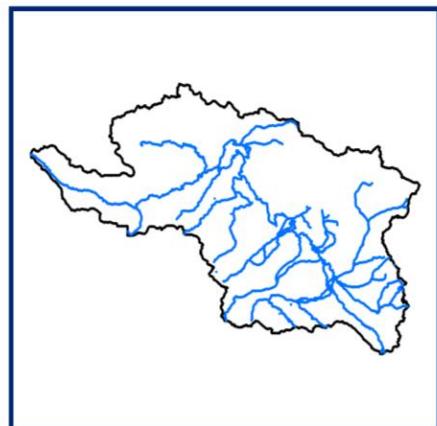


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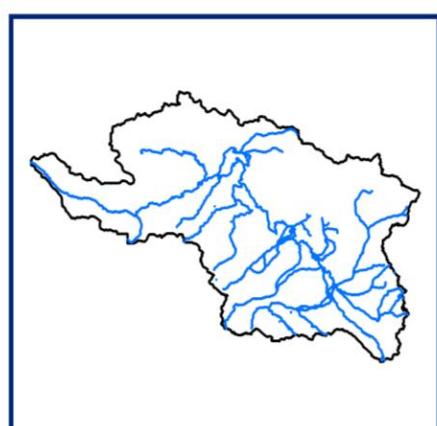
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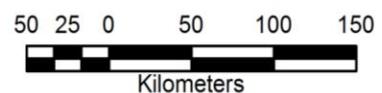
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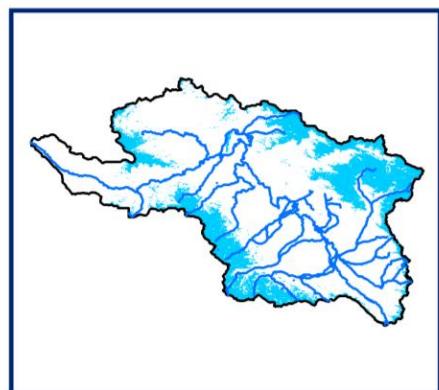
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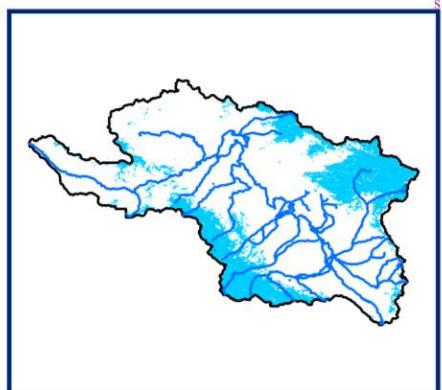
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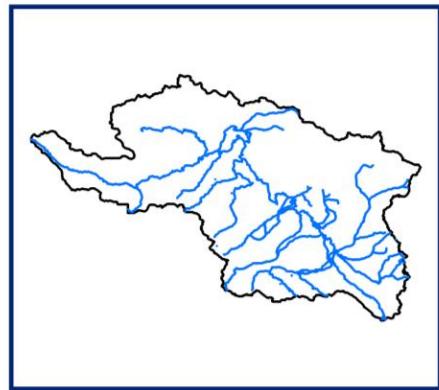
**SNOW COVER MAP : JHELUM SUB-BASIN**



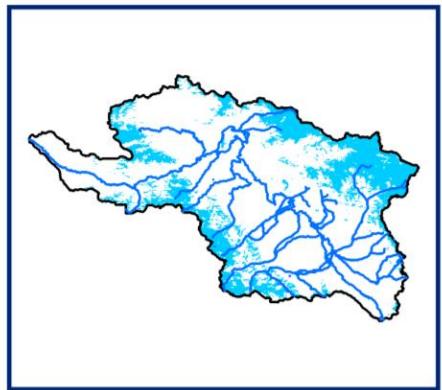
**02 JANUARY 2016**



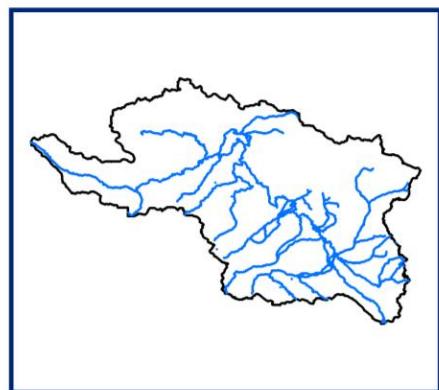
**05 JANUARY 2016**



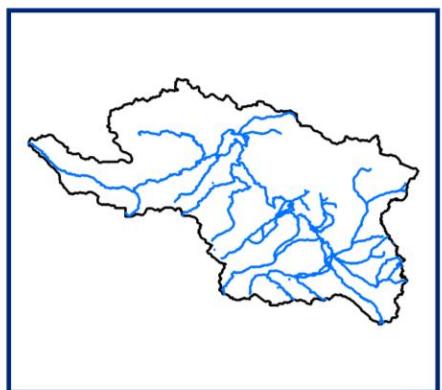
**DATA NOT AVAILABLE**



**19 JANUARY 2016**



**DATA NOT AVAILABLE**

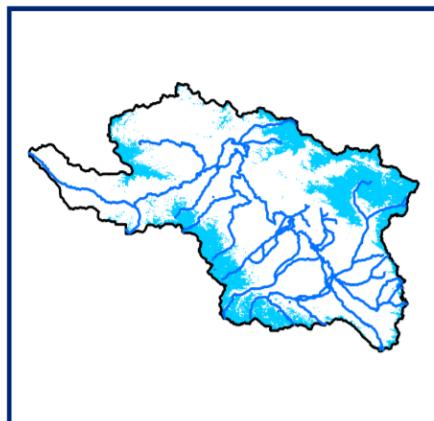


**DATA NOT AVAILABLE**

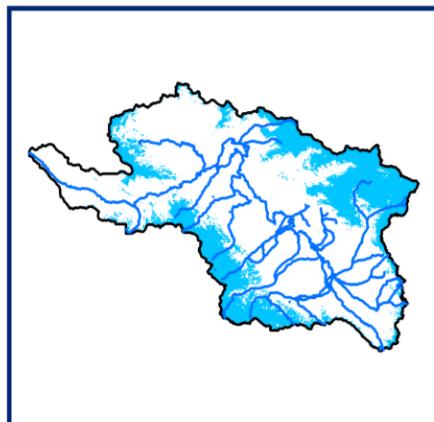
 SNOW

50 25 0 50 100 150  
  
Kilometers

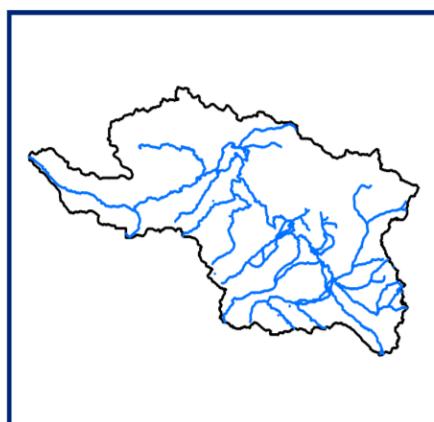
## 10 DAILY SNOW COVER MAP : JHELUM SUB-BASIN



DATA USED  
**02 JANUARY 2016**  
**05 JANUARY 2016**



DATA USED  
**15 JANUARY 2016**

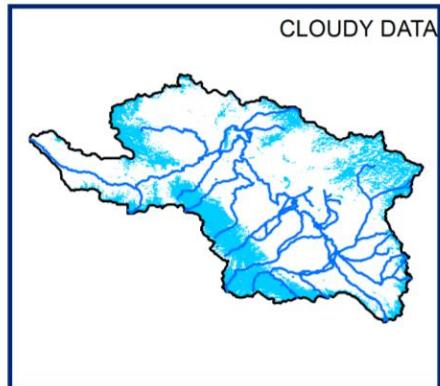


**DATA NOT AVAILABLE**

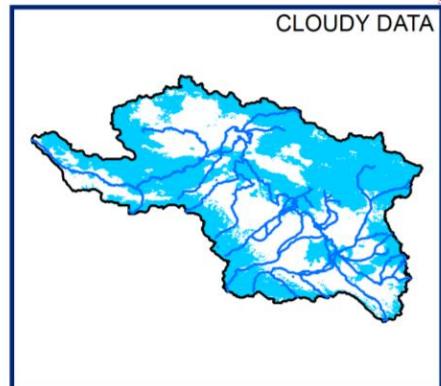
SNOW

50 25 0 50 100 150  
Kilometers

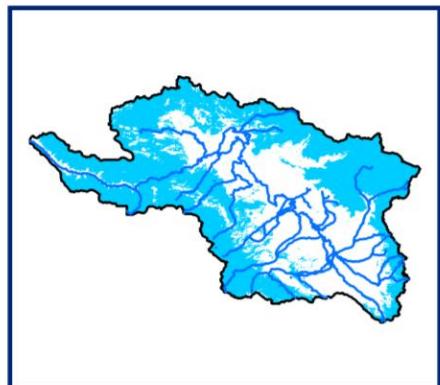
**SNOW COVER MAP : JHELUM SUB-BASIN**



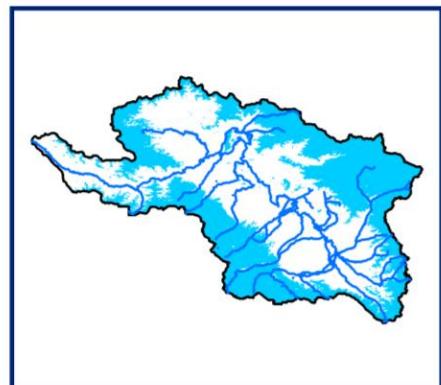
05 FEBRUARY 2016



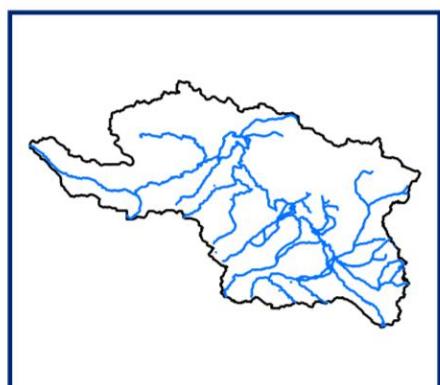
10 FEBRUARY 2016



12 FEBRUARY 2016



17 FEBRUARY 2016

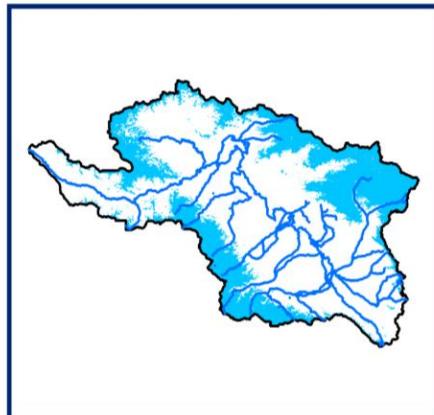


DATA NOT AVAILABLE

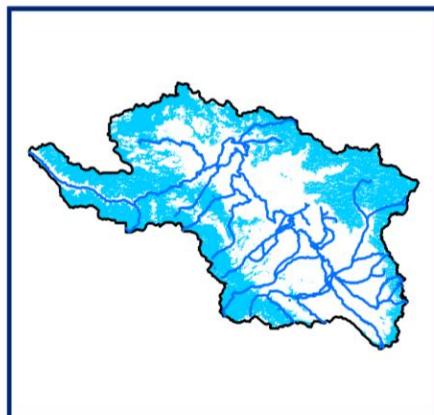
SNOW

50 25 0 50 100 150  
Kilometers

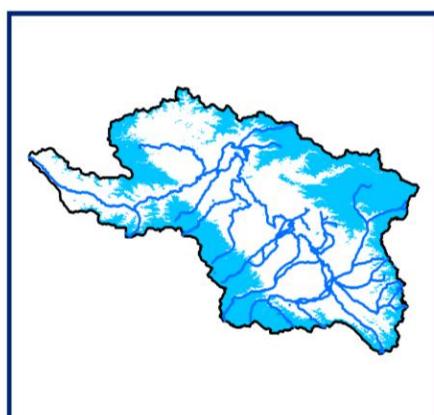
## 10 DAILY SNOW COVER MAP : JHELUM SUB-BASIN



DATA USED  
**05 FEBRUARY 2016**  
**10 FEBRUARY 2016**



DATA USED  
**12 FEBRUARY 2016**  
**17 FEBRUARY 2016**

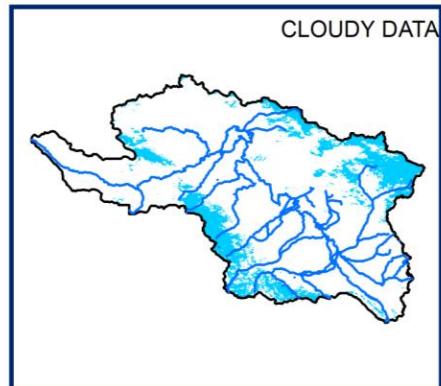


DATA USED  
**25 FEBRUARY 2016**

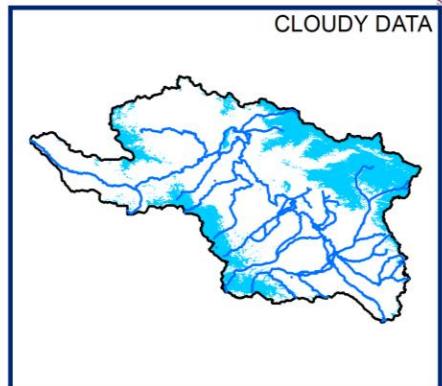
 SNOW

50 25 0 50 100 150  
  
Kilometers

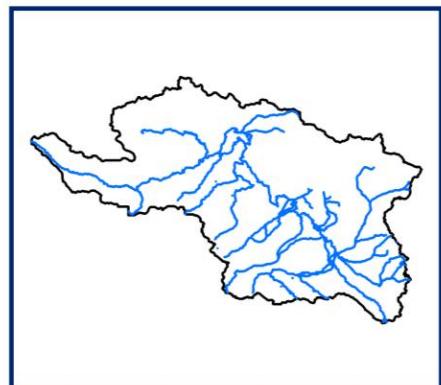
**SNOW COVER MAP : JHELUM SUB-BASIN**



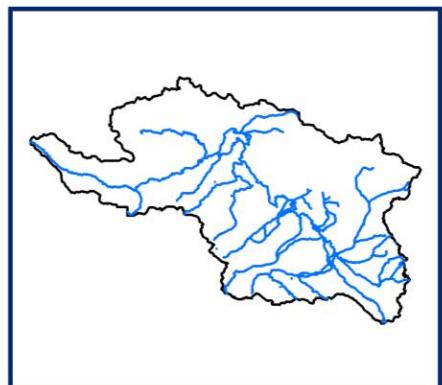
04 MARCH 2016



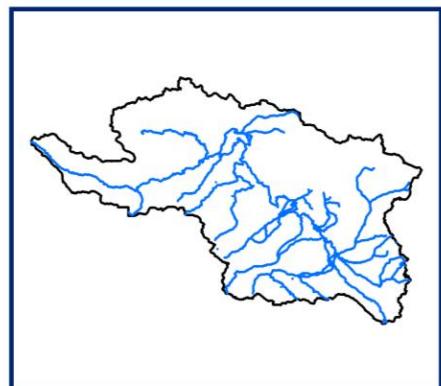
07 MARCH 2016



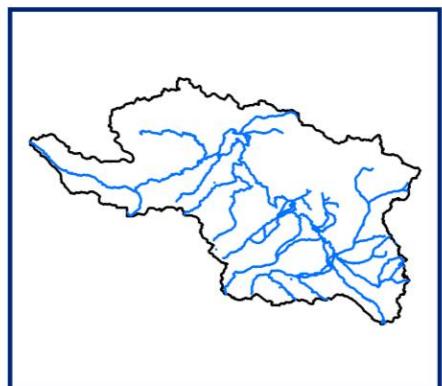
DATA NOT AVAILABLE



DATA NOT AVAILABLE



DATA NOT AVAILABLE



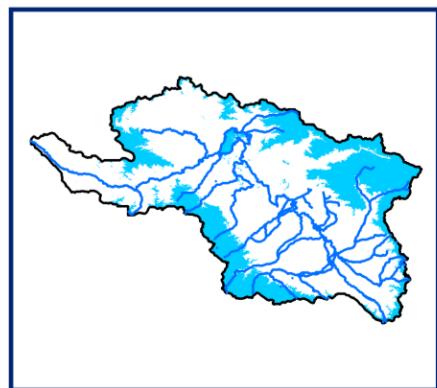
DATA NOT AVAILABLE

SNOW

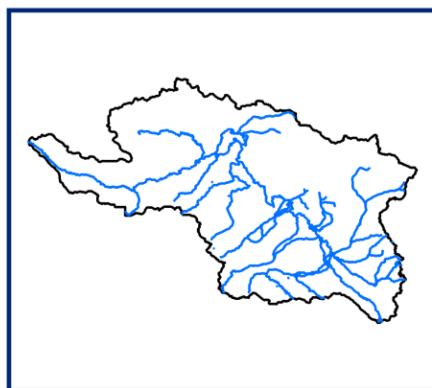
50 25 0 50 100 150  
Kilometers



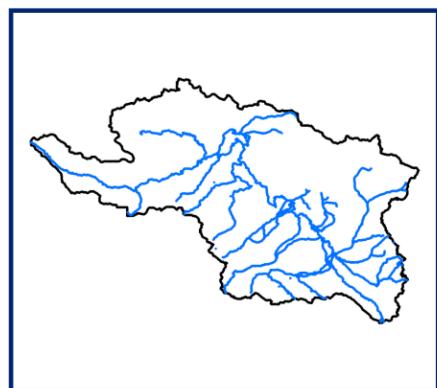
**SNOW COVER MAP : JHELUM SUB-BASIN**



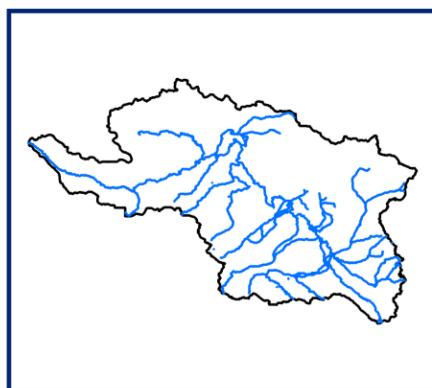
**14 APRIL 2016**



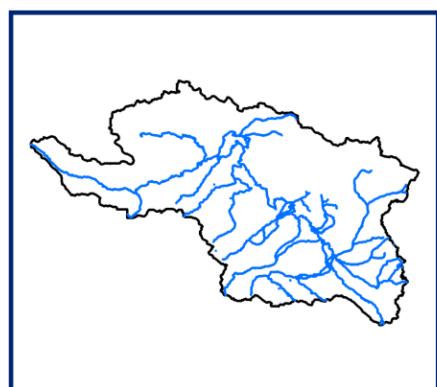
**DATA NOT AVAILABLE**



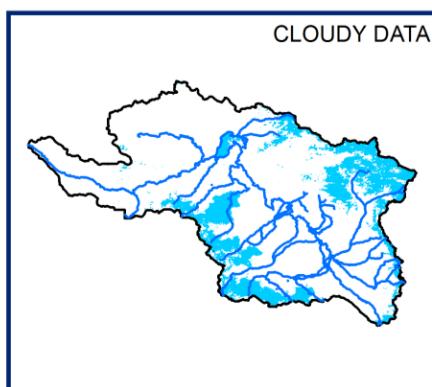
**DATA NOT AVAILABLE**



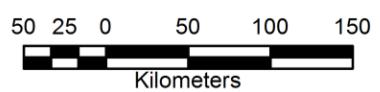
**DATA NOT AVAILABLE**



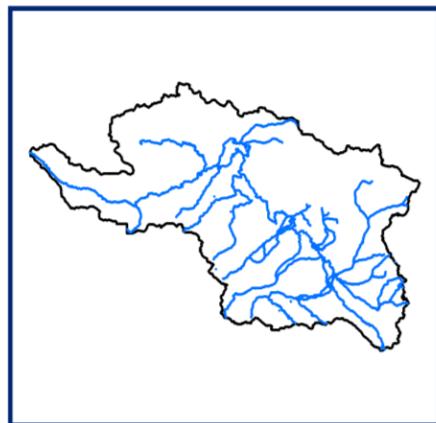
**DATA NOT AVAILABLE**



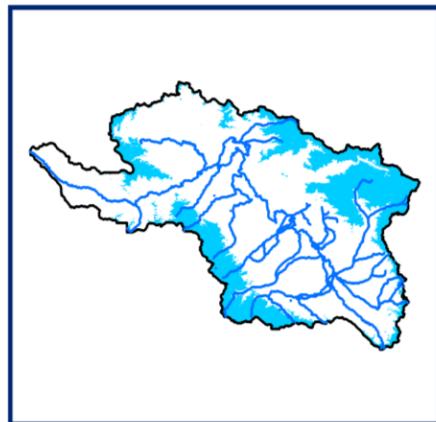
**27 APRIL 2016**



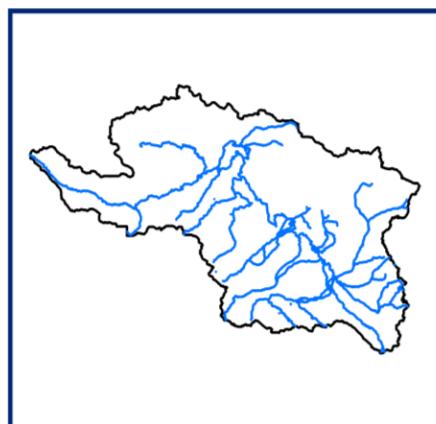
## 10 DAILY SNOW COVER MAP : JHELUM SUB-BASIN



DATA NOT AVAILABLE



DATA USED  
15 APRIL 2016

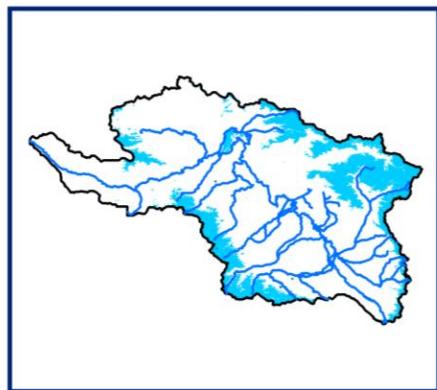


DATA NOT AVAILABLE

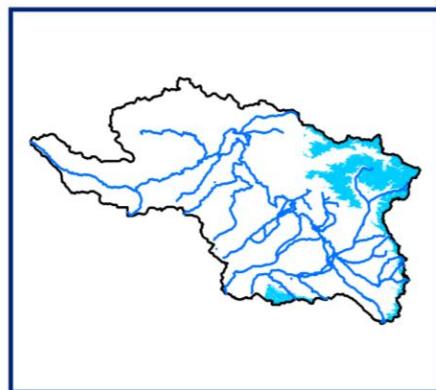
 SNOW

50 25 0 50 100 150  
Kilometers

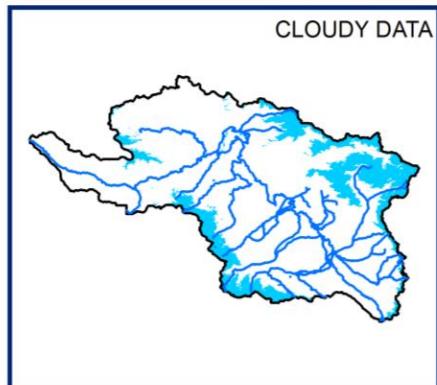
**SNOW COVER MAP : JHELUM SUB-BASIN**



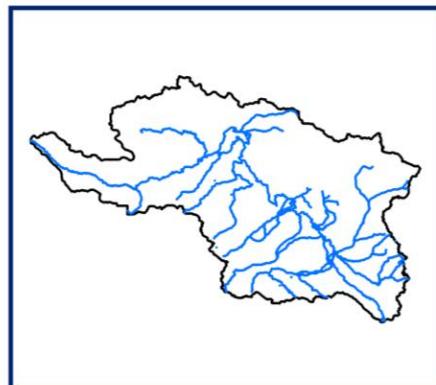
**01 MAY 2016**



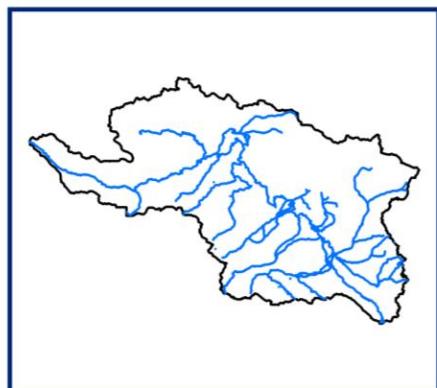
**02 MAY 2016**



**06 MAY 2016**



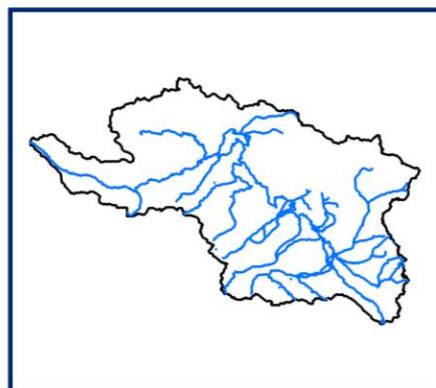
**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**



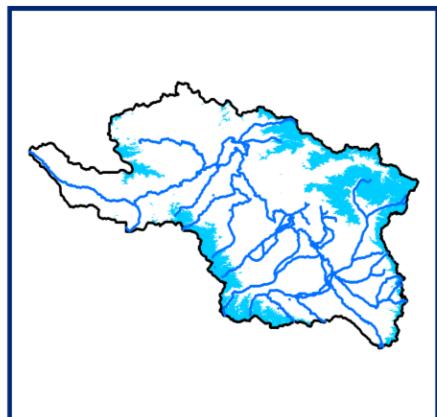
**SNOW**



**DATA NOT AVAILABLE**



## 10 DAILY SNOW COVER MAP : JHELUM SUB-BASIN

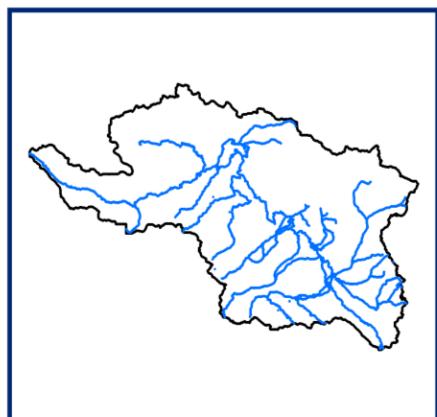


DATA USED

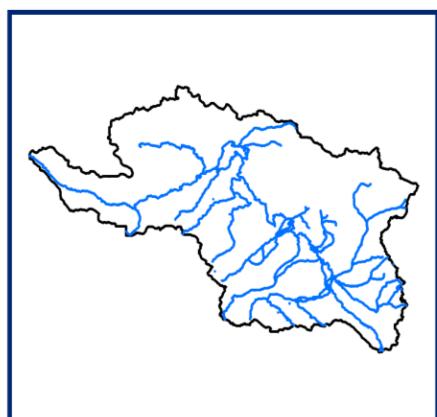
**01 MAY 2016**

**02 MAY 2016**

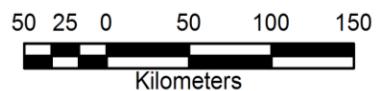
**06 MAY 2016**



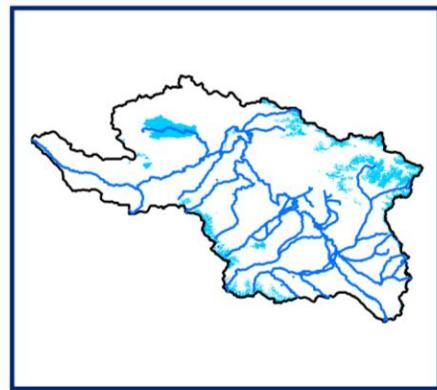
**DATA NOT AVAILABLE**



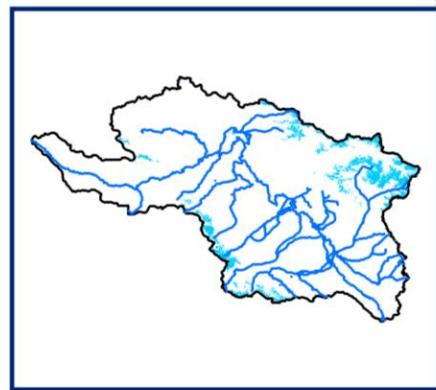
**DATA NOT AVAILABLE**



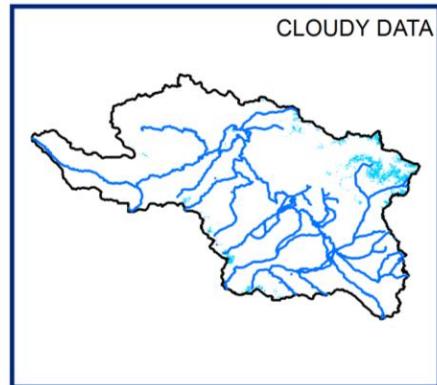
**SNOW COVER MAP : JHELUM SUB-BASIN**



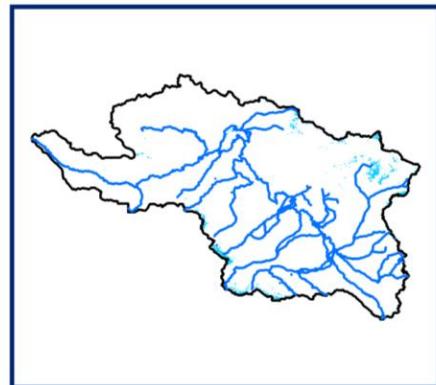
**04 JUNE 2016**



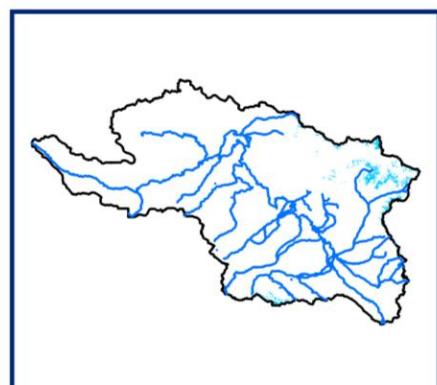
**08 JUNE 2016**



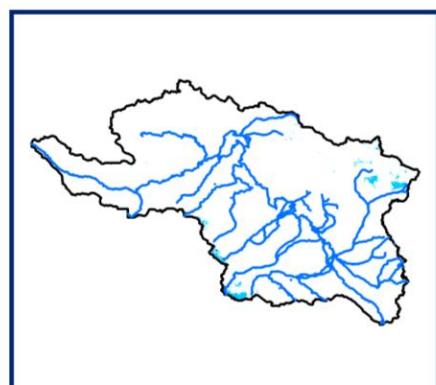
**13 JUNE 2016**



**18 JUNE 2016**



**19 JUNE 2016**

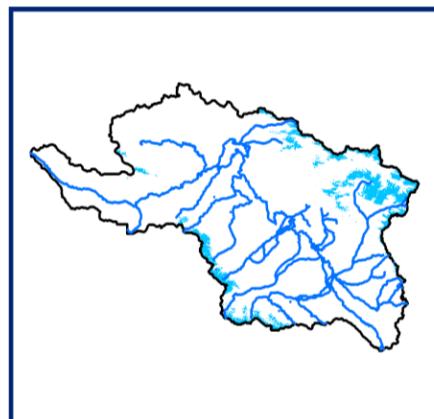


**23 JUNE 2016**

**SNOW**

50 25 0 50 100 150  
 Kilometers

## 10 DAILY SNOW COVER MAP : JHELUM SUB-BASIN

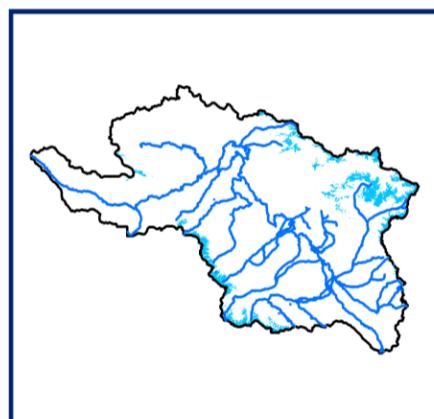


DATA USED

04 JUNE 2016

08 JUNE 2016

09 JUNE 2016

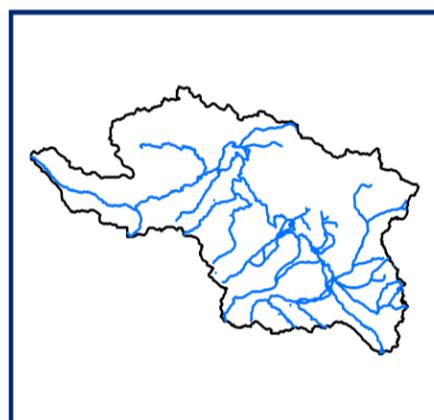


DATA USED

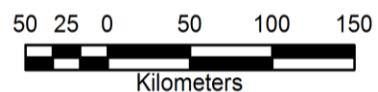
13 JUNE 2016

14 JUNE 2016

19 JUNE 2016



DATA NOT AVAILABLE



# *KISANGANGA SUB-BASIN*

### AREAL EXTENT OF SNOW (5 DAILY)

**BASIN NAME: KISANGANGA**

**BASIN AREA: 7451sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
<b>October 2015</b>							
<b>1</b>	01-Oct-15	1186	16	<b>2</b>	03-Oct-15	1038	14
<b>November 2015</b>							
<b>3</b>	01-Nov-15	5019	67	<b>5</b>	08-Nov-15	5697	76
<b>4</b>	06-Nov-15	5806	78	<b>6</b>	15-Nov-15	3682	49 (c)
<b>December 2015</b>							
<b>7</b>	04-Dec-15	3935	53	<b>8</b>	07-Dec-15	3542	48 (c)
<b>January 2016</b>							
<b>9</b>	02-Jan-16	5430	73	<b>11</b>	19-Jan-16	5758	77
<b>10</b>	05-Jan-16	5580	75 (c)				
<b>February 2016</b>							
<b>12</b>	02-Feb-16	6729	90	<b>15</b>	12-Feb-16	7080	95
<b>13</b>	05-Feb-16	4134	55 (c)	<b>16</b>	17-Feb-16	6184	83
<b>14</b>	09-Feb-16	5738	77	<b>17</b>	26-Feb-16	5683	76
	10-Feb-16	7044	95 (c)				
<b>March 2016</b>							
<b>18</b>	04-Mar-16	4099	55 (c)	<b>20</b>	16-Mar-16	6195	83
<b>19</b>	07-Mar-16	4840	65				
<b>April 2016</b>							
<b>21</b>	07-Apr-16	3872	52 (c)	<b>22</b>	14-Apr-16	5110	69
<b>May 2016</b>							
<b>23</b>	01-May-16	3926	53	<b>24</b>	06-May-16	3730	50
<b>June 2016</b>							
<b>25</b>	04-Jun-16	1791	24	<b>28</b>	13-Jun-16	976	13 (c)
<b>26</b>	08-Jun-16	1703	23	<b>29</b>	18-Jun-16	877	12 (c)
<b>27</b>	09-Jun-16	1462	20	<b>30</b>	23-Jun-16	560	8 (c)

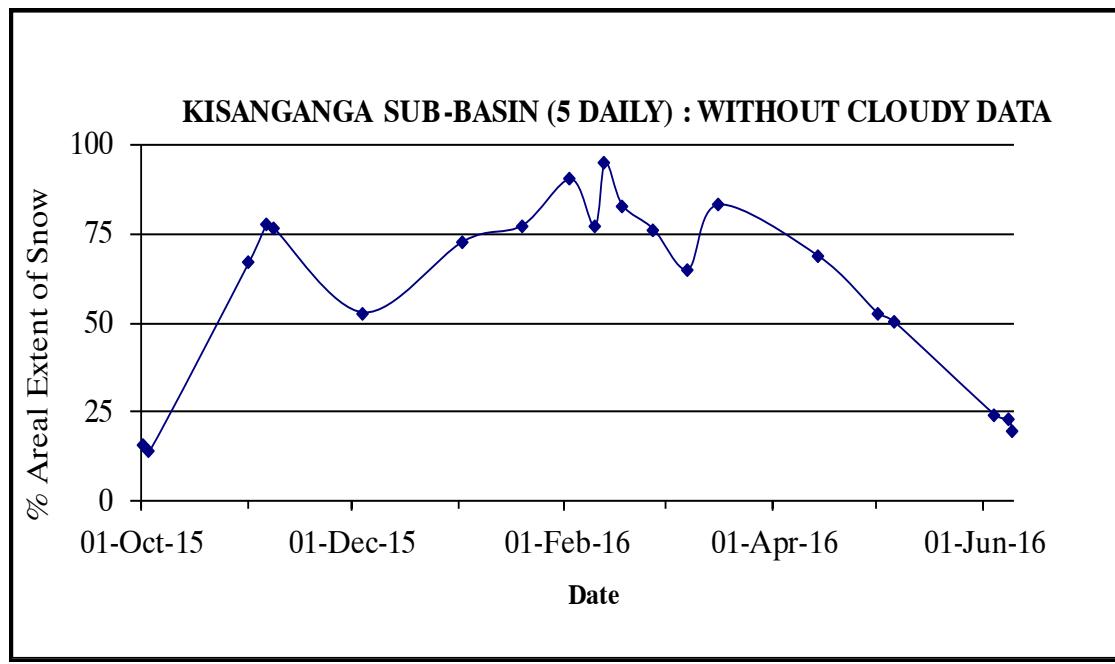
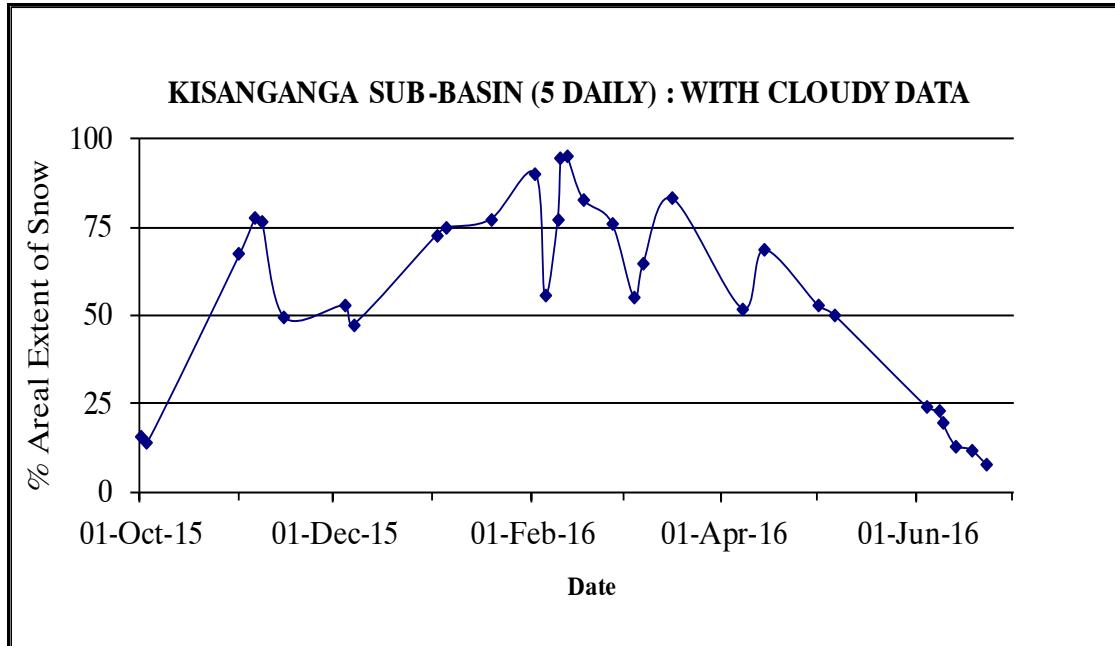
### AREAL EXTENT OF SNOW (10 DAILY)

**BASIN NAME: KISANGANGA**

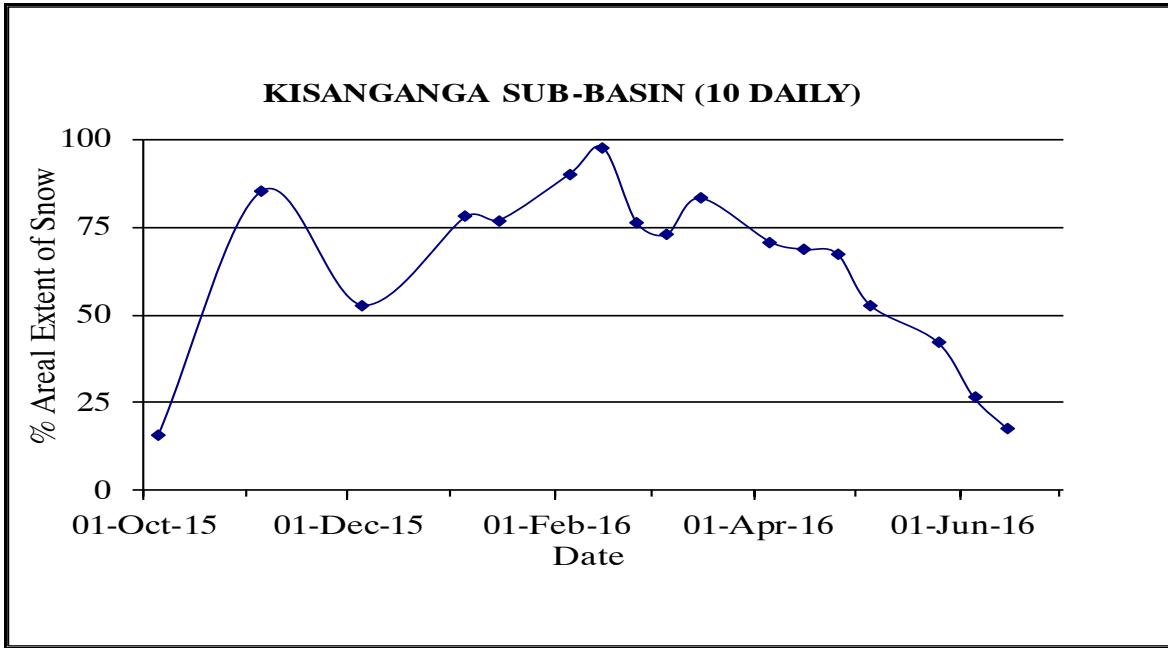
**BASIN AREA: 7451 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
<b>October 2015</b>				<b>November 2015</b>			
<b>1</b>	05-Oct-15	1185	16	<b>2</b>	05-Nov-15	6347	85
<b>December 2015</b>				<b>January 2016</b>			
<b>3</b>	05-Dec-15	3935	53	<b>4</b>	05-Jan-16	5806	78
				<b>5</b>	15-Jan-16	5730	77
				<b>6</b>	25-Jan-16	6706	90
<b>February 2016</b>				<b>March 2016</b>			
<b>7</b>	05-Feb-16	6706	90	<b>10</b>	05-Mar-16	5424	73
<b>8</b>	15-Feb-16	7259	97	<b>11</b>	25-Mar-16	6195	83
<b>9</b>	25-Feb-16	5684	76				
<b>April 2016</b>				<b>May 2016</b>			
<b>12</b>	5-Apr-16	5269	71	<b>15</b>	05-May-16	3925	53
<b>13</b>	15-Apr-16	5110	69	<b>16</b>	25-May-16	3153	42
<b>14</b>	25-Apr-16	5020	67				
<b>June 2016</b>							
<b>17</b>	05-Jun-2016	1971	26				
<b>18</b>	15-Jun-2016	1312	18				

## SNOW COVER DEPLETION CURVE



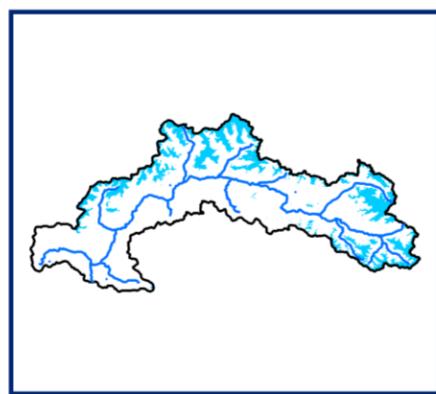
## SNOW COVER DEPLETION CURVE



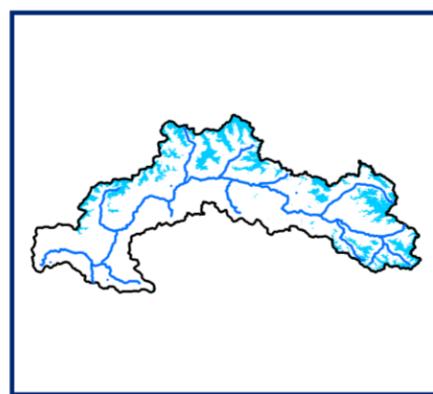
# *SNOW COVER MAP*

**SNOW COVER MAP**

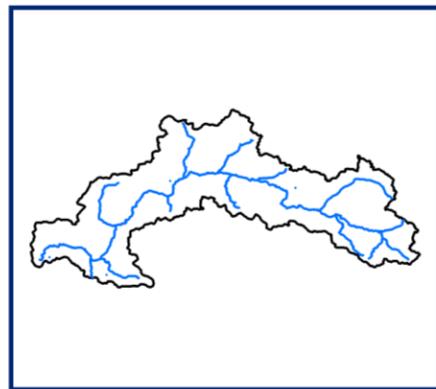
: KISANGANGA SUB-BASIN



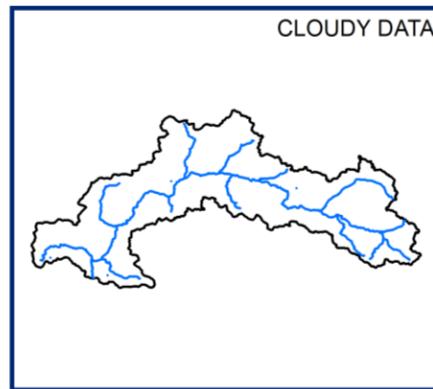
**01 OCTOBER 2015**



**03 OCTOBER 2015**

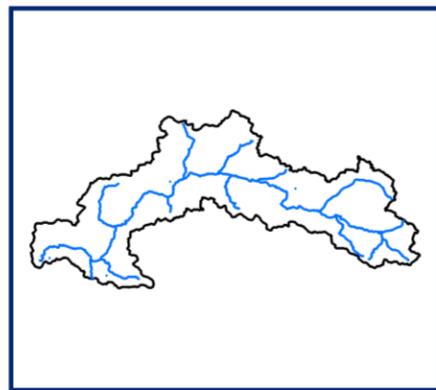


**DATA NOT AVAILABLE**

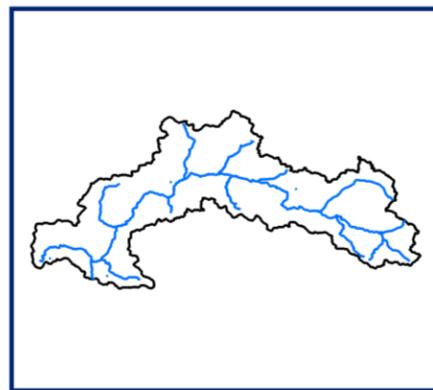


**CLOUDY DATA**

**DATA NOT AVAILABLE**



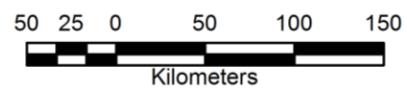
**DATA NOT AVAILABLE**



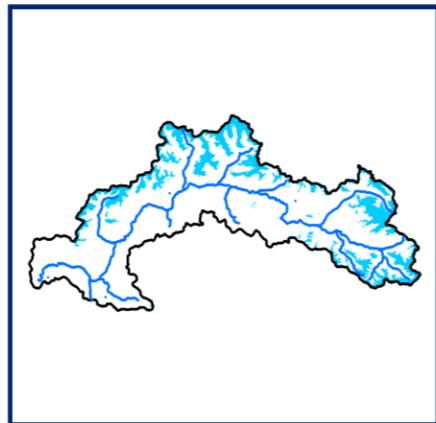
**DATA NOT AVAILABLE**



**SNOW**



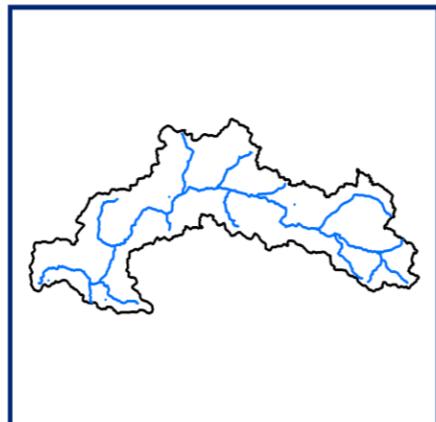
## 10 DAILY SNOW COVER MAP : KISANGANGA SUB-BASIN



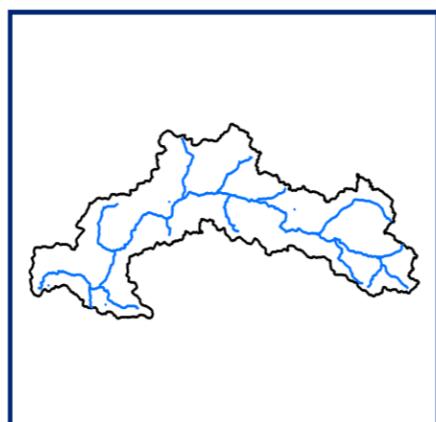
DATA USED

01 OCTOBER 2015

03 OCTOBER 2015



DATA NOT AVAILABLE



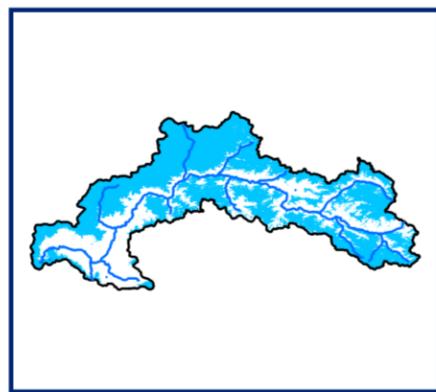
DATA NOT AVAILABLE

SNOW

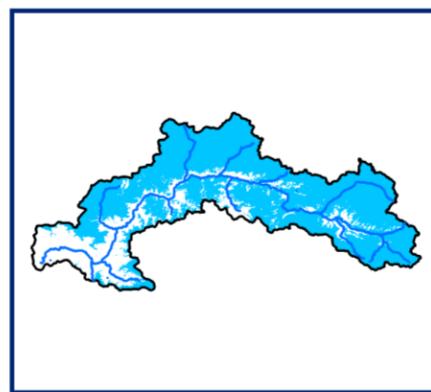
50 25 0 50 100 150  
Kilometers

**SNOW COVER MAP**

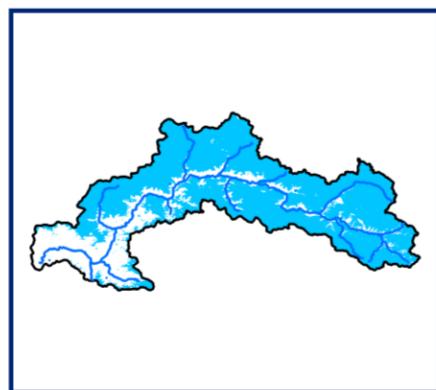
: **KISANGANGA SUB-BASIN**



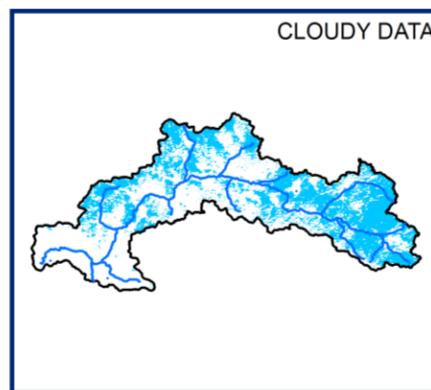
**01 NOVEMBER 2015**



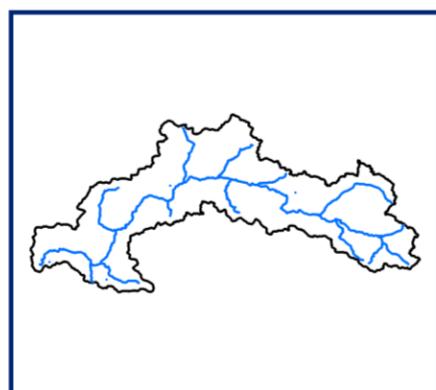
**06 NOVEMBER 2015**



**08 NOVEMBER 2015**

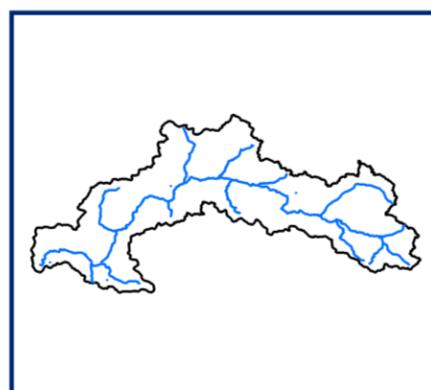


**15 NOVEMBER 2015**



**DATA NOT AVAILABLE**

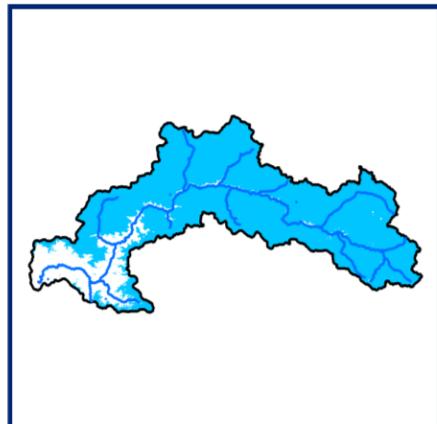
SNOW



**DATA NOT AVAILABLE**

50 25 0 50 100 150  
Kilometers

## 10 DAILY SNOW COVER MAP : KISANGANGA SUB-BASIN

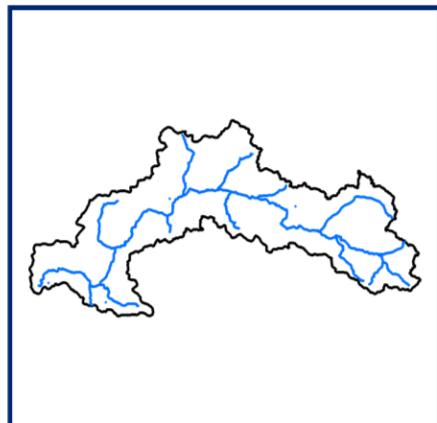


DATA USED

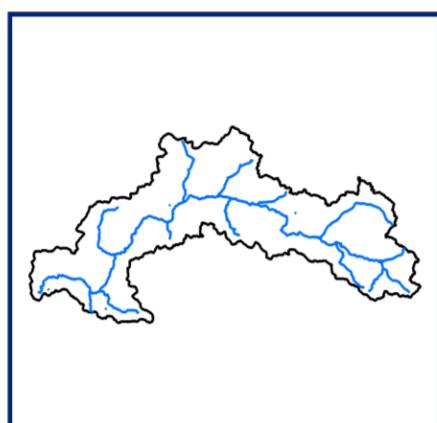
01 NOVEMBER 2015

06 NOVEMBER 2015

08 NOVEMBER 2015



DATA NOT AVAILABLE



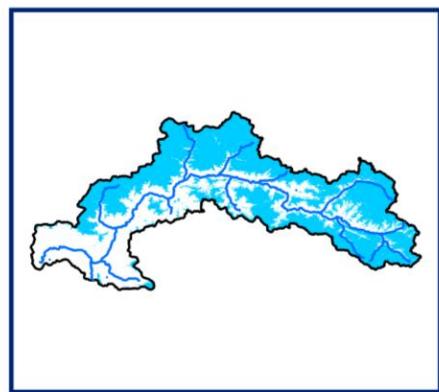
DATA NOT AVAILABLE

SNOW

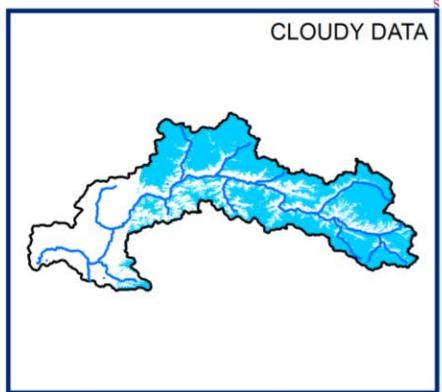
50 25 0 50 100 150  
 Kilometers

**SNOW COVER MAP**

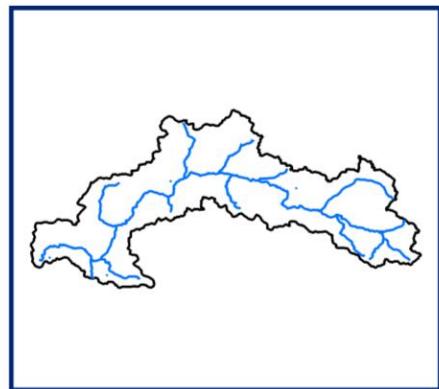
: **KISANGANGA SUB-BASIN**



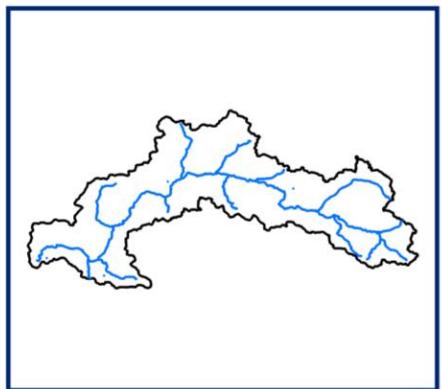
**04 DECEMBER 2015**



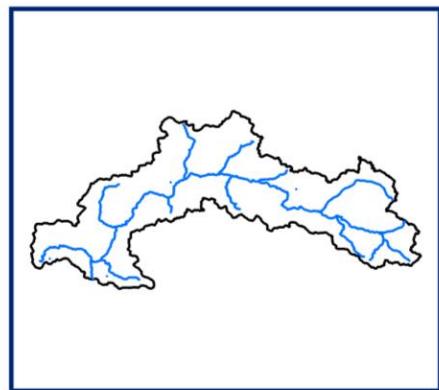
**CLOUDY DATA**  
**07 DECEMBER 2015**



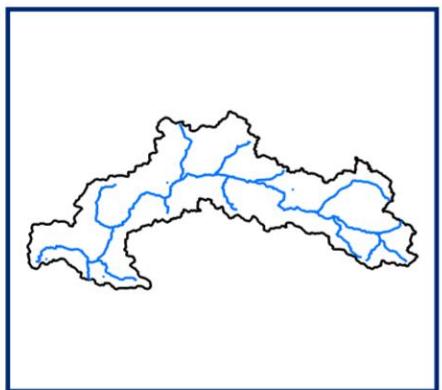
**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**



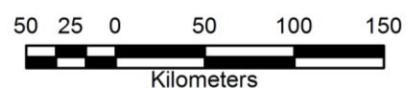
**DATA NOT AVAILABLE**



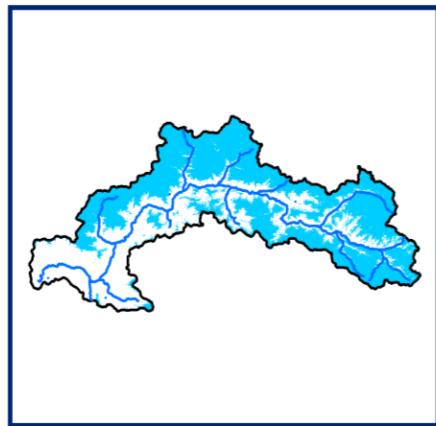
**DATA NOT AVAILABLE**



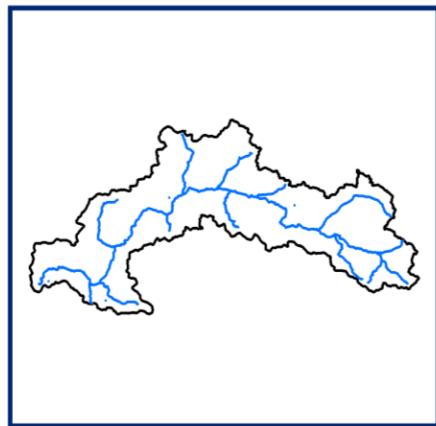
**SNOW**



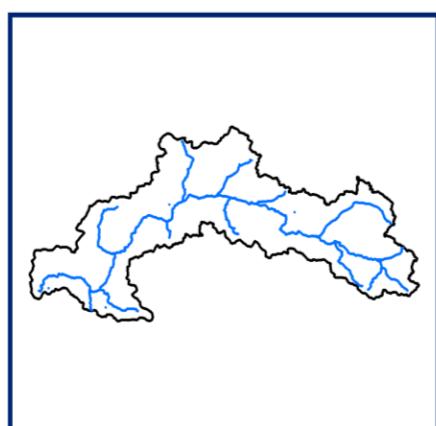
**10 DAILY SNOW COVER MAP : KISANGANGA SUB-BASIN**



**DATA USED**  
**04 DECEMBER 2015**  
**07 DECEMBER 2015**



**DATA NOT AVAILABLE**



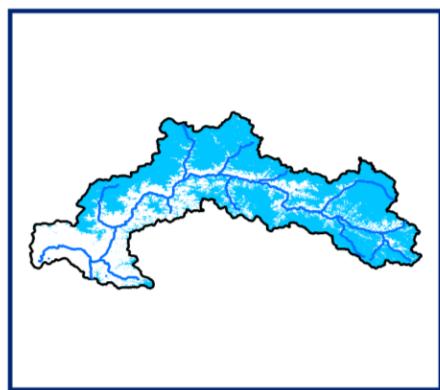
**DATA NOT AVAILABLE**

 **SNOW**

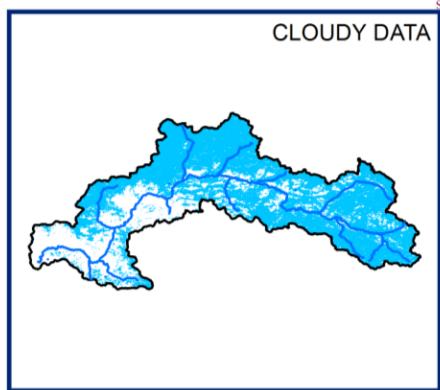
50 25 0 50 100 150  
Kilometers

**SNOW COVER MAP**

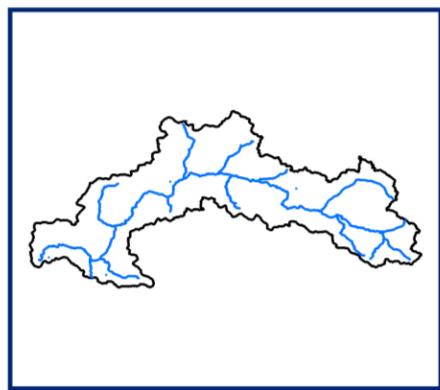
: **KISANGANGA SUB-BASIN**



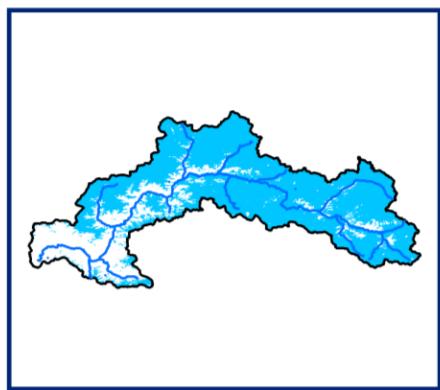
**02 JANUARY 2016**



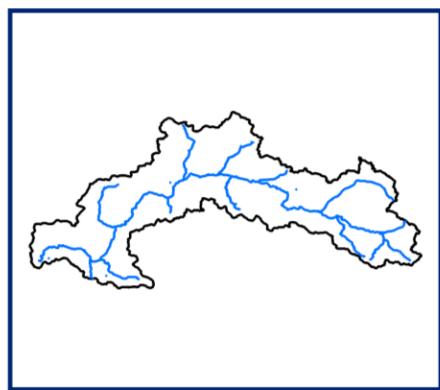
**05 JANUARY 2016**



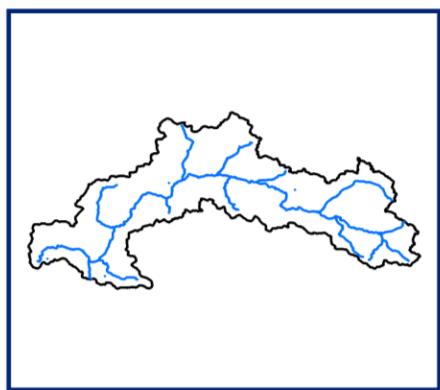
**DATA NOT AVAILABLE**



**19 JANUARY 2016**



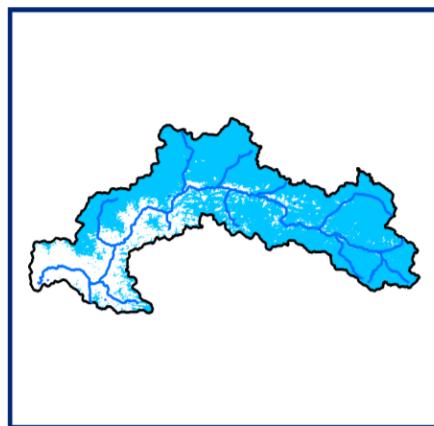
**DATA NOT AVAILABLE**



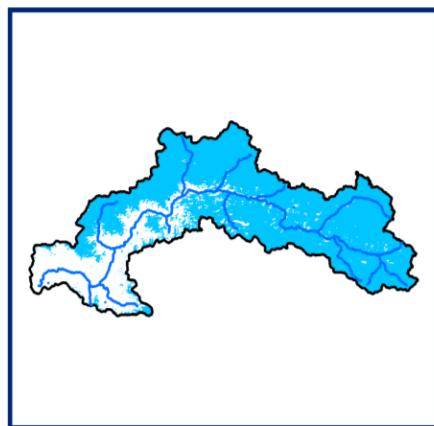
**DATA NOT AVAILABLE**



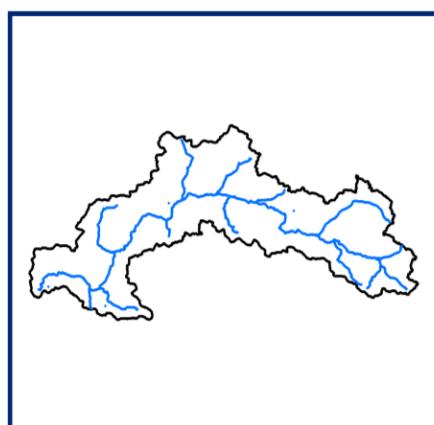
**10 DAILY SNOW COVER MAP : KISANGANGA SUB-BASIN**



**DATA USED**  
**02 JANUARY 2016**  
**05 JANUARY 2016**



**DATA USED**  
**15 JANUARY 2016**



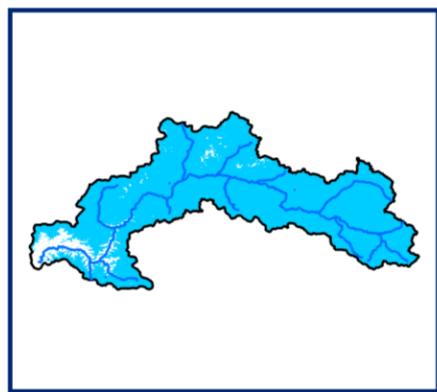
**DATA NOT AVAILABLE**

 **SNOW**

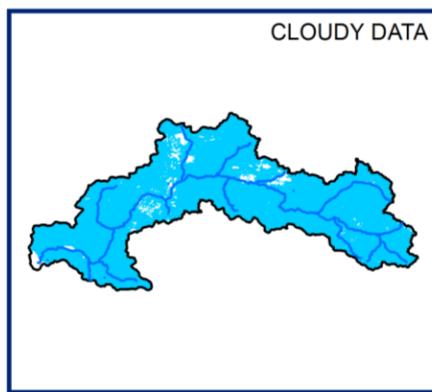
50 25 0 50 100 150  
Kilometers

**SNOW COVER MAP**

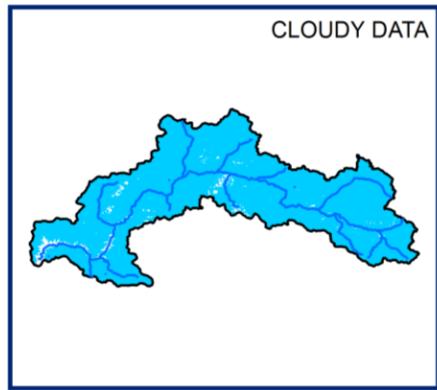
: **KISANGANGA SUB-BASIN**



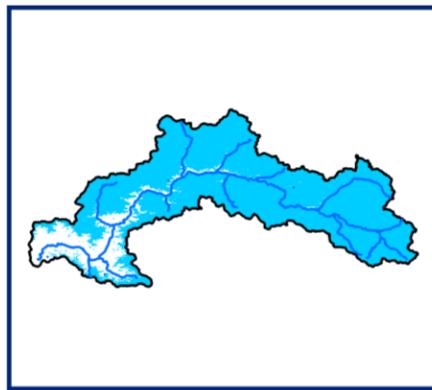
**02 FEBRUARY 2016**



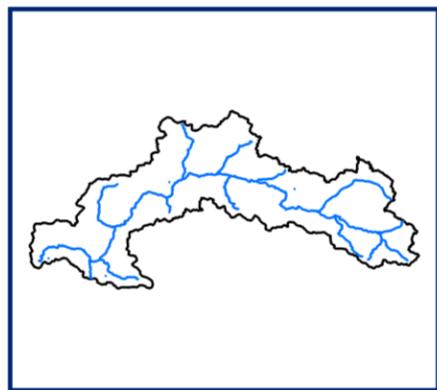
**10 FEBRUARY 2016**



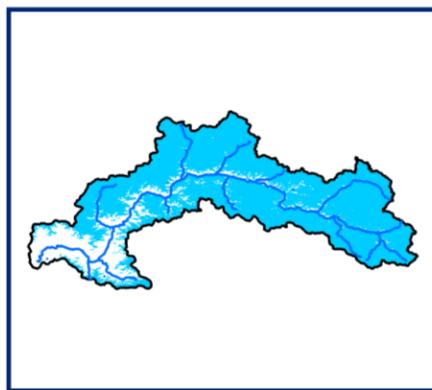
**12 FEBRUARY 2016**



**17 FEBRUARY 2016**



**DATA NOT AVAILABLE**

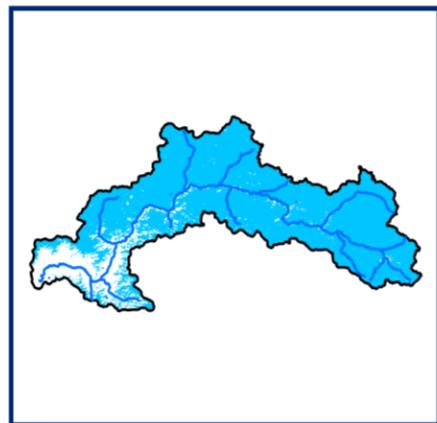


**26 FEBRUARY 2016**

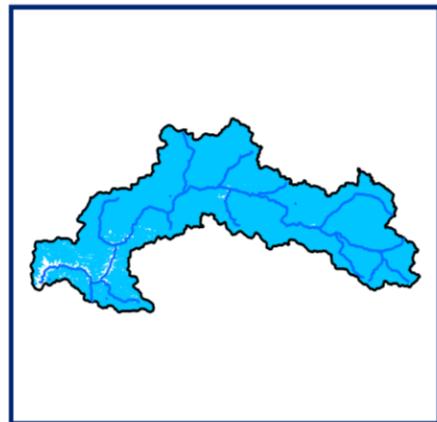
 **SNOW**

50 25 0 50 100 150  
Kilometers

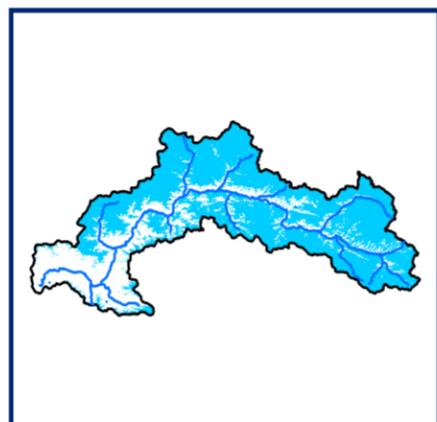
## 10 DAILY SNOW COVER MAP : KISANGANGA SUB-BASIN



DATA USED  
**02 FEBRUARY 2016**  
**05 FEBRUARY 2016**  
**09 FEBRUARY 2016**

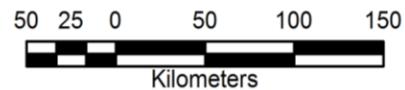


DATA USED  
**12 FEBRUARY 2016**  
**17 FEBRUARY 2016**



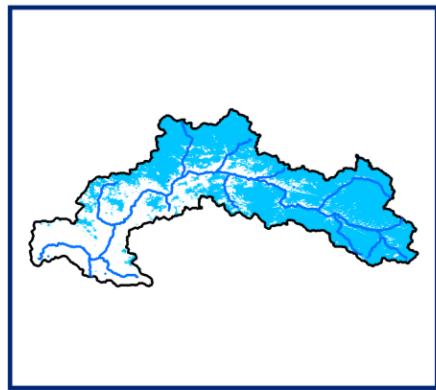
DATA USED  
**25 FEBRUARY 2016**

SNOW

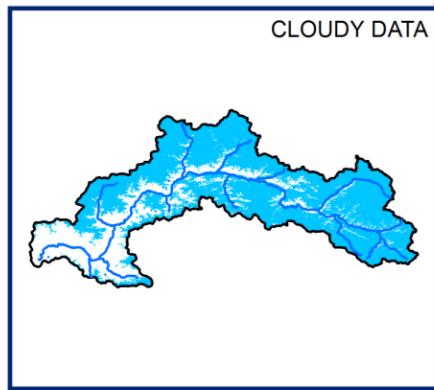


## SNOW COVER MAP

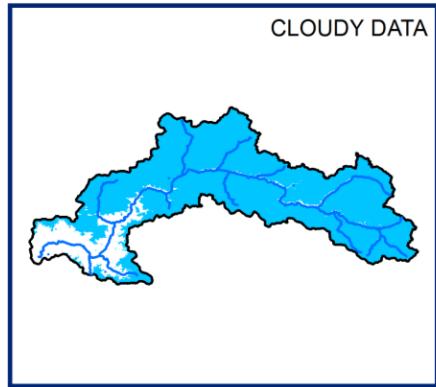
: KISANGANGA SUB-BASIN



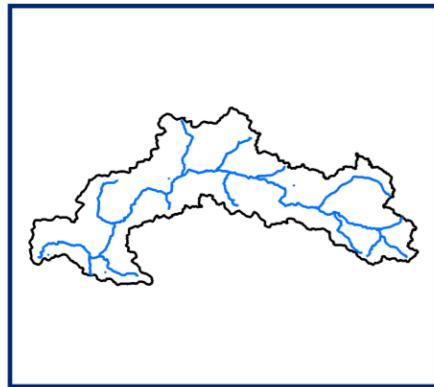
04 MARCH 2016



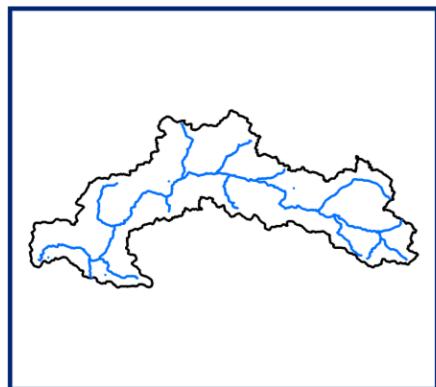
07 MARCH 2016



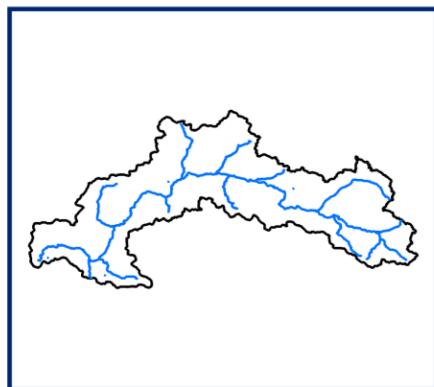
16 MARCH 2016



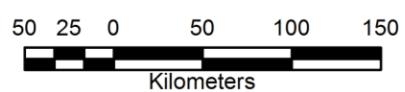
DATA NOT AVAILABLE



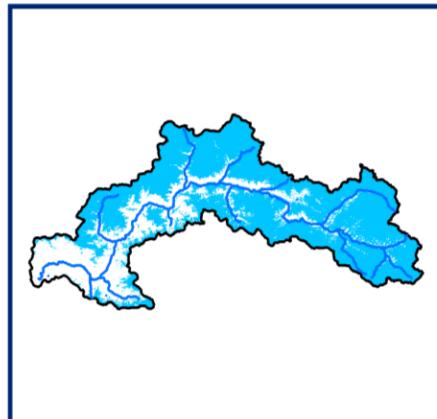
DATA NOT AVAILABLE



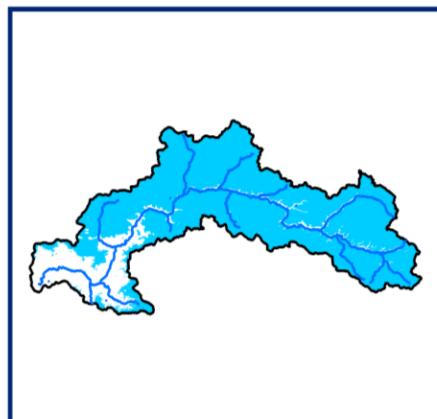
DATA NOT AVAILABLE



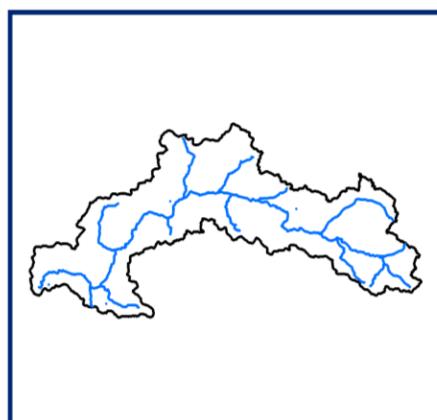
## 10 DAILY SNOW COVER MAP : KISANGANGA SUB-BASIN



DATA USED  
**04 MARCH 2016**  
**07 MARCH 2016**



DATA USED  
**15 MARCH 2016**



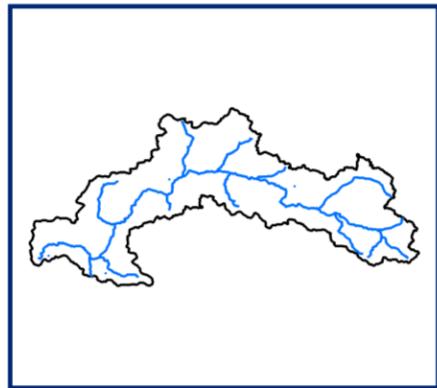
**DATA NOT AVAILABLE**

SNOW

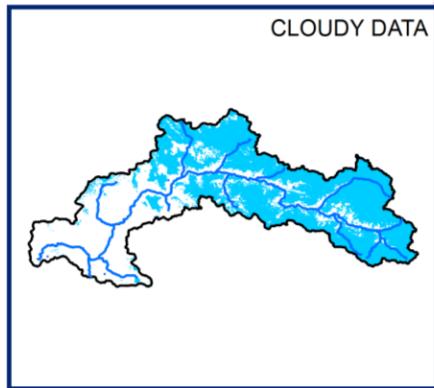
50 25 0 50 100 150  
Kilometers

**SNOW COVER MAP**

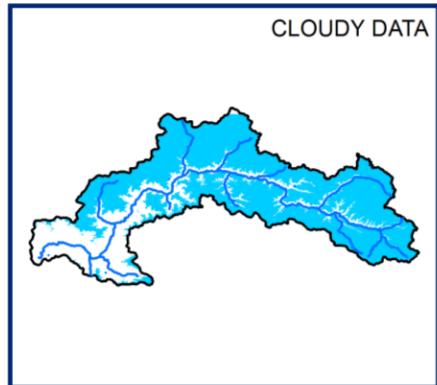
: **KISANGANGA SUB-BASIN**



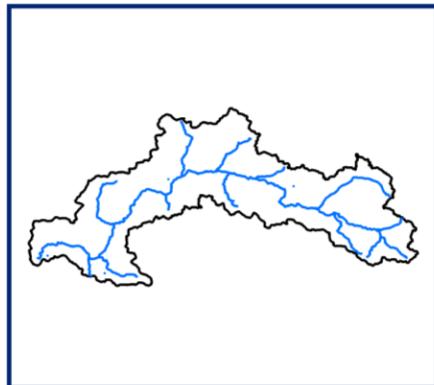
**DATA NOT AVAILABLE**



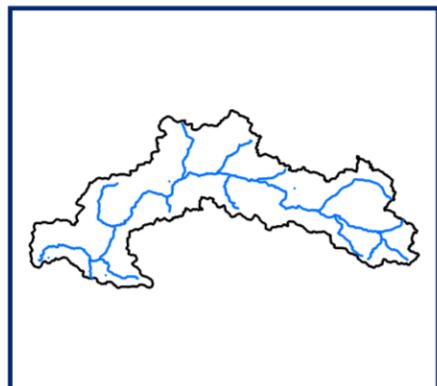
**07 APRIL 2016**



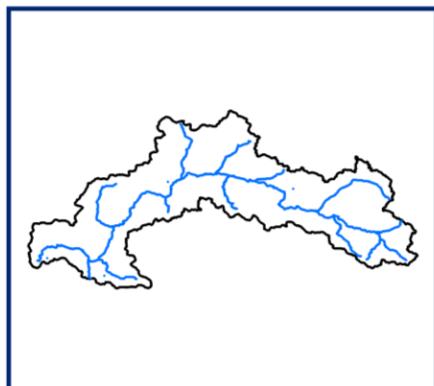
**14 APRIL 2016**



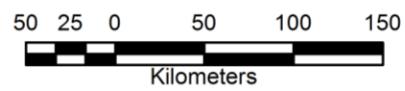
**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**



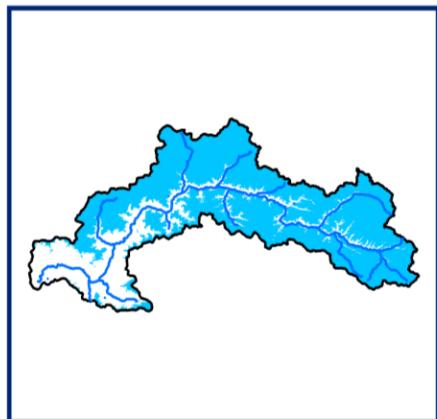
**DATA NOT AVAILABLE**



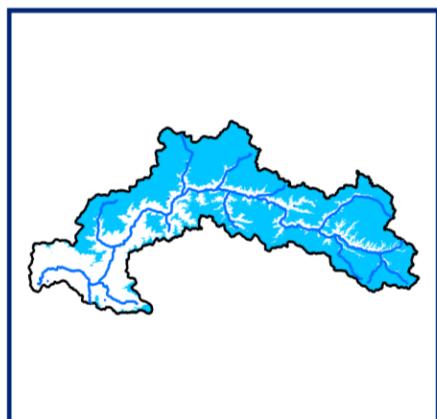
**10 DAILY SNOW COVER MAP : KISANGANGA SUB-BASIN**



**DATA USED  
05 APRIL 2016**



**DATA USED  
15 APRIL 2016**



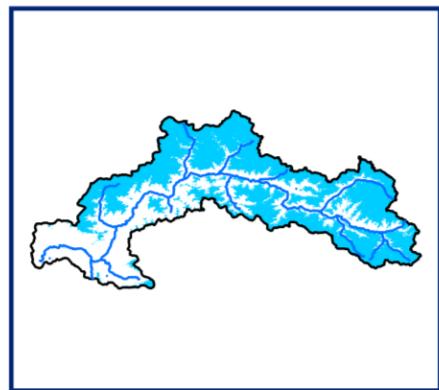
**DATA USED  
25 APRIL 2016**

 SNOW

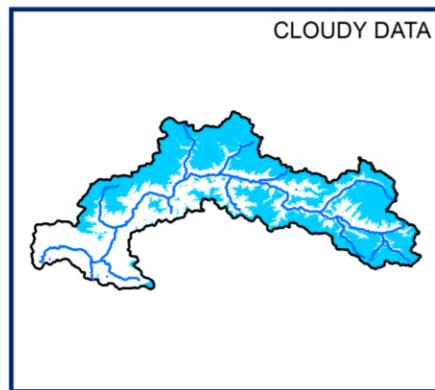
50 25 0 50 100 150  
  
Kilometers

**SNOW COVER MAP**

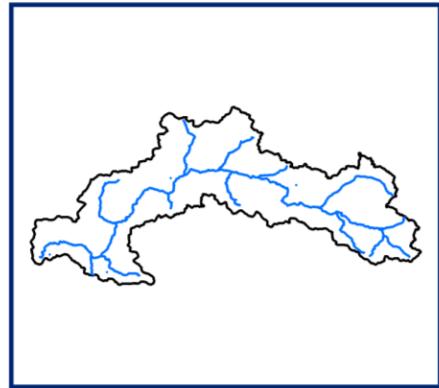
: **KISANGANGA SUB-BASIN**



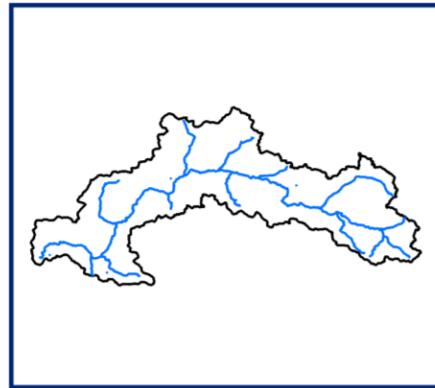
**01 MAY 2016**



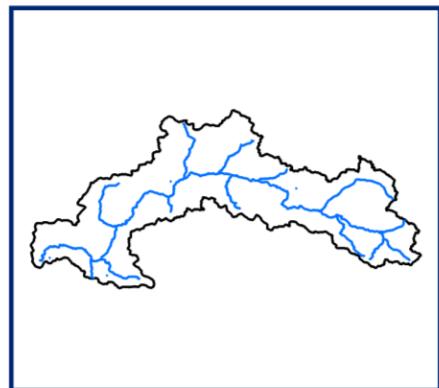
**06 MAY 2016**



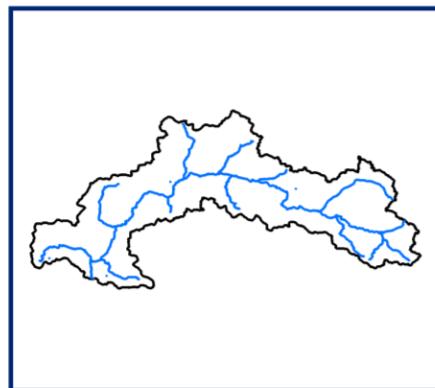
**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**

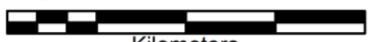


**DATA NOT AVAILABLE**

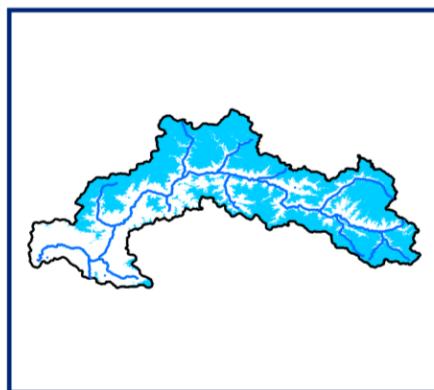


**DATA NOT AVAILABLE**

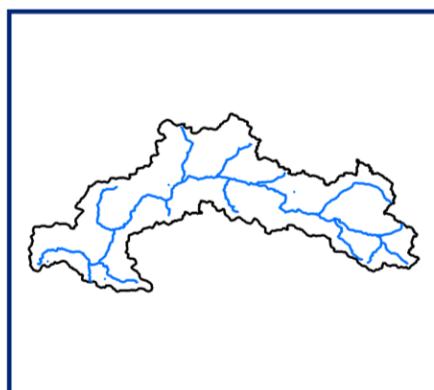
 **SNOW**

50 25 0 50 100 150  
  
Kilometers

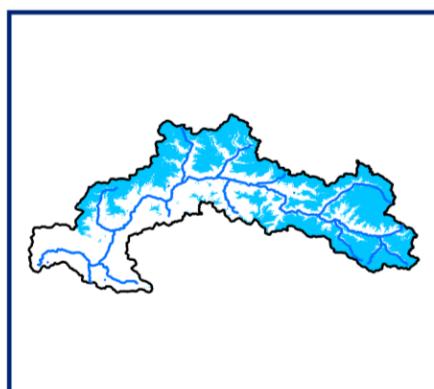
**10 DAILY SNOW COVER MAP : KISANGANGA SUB-BASIN**



DATA USED  
**01 MAY 2016**  
**06 MAY 2016**



**DATA NOT AVAILABLE**



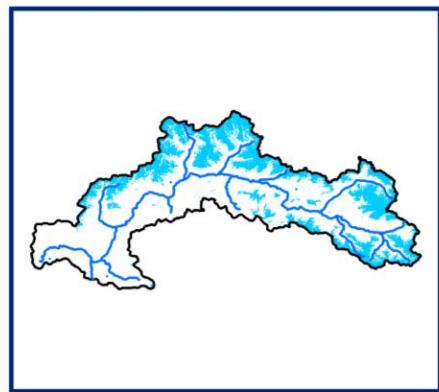
DATA USED  
**25 MAY 2016**

 SNOW

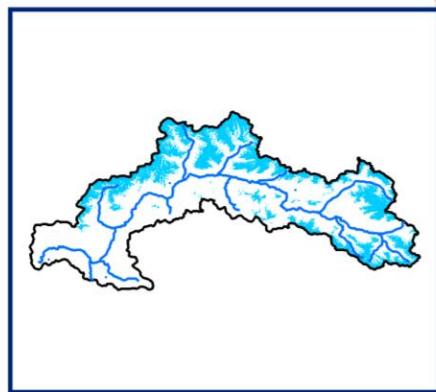
50 25 0 50 100 150  
Kilometers

**SNOW COVER MAP**

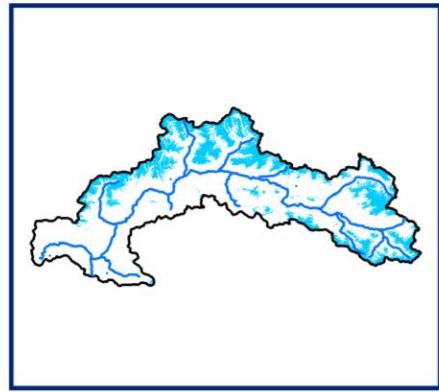
: KISANGANGA SUB-BASIN



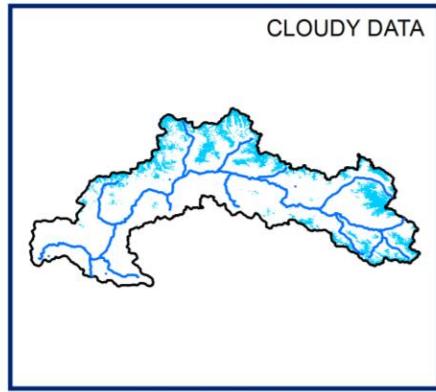
**04 JUNE 2016**



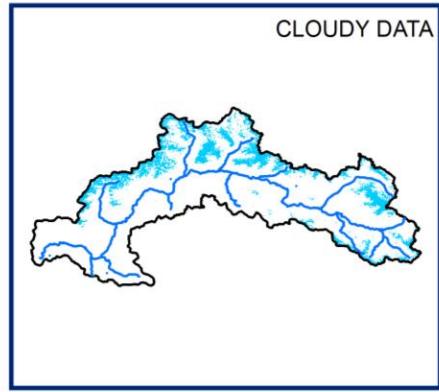
**08 JUNE 2016**



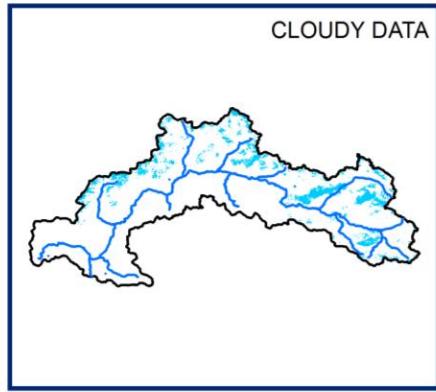
**09 JUNE 2016**



**13 JUNE 2016**



**18 JUNE 2016**



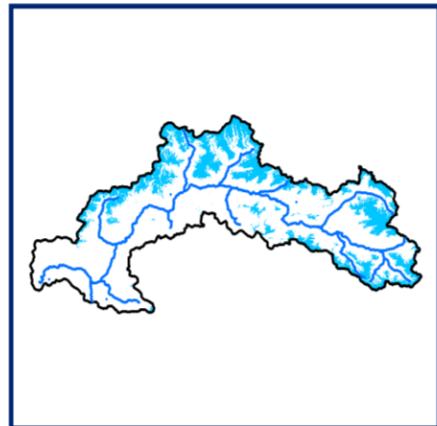
**23 JUNE 2016**



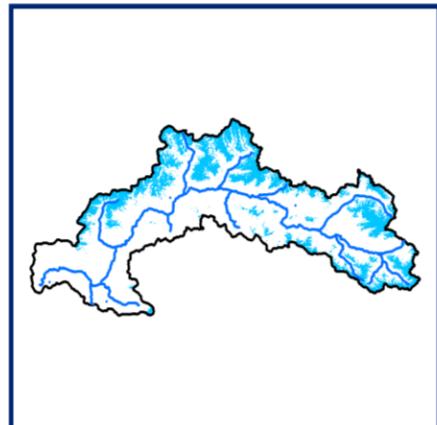
**SNOW**



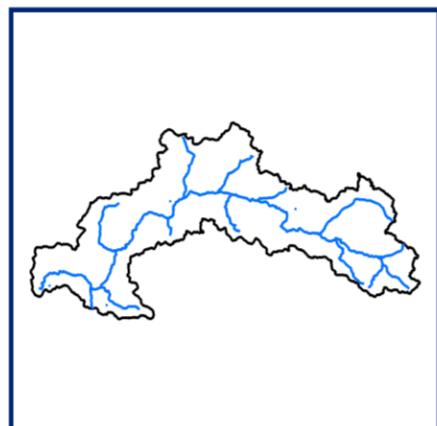
**10 DAILY SNOW COVER MAP : KISANGANGA SUB-BASIN**



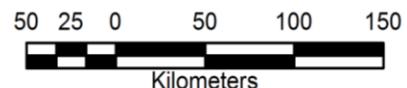
DATA USED  
**04 JUNE 2016**  
**08 JUNE 2016**



DATA USED  
**13 JUNE 2016**  
**18 JUNE 2016**



**DATA NOT AVAILABLE**



# *ASTOR SUB-BASIN*

## AREAL EXTENT OF SNOW (5 DAILY)

**BASIN NAME: ASTOR**

**BASIN AREA: 4008 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
<b>October 2015</b>							
<b>1</b>	01-Oct-15	1945	49	<b>3</b>	05-Oct-15	1118	28 (C)
<b>2</b>	03-Oct-15	1802	45	<b>4</b>	15-Oct-15	609	15 (C)
<b>November 2015</b>							
<b>5</b>	01-Nov-15	3000	75	<b>7</b>	08-Nov-15	3517	88
<b>6</b>	06-Nov-15	3682	92	<b>8</b>	15-Nov-15	3194	80 (C)
<b>December 2015</b>							
<b>9</b>	04-Dec-15	2490	62 (C)	<b>10</b>	05-Dec-15	3270	82
<b>January 2016</b>							
<b>11</b>	02-Jan-16	3454	86	<b>13</b>	19-Jan-16	3599	90
<b>12</b>	05-Jan-16	3364	84 (C)				
<b>February 2016</b>							
<b>14</b>	02-Feb-16	3672	92	<b>17</b>	10-Feb-16	3565	89 (C)
<b>15</b>	05-Feb-16	3346	83 (C)	<b>18</b>	12-Feb-16	3762	94
<b>16</b>	09-Feb-16	3645	91 (C)	<b>19</b>	26-Feb-16	3658	91
<b>March 2016</b>							
<b>20</b>	04-Mar-16	3505	87	<b>22</b>	07-Mar-16	3446	86
<b>21</b>	05-Mar-16	3542	88	<b>23</b>	16-Mar-16	3548	89
<b>April 2016</b>							
<b>24</b>	07-Apr-16	3257	81 (C)	<b>26</b>	27-Apr-16	2271	57 (C)
<b>25</b>	24-Apr-16	3240	81				
<b>May 2016</b>							
<b>27</b>	01-May-16	3145	78	<b>28</b>	06-May-16	3010	75
<b>June 2016</b>							
<b>29</b>	04-Jun-16	1841	46	<b>33</b>	14-Jun-16	1460	36
<b>30</b>	08-Jun-16	1742	43	<b>34</b>	18-Jun-16	816	20 (C)
<b>31</b>	09-Jun-16	1493	37	<b>35</b>	23-Jun-16	708	18 (C)
<b>32</b>	13-Jun-16	1088	27 (C)				

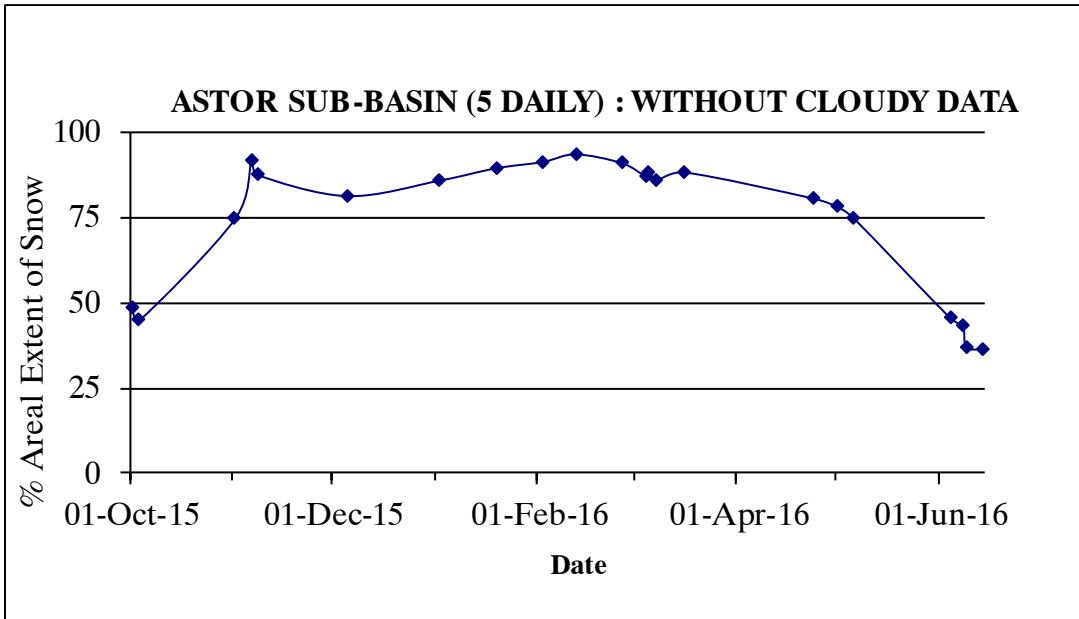
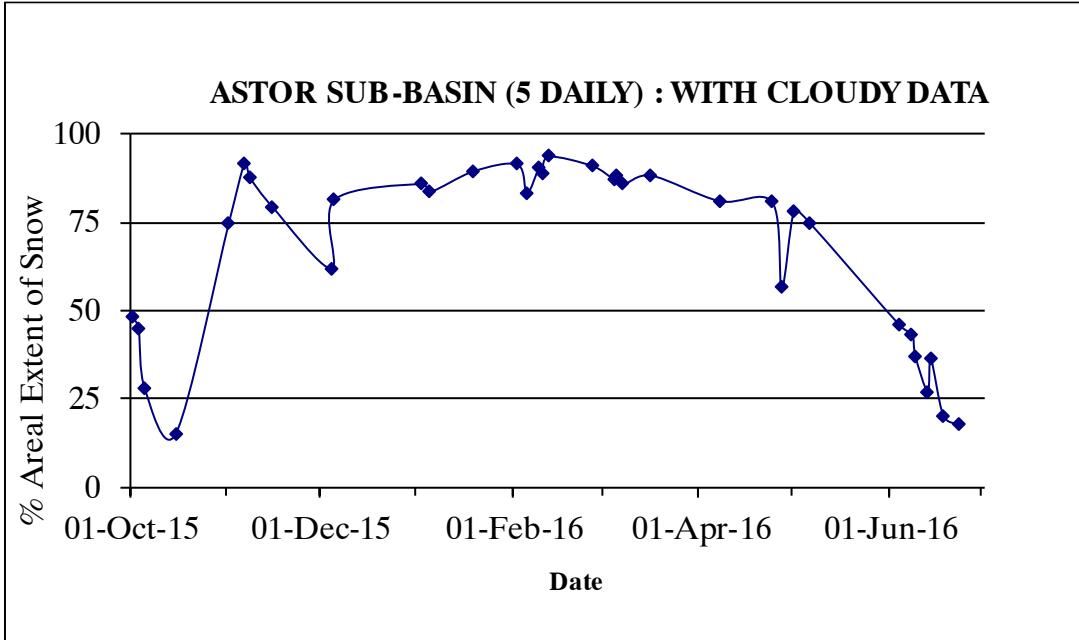
**AREAL EXTENT OF SNOW (10 DAILY)**

**BASIN NAME: ASTOR**

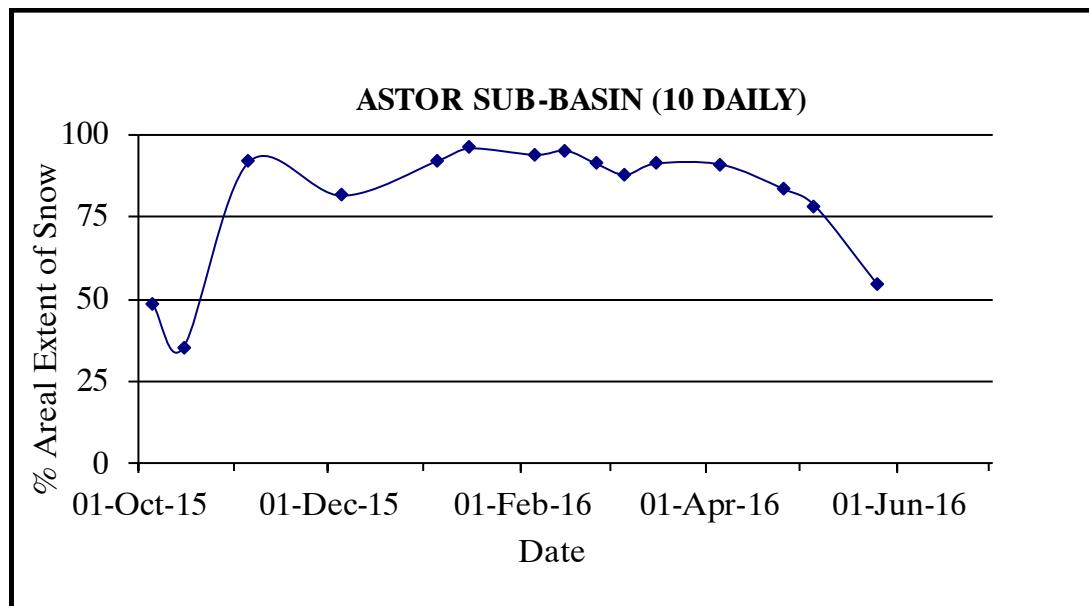
**BASIN AREA: 4008 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
<b>October 2015</b>				<b>November 2015</b>			
<b>1</b>	05-Oct-15	1947	49	<b>3</b>	05-Nov-15	3682	92
<b>2</b>	15-Oct-15	1406	35				
<b>December 2015</b>				<b>January 2016</b>			
<b>4</b>	05-Dec-15	3269	82	<b>5</b>	05-Jan-16	3703	92
				<b>6</b>	15-Jan-16	3851	96
				<b>7</b>	25-Jan-16		
<b>February 2016</b>				<b>March 2016</b>			
<b>8</b>	05-Feb-16	3772	94	<b>11</b>	05-Mar-16	3445	86
<b>9</b>	15-Feb-16	3822	95	<b>12</b>	15-Mar-16	3665	91
<b>10</b>	25-Feb-16	3657	91				
<b>April 2016</b>				<b>May 2016</b>			
<b>13</b>	05-Apr-16	3651	91	<b>15</b>	05-May-16	3145	78
<b>14</b>	25-Apr-16	3350	84	<b>16</b>	25-May-16	2182	54
<b>June 2016</b>							
<b>17</b>	05-Jun-2016	2022	50				
<b>18</b>	15-Jun-2016	1460	36				

## SNOW COVER DEPLETION CURVE



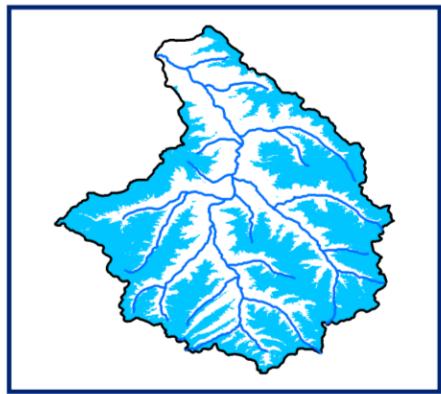
## SNOW COVER DEPLETION CURVE



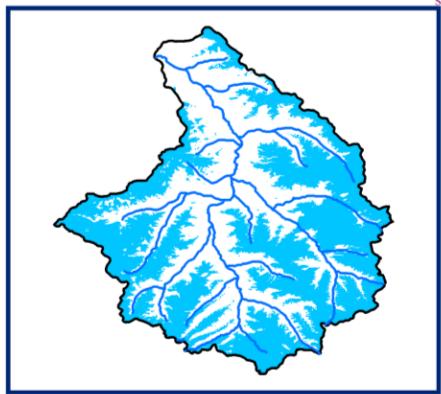
# *SNOW COVER MAP*

**SNOW COVER MAP**

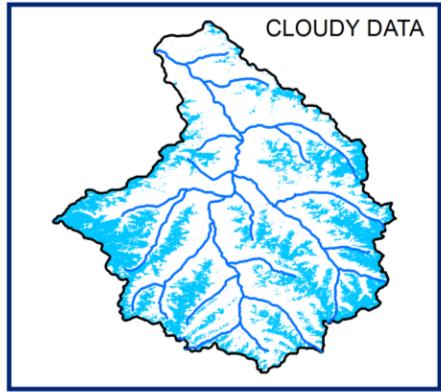
: ASTOR SUB-BASIN



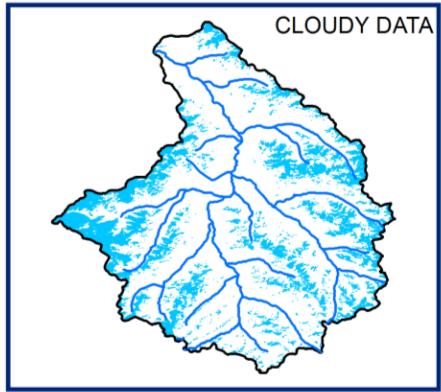
**01 OCTOBER 2015**



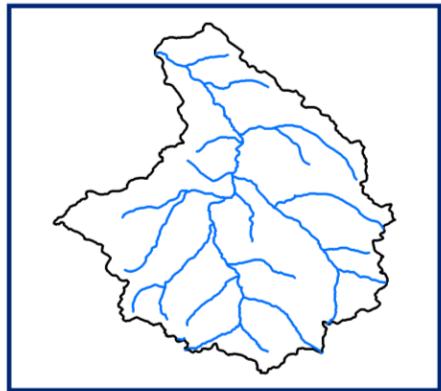
**03 OCTOBER 2015**



**05 OCTOBER 2015**

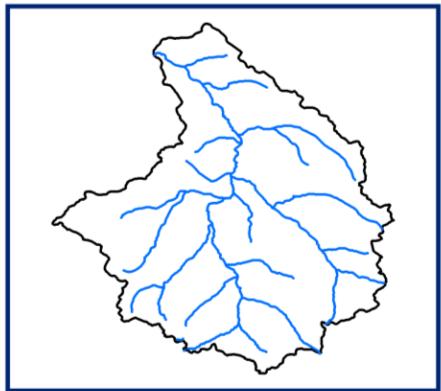


**15 OCTOBER 2015**



**DATA NOT AVAILABLE**

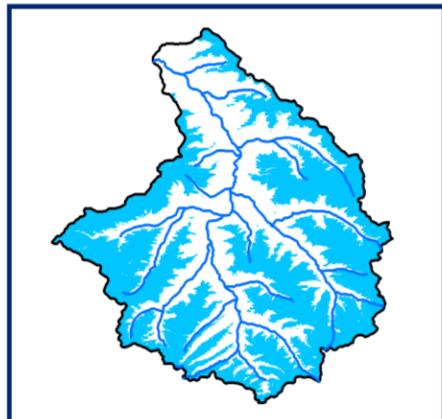
 SNOW



**DATA NOT AVAILABLE**

25 12.5 0 25 50 75  
Kilometers

## 10 DAILY SNOW COVER MAP : ASTOR SUB-BASIN

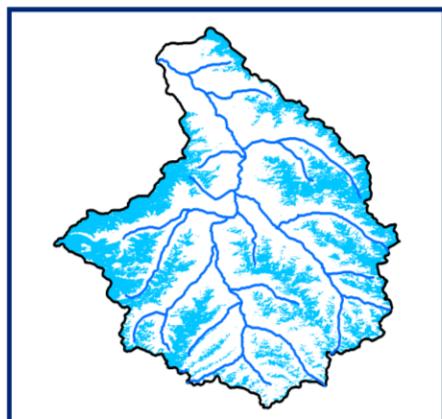


DATA USED

**01 OCTOBER 2015**

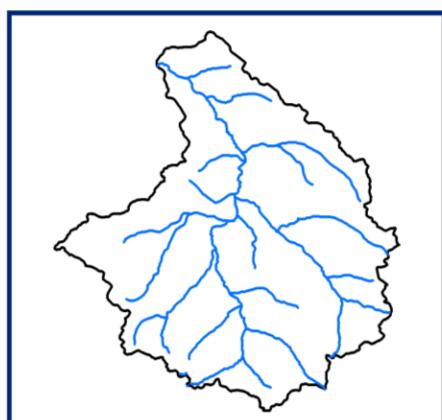
**03 OCTOBER 2015**

**05 OCTOBER 2015**



DATA USED

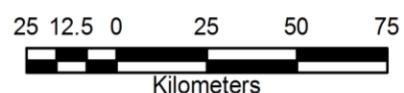
**15 OCTOBER 2015**



**DATA NOT AVAILABLE**

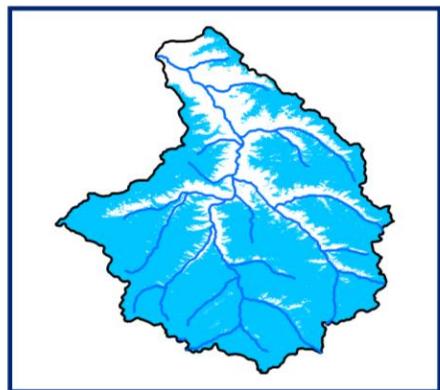


SNOW

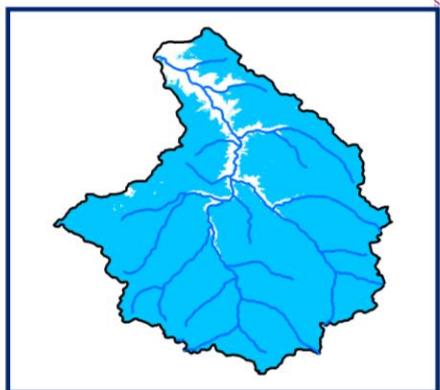


**SNOW COVER MAP**

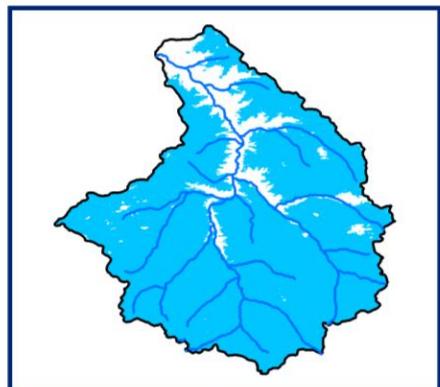
: ASTOR SUB-BASIN



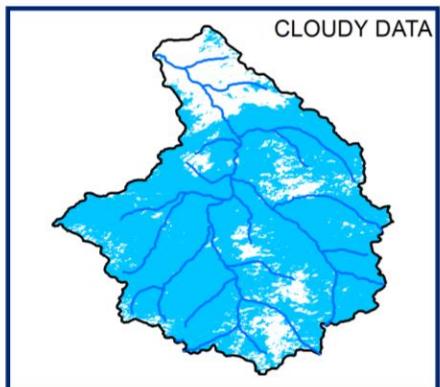
**01 NOVEMBER 2015**



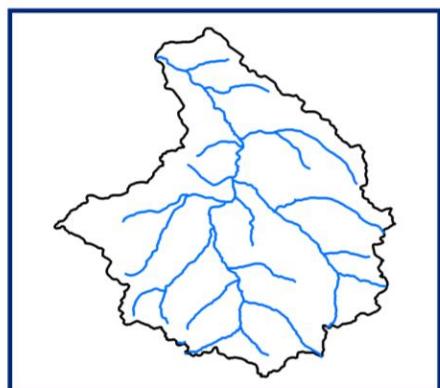
**06 NOVEMBER 2015**



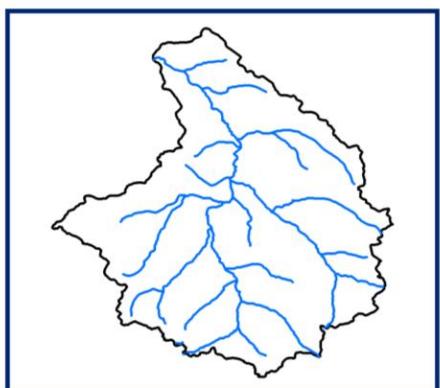
**08 NOVEMBER 2015**



**15 NOVEMBER 2015**



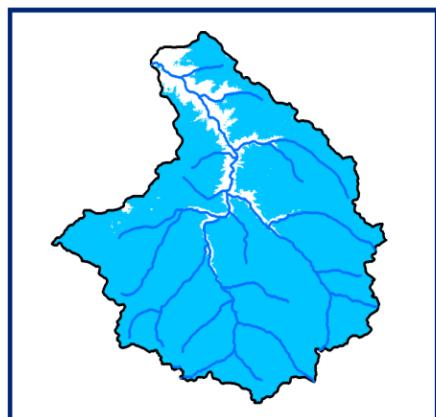
**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**



## 10 DAILY SNOW COVER MAP : ASTOR SUB-BASIN

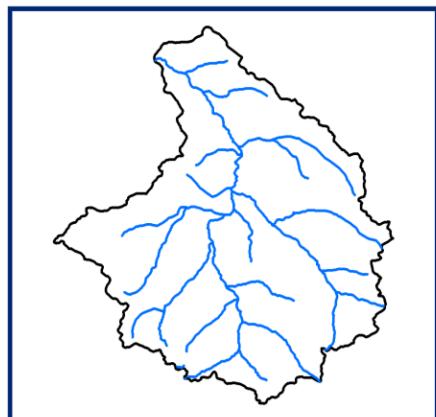


DATA USED

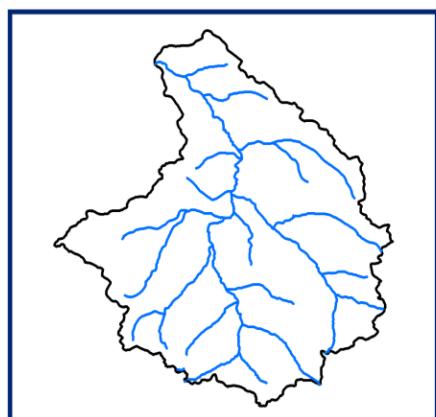
**01 NOVEMBER 2015**

**06 NOVEMBER 2015**

**08 NOVEMBER 2015**



**DATA NOT AVAILABLE**

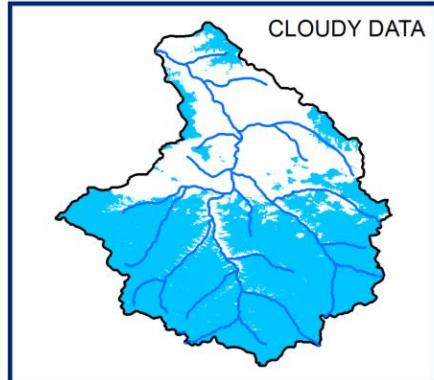


**DATA NOT AVAILABLE**

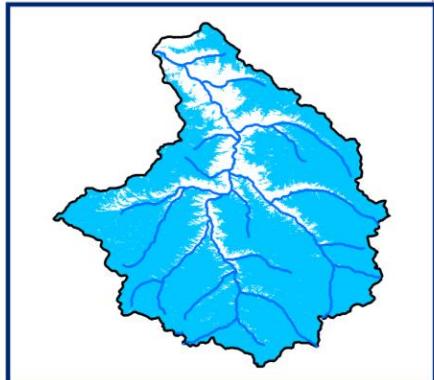
SNOW

25 12.5 0 25 50 75  
 Kilometers

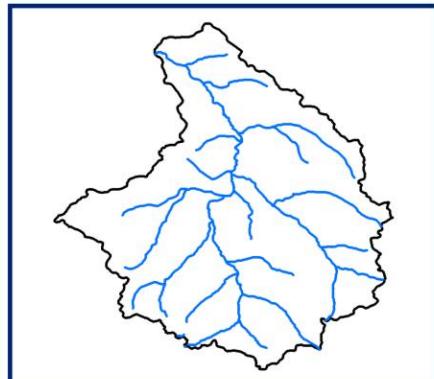
**SNOW COVER MAP : ASTOR SUB-BASIN**



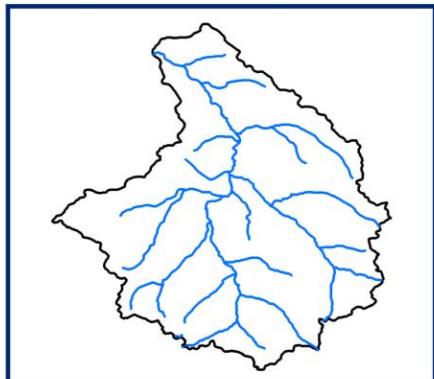
04 DECEMBER 2015



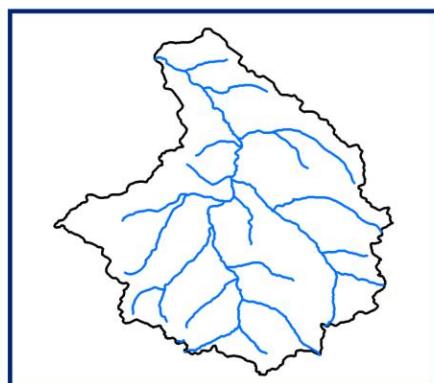
05 DECEMBER 2015



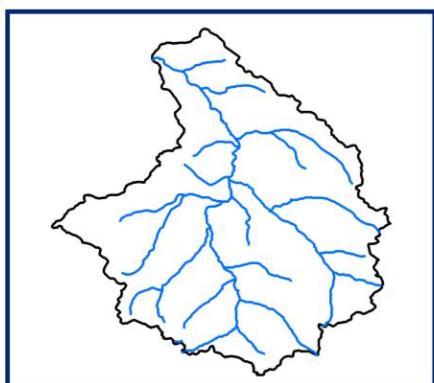
DATA NOT AVAILABLE



DATA NOT AVAILABLE



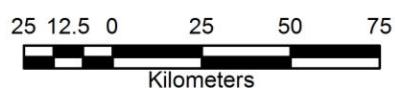
DATA NOT AVAILABLE



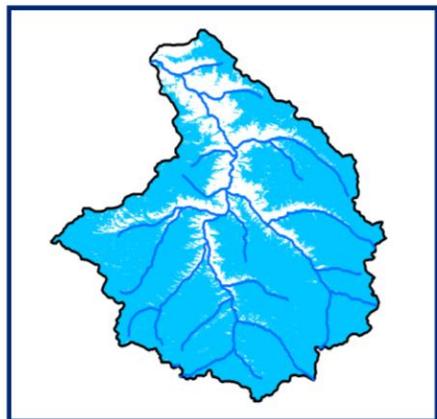
DATA NOT AVAILABLE



SNOW



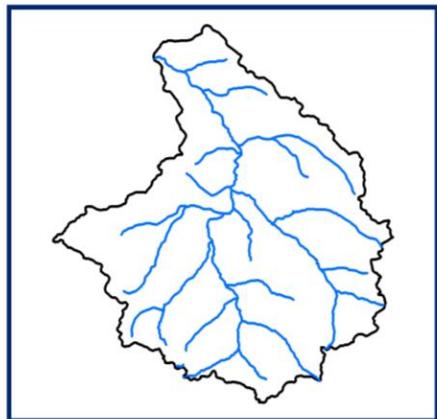
## 10 DAILY SNOW COVER MAP : ASTOR SUB-BASIN



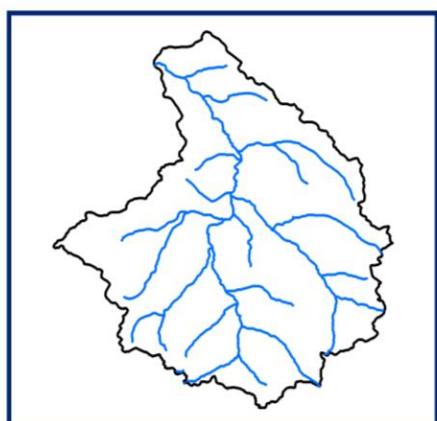
DATA USED

04 DECEMBER 2015

05 DECEMBER 2015



DATA NOT AVAILABLE



DATA NOT AVAILABLE

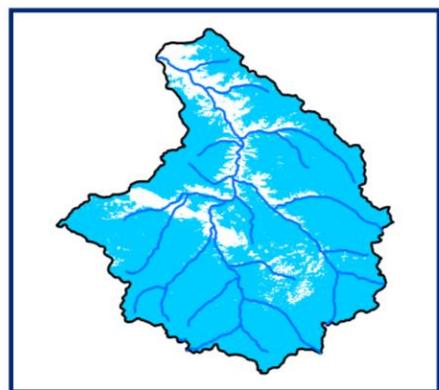
SNOW

A legend entry consisting of a small blue square followed by the word "SNOW" in a standard black font.

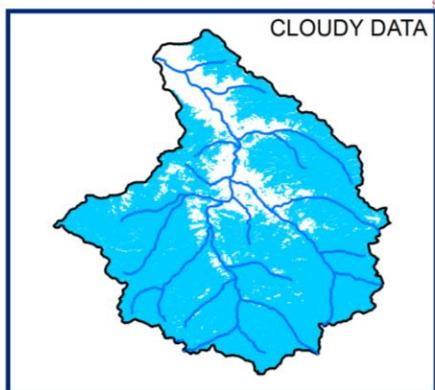
25 12.5 0 25 50 75  
A scale bar at the bottom of the map frame, marked in kilometers. It includes numerical labels at 25, 12.5, 0, 25, 50, and 75, with intermediate tick marks every 2.5 units. Below the scale bar, the word "Kilometers" is written.

## SNOW COVER MAP

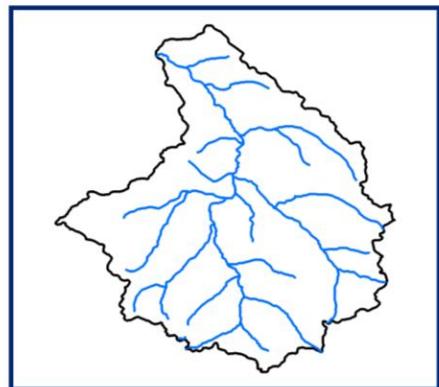
: ASTOR SUB-BASIN



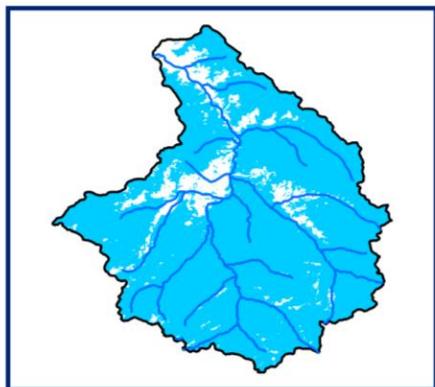
02 JANUARY 2016



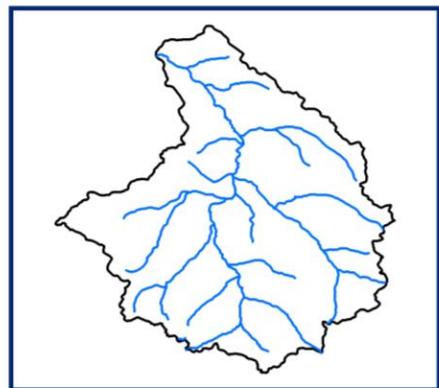
CLOUDY DATA  
05 JANUARY 2016



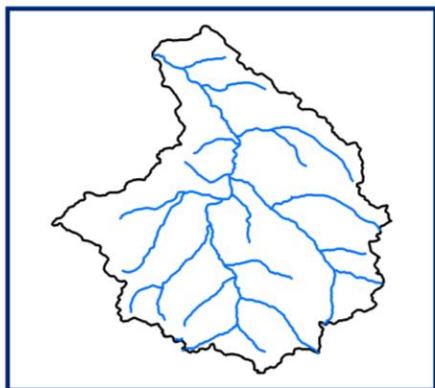
DATA NOT AVAILABLE



19 JANUARY 2016



DATA NOT AVAILABLE

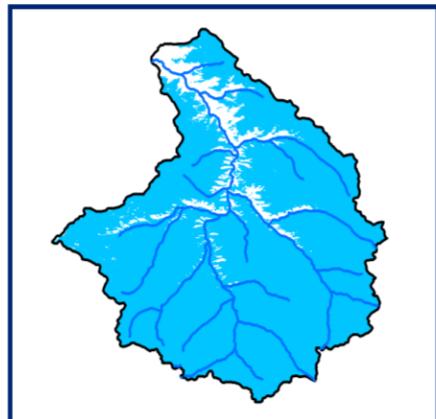


DATA NOT AVAILABLE

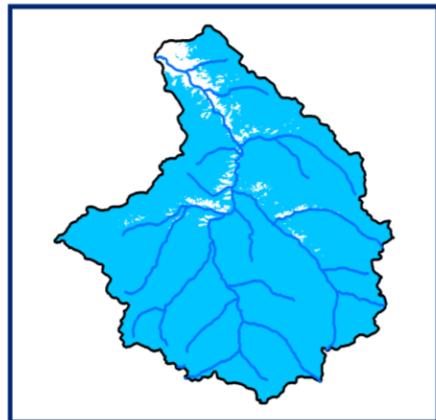
 SNOW

25 12.5 0 25 50 75  
Kilometers

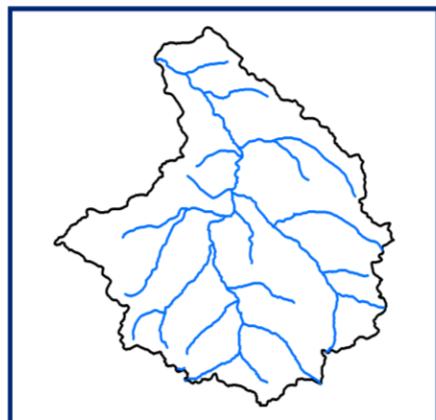
## 10 DAILY SNOW COVER MAP : ASTOR SUB-BASIN



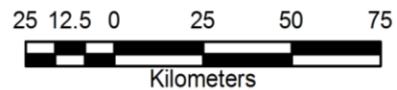
DATA USED  
**02 JANUARY 2016**  
**05 JANUARY 2016**



DATA USED  
**15 JANUARY 2016**

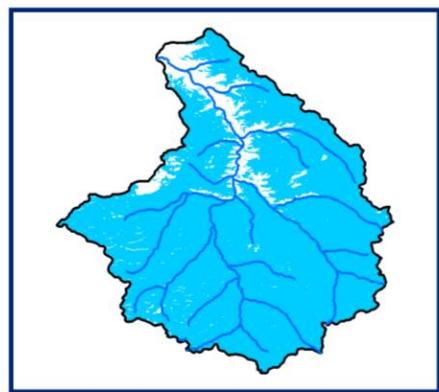


DATA NOT AVAILABLE

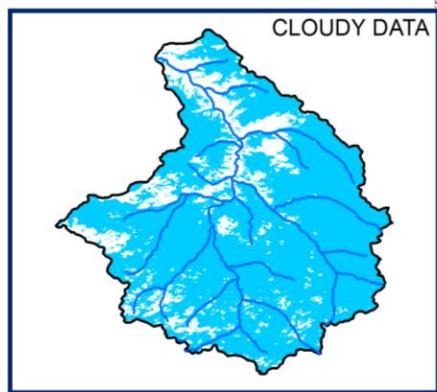


## SNOW COVER MAP

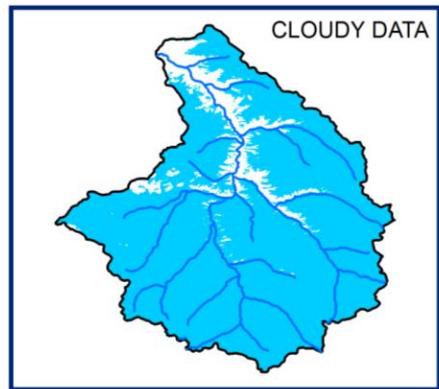
: ASTOR SUB-BASIN



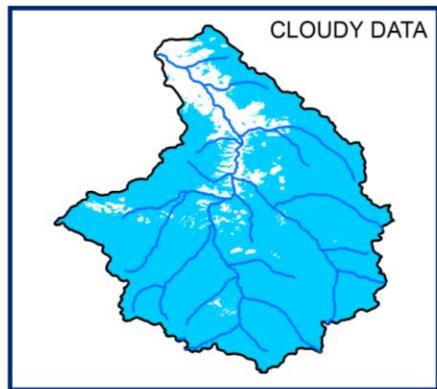
02 FEBRUARY 2016



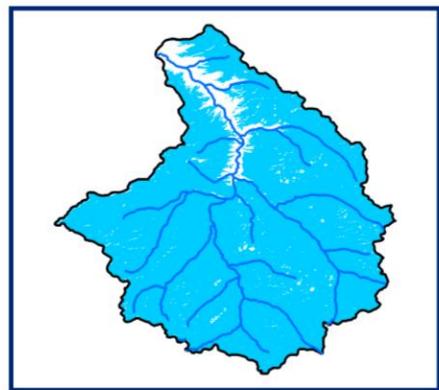
05 FEBRUARY 2016



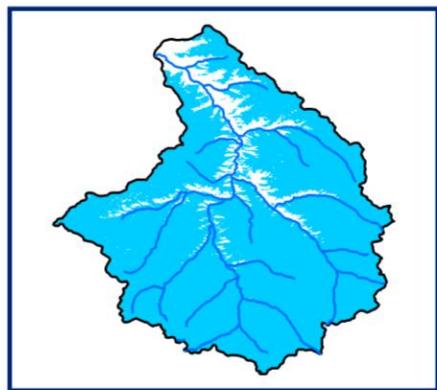
09 FEBRUARY 2016



10 FEBRUARY 2016



12 FEBRUARY 2016

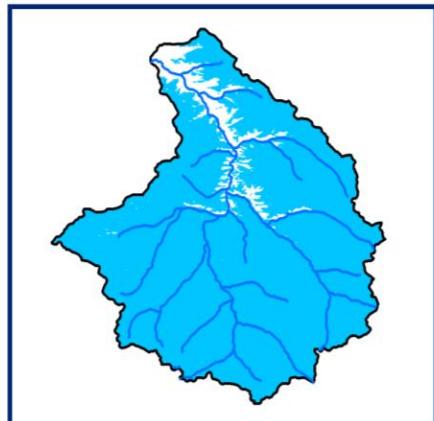


26 FEBRUARY 2016

SNOW

25 12.5 0 25 50 75  
Kilometers

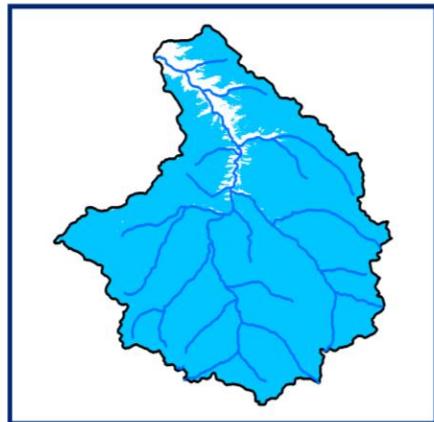
## 10 DAILY SNOW COVER MAP : ASTOR SUB-BASIN



DATA USED

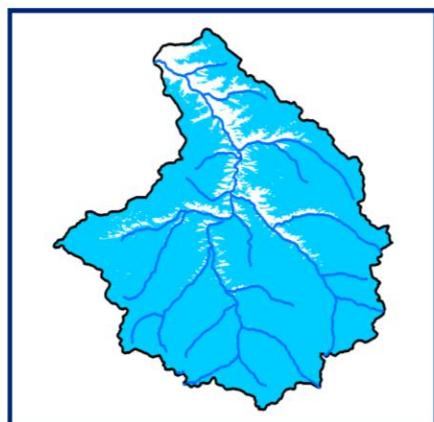
**02 FEBRUARY 2016**

**05 FEBRUARY 2016**



DATA USED

**15 FEBRUARY 2016**



DATA USED

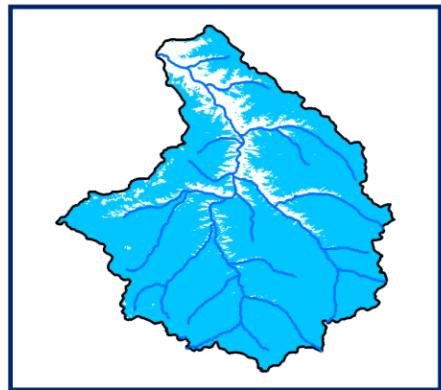
**25 FEBRUARY 2016**

 SNOW

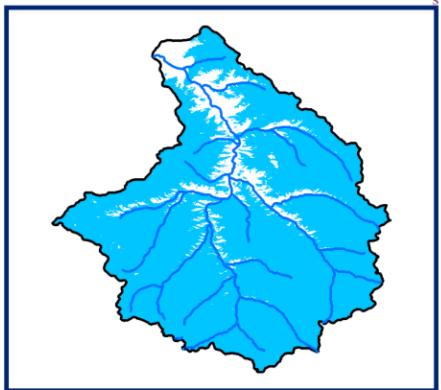
25 12.5 0 25 50 75  
  
Kilometers

**SNOW COVER MAP**

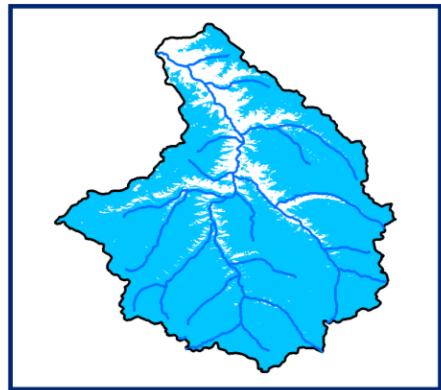
: ASTOR SUB-BASIN



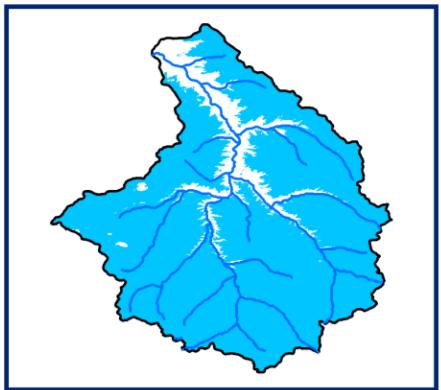
**04 MARCH 2016**



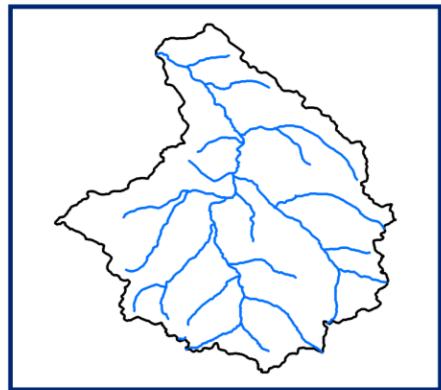
**05 MARCH 2016**



**07 MARCH 2016**



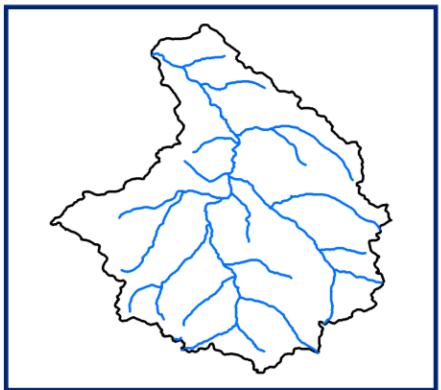
**16 MARCH 2016**



**DATA NOT AVAILABLE**



**SNOW**



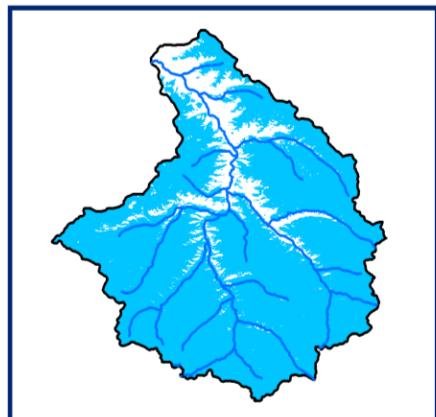
**DATA NOT AVAILABLE**

25 12.5 0 25 50 75



Kilometers

## 10 DAILY SNOW COVER MAP : ASTOR SUB-BASIN

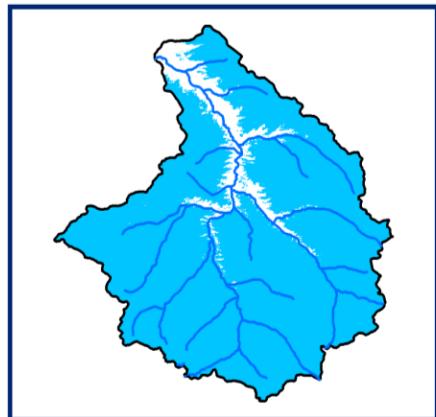


DATA USED

**04 MARCH 2016**

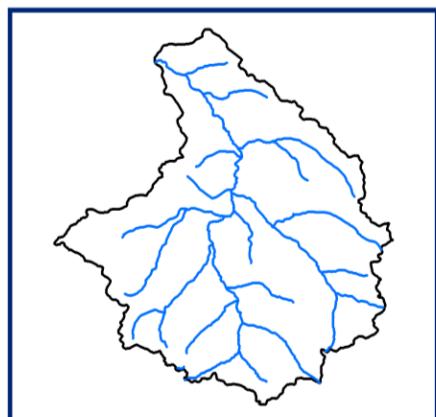
**05 MARCH 2016**

**07 MARCH 2016**



DATA USED

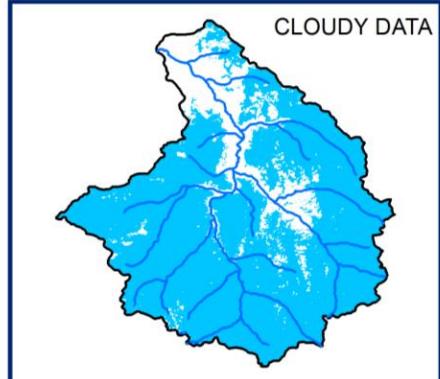
**15 MARCH 2016**



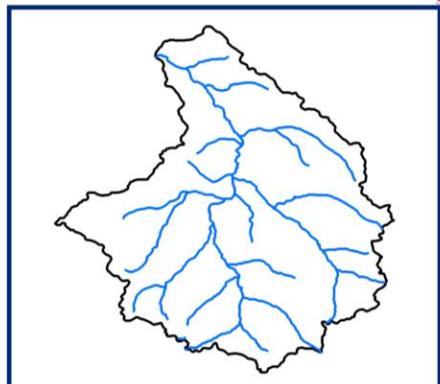
SNOW

25 12.5 0 25 50 75  
 Kilometers

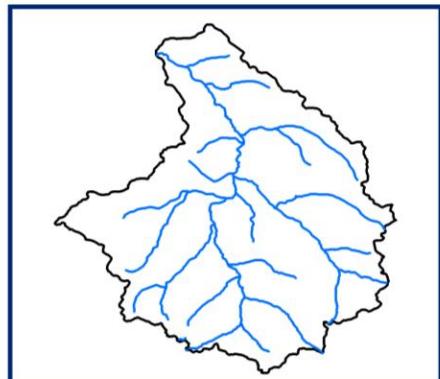
**SNOW COVER MAP : ASTOR SUB-BASIN**



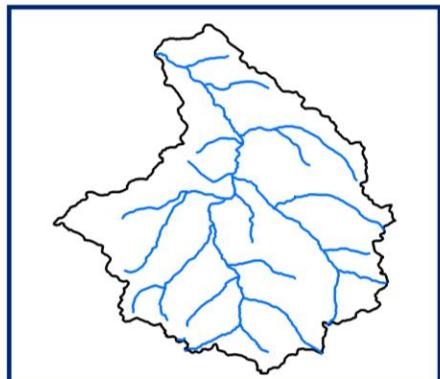
07 APRIL 2016



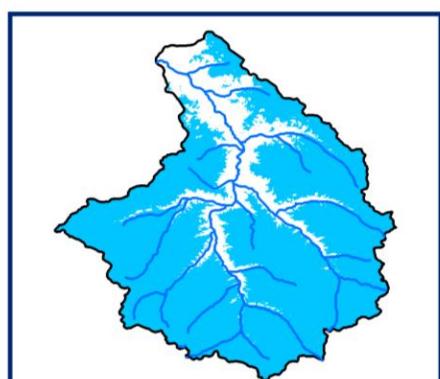
DATA NOT AVAILABLE



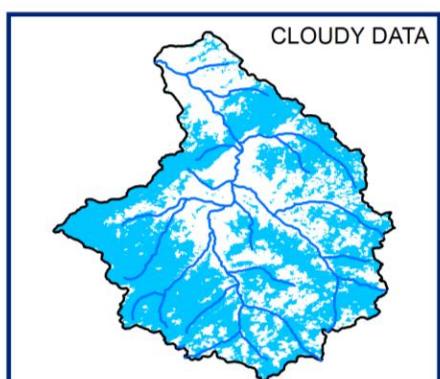
DATA NOT AVAILABLE



DATA NOT AVAILABLE



24 APRIL 2016



27 APRIL 2016

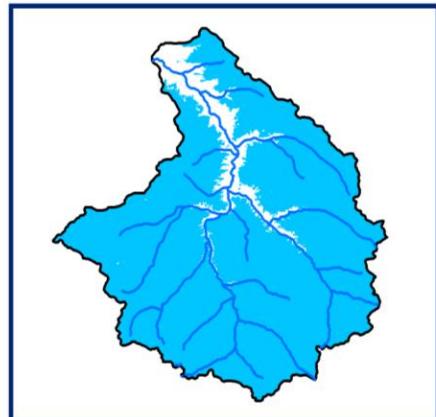


SNOW

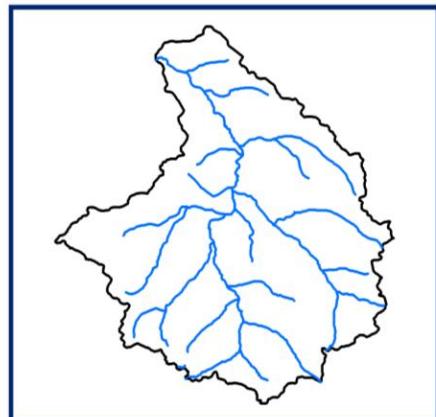


Kilometers

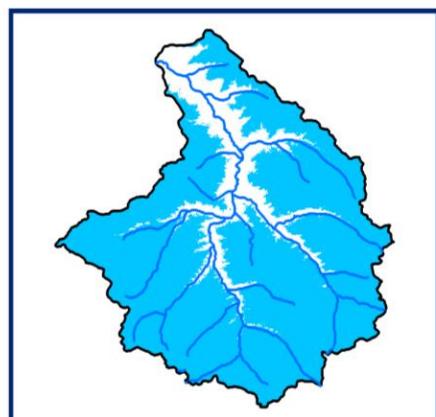
## 10 DAILY SNOW COVER MAP : ASTOR SUB-BASIN



DATA USED  
**05 APRIL 2016**



DATA NOT AVAILABLE

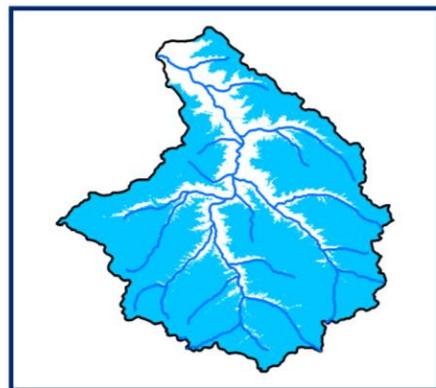


DATA USED  
**24 APRIL 2016**  
**27 APRIL 2016**

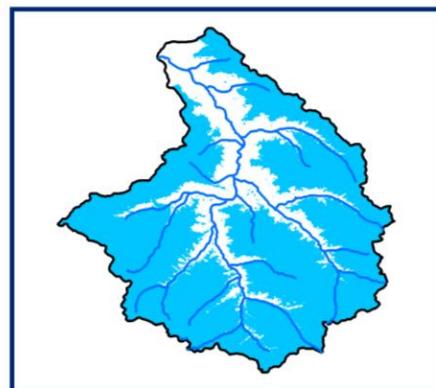
 SNOW

25 12.5 0 25 50 75  
  
Kilometers

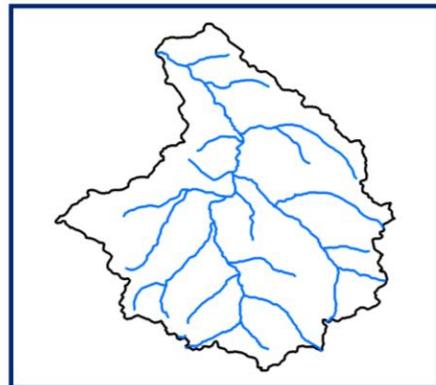
**SNOW COVER MAP : ASTOR SUB-BASIN**



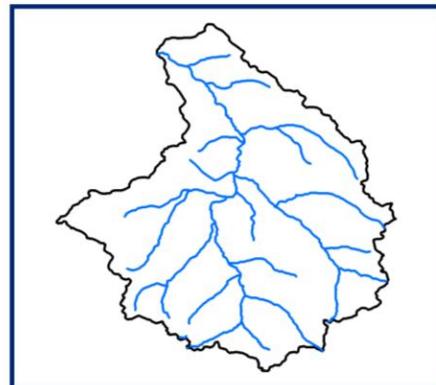
**01 MAY 2016**



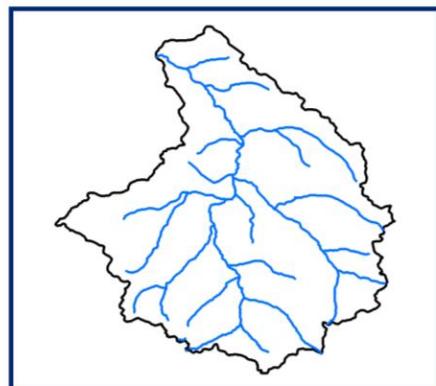
**06 MAY 2016**



**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**

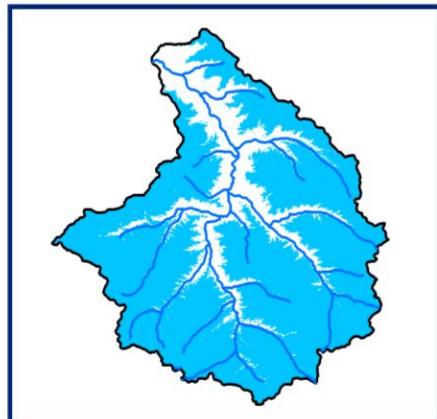


**DATA NOT AVAILABLE**

 **SNOW**

25 12.5 0 25 50 75  
Kilometers

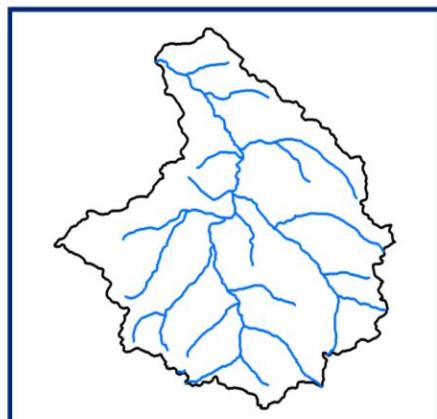
## 10 DAILY SNOW COVER MAP : ASTOR SUB-BASIN



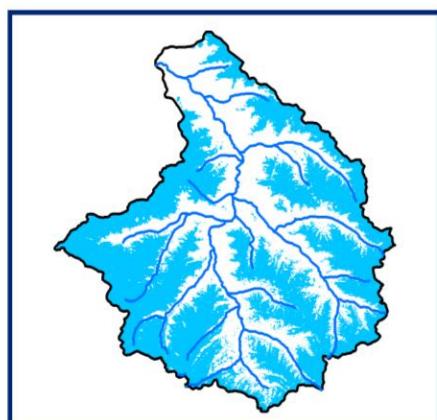
DATA USED

**01 MAY 2016**

**06 MAY 2016**

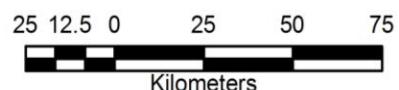


DATA NOT AVAILABLE



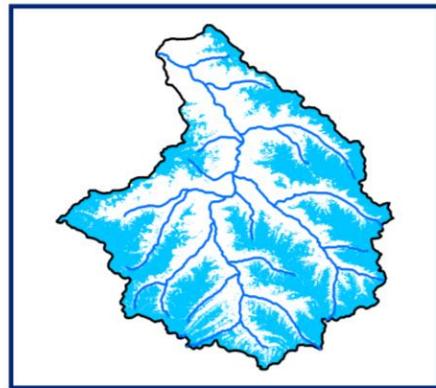
DATA USED

**25 MAY 2016**

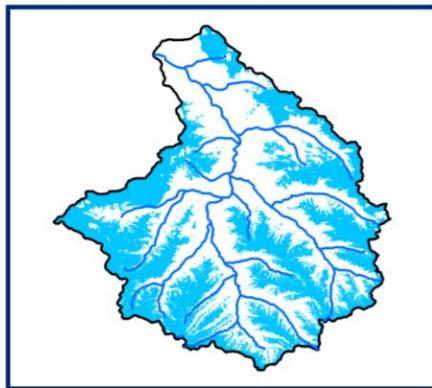


**SNOW COVER MAP**

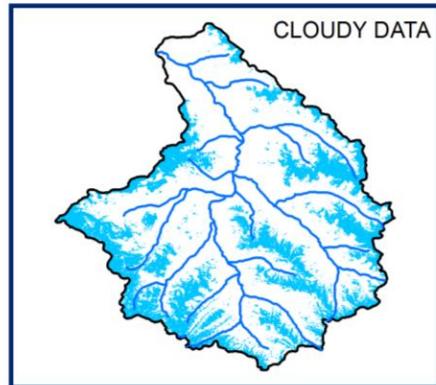
: ASTOR SUB-BASIN



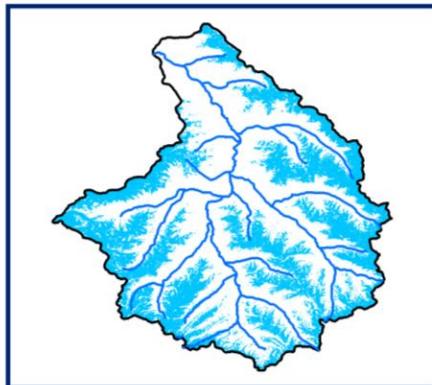
**04 JUNE 2016**



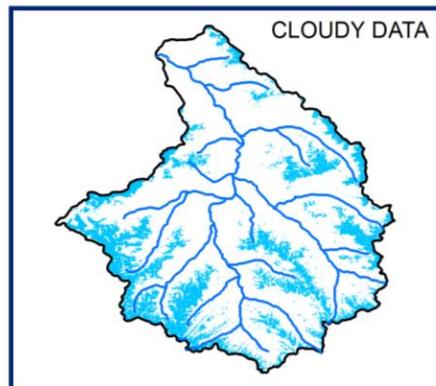
**08 JUNE 2016**



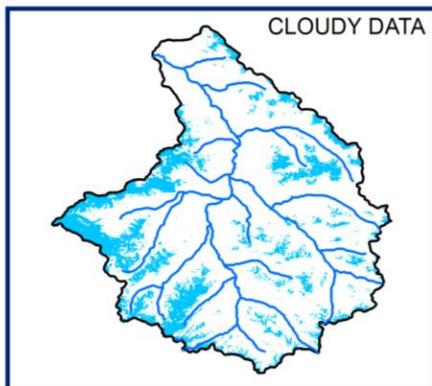
**13 JUNE 2016**



**14 JUNE 2016**



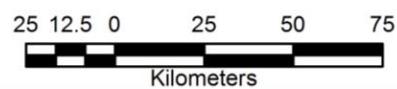
**18 JUNE 2016**



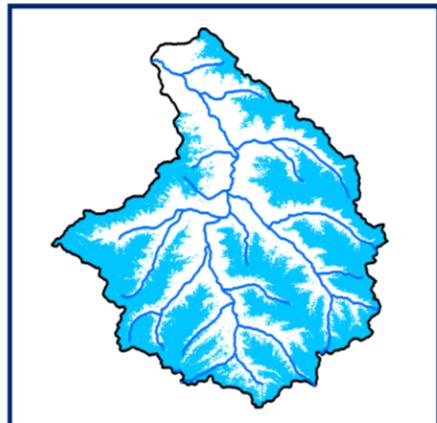
**23 JUNE 2016**



**SNOW**



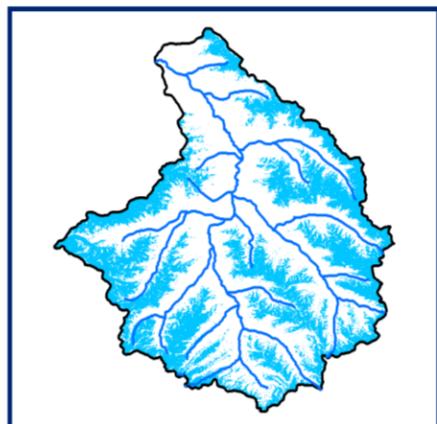
## 10 DAILY SNOW COVER MAP : ASTOR SUB-BASIN



DATA USED

**04 JUNE 2016**

**08 JUNE 2016**

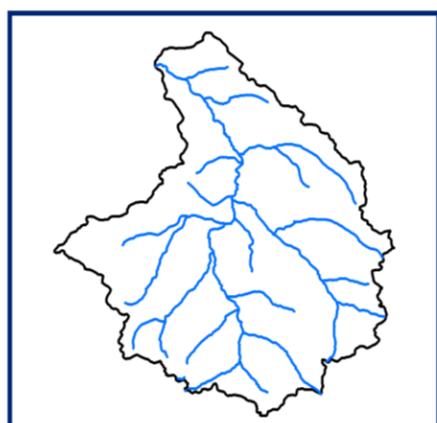


DATA USED

**13 JUNE 2016**

**14 JUNE 2016**

**18 JUNE 2016**



**DATA NOT AVAILABLE**



SNOW



# *SHIGO SUB-BASIN*

### AREAL EXTENT OF SNOW (5 DAILY)

**BASIN NAME: SHIGO**

**BASIN AREA: 5539 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
<b>October 2015</b>							
<b>1</b>	01-Oct-15	3035	55	<b>3</b>	05-Oct-15	2245	41
<b>2</b>	03-Oct-15	2735	49		15-Oct-15	938	17 (c)
<b>November 2015</b>							
<b>4</b>	01-Nov-15	3370	61	<b>6</b>	08-Nov-15	4415	80
<b>5</b>	06-Nov-15	4588	83	<b>7</b>	15-Nov-15	3808	69 (c)
<b>December 2015</b>							
<b>8</b>	04-Dec-15	4249	77	<b>10</b>	07-Dec-15	3981	72
<b>9</b>	05-Dec-15	4082	74				
<b>January 2016</b>							
<b>11</b>	02-Jan-16	4509	81	<b>14</b>	19-Jan-16	4580	83 (c)
<b>12</b>	03-Jan-16	4550	82	<b>15</b>	27-Jan-16	5146	93 (c)
<b>13</b>	05-Jan-16	5234	94				
<b>February 2016</b>							
<b>16</b>	02-Feb-16	4869	88	<b>19</b>	12-Feb-16	4877	88
<b>17</b>	05-Feb-16	4809	87	<b>20</b>	17-Feb-16	4733	85
<b>18</b>	10-Feb-16	4756	86 (c)	<b>21</b>	26-Feb-16	4897	88
<b>March 2016</b>							
<b>22</b>	04-Mar-16	4563	82	<b>23</b>	07-Mar-16	4564	82
<b>April 2016</b>							
<b>24</b>	07-Apr-16	4735	85	<b>26</b>	24-Apr-16	4459	81
<b>25</b>	14-Apr-16	4657	84				
<b>May 2016</b>							
<b>27</b>	01-May-16	4248	77	<b>29</b>	06-May-16	3901	70
<b>28</b>	02-May-16	4153	75				

<b>June 2016</b>							
<b>30</b>	04-Jun-16	2855	52	<b>34</b>	18-Jun-16	914	17 (c)
<b>31</b>	09-Jun-16	1839	33 (c)	<b>35</b>	19-Jun-16	640	12 (c)
<b>32</b>	13-Jun-16	1377	25 (c)	<b>36</b>	23-Jun-16	500	9 (c)
<b>33</b>	14-Jun-16	1641	30				

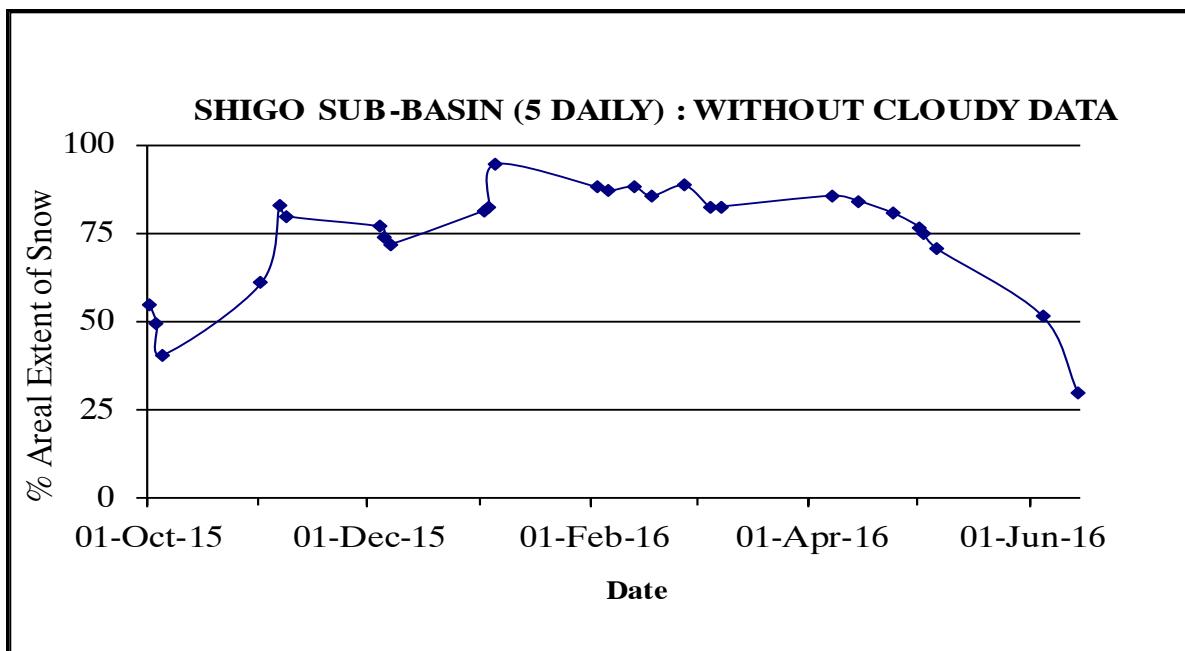
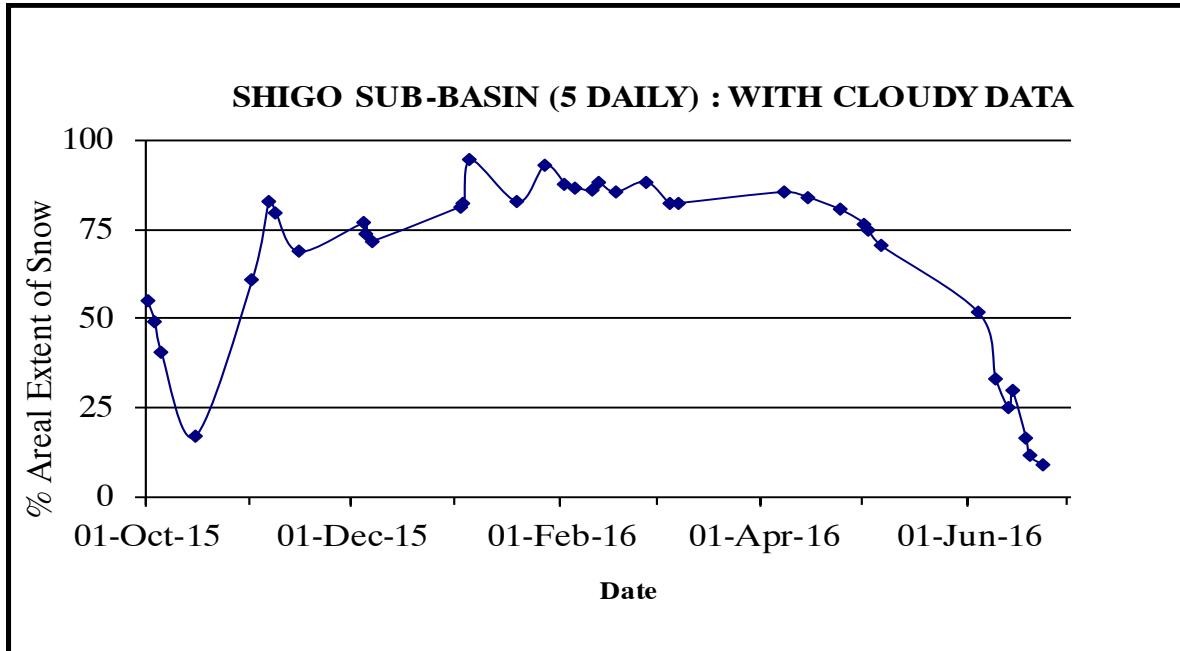
**AREAL EXTENT OF SNOW (10 DAILY)**

**BASIN NAME: SHIGO**

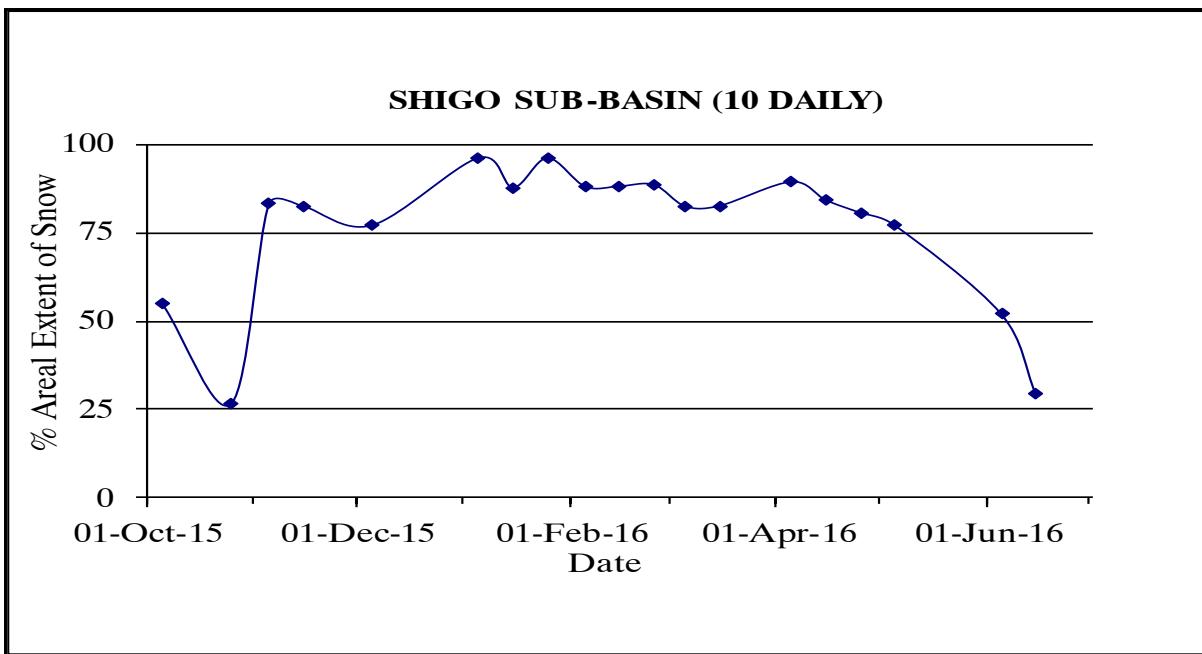
**BASIN AREA: 5539 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
<b>October 2015</b>				<b>November 2015</b>			
<b>1</b>	05-Oct-15	3034	55	<b>3</b>	05-Nov-15	4601	83
<b>2</b>	25-Oct-15	1483	27	<b>4</b>	15-Nov-15	4558	82
<b>December 2015</b>				<b>January 2016</b>			
<b>5</b>	05-Dec-15	4082	77	<b>6</b>	05-Jan-16	5317	96
				<b>7</b>	15-Jan-16	4855	88
				<b>8</b>	25-Jan-16	5314	96
<b>February 2016</b>				<b>March 2016</b>			
<b>9</b>	05-Feb-16	4868	88	<b>12</b>	05-Mar-16	4563	82
<b>10</b>	15-Feb-16	4733	88	<b>13</b>	15-Mar-16	4567	82
<b>11</b>	25-Feb-16	4897	88				
<b>April 2016</b>				<b>May 2016</b>			
<b>14</b>	05-Apr-16	4943	89	<b>17</b>	05-May-16	4153	77
<b>15</b>	15-Apr-16	4657	84				
<b>16</b>	25-Apr-16	4459	81				
<b>June 2016</b>							
<b>18</b>	05-Jun-2016	2808	52				
<b>19</b>	15-Jun-2016	1639	30				

## SNOW COVER DEPLETION CURVE



## SNOW COVER DEPLETION CURVE

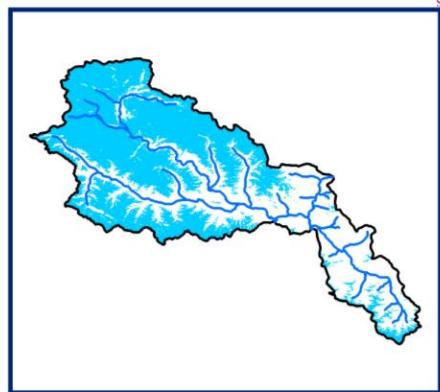


# *SNOW COVER MAP*

**SNOW COVER MAP : SHIGO SUB-BASIN**



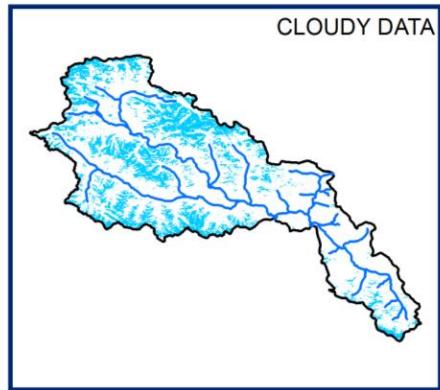
**01 OCTOBER 2015**



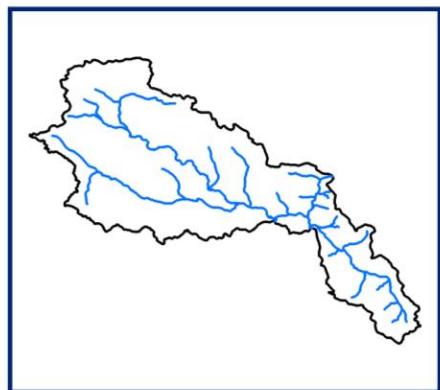
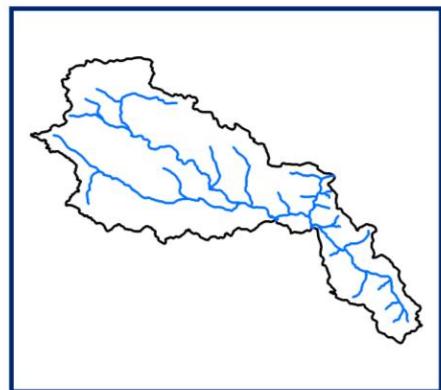
**03 OCTOBER 2015**



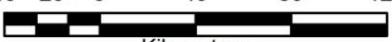
**05 OCTOBER 2015**



**15 OCTOBER 2015**



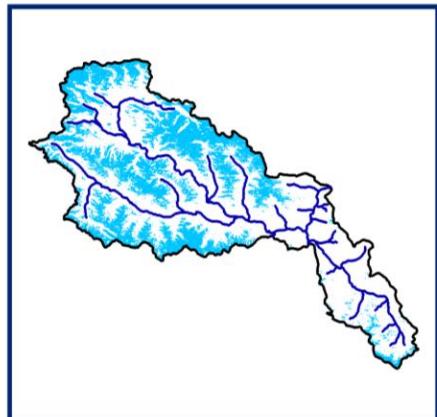
 **SNOW**

40 20 0 40 80 120  
  
Kilometers

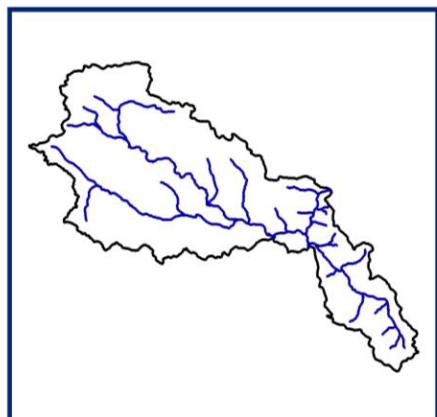
## 10 DAILY SNOW COVER MAP : SHIGO SUB-BASIN



DATA USED  
**01 OCTOBER 2015**  
**03 OCTOBER 2015**  
**05 OCTOBER 2015**



DATA USED  
**15 OCTOBER 2015**



**DATA NOT AVAILABLE**

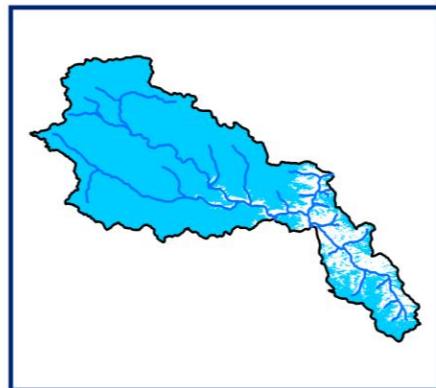


**SNOW COVER MAP**

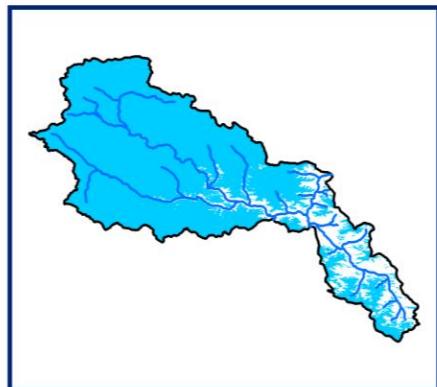
: SHIGO SUB-BASIN



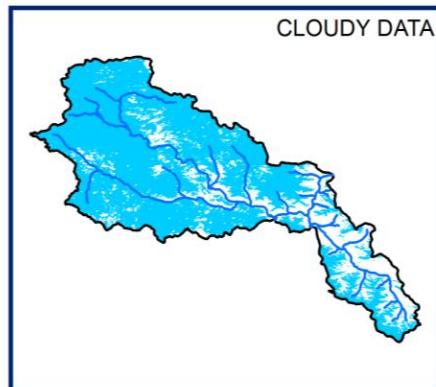
**01 NOVEMBER 2015**



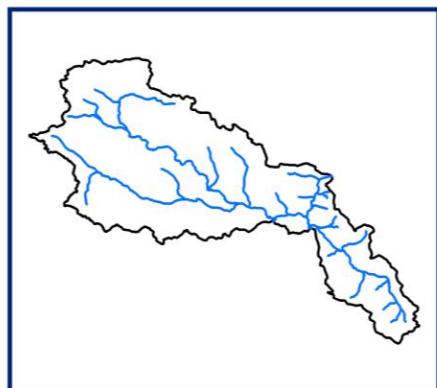
**06 NOVEMBER 2015**



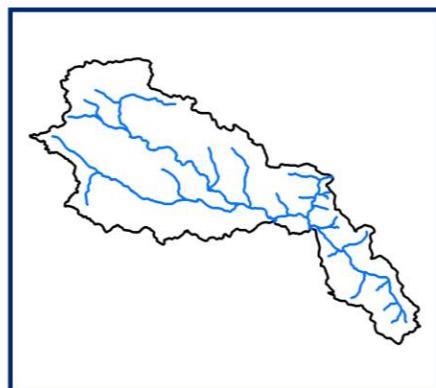
**08 NOVEMBER 2015**



**CLOUDY DATA**  
**15 NOVEMBER 2015**

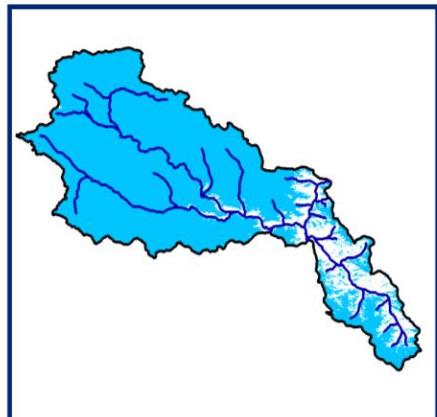


 SNOW



40 20 0 40 80 120  
Kilometers

## 10 DAILY SNOW COVER MAP : SHIGO SUB-BASIN

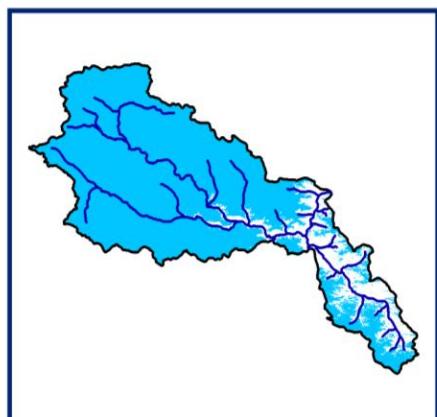


DATA USED

**01 NOVEMBER 2015**

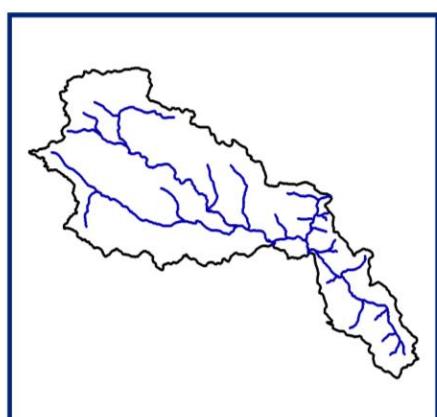
**06 NOVEMBER 2015**

**08 NOVEMBER 2015**



DATA USED

**15 NOVEMBER 2015**

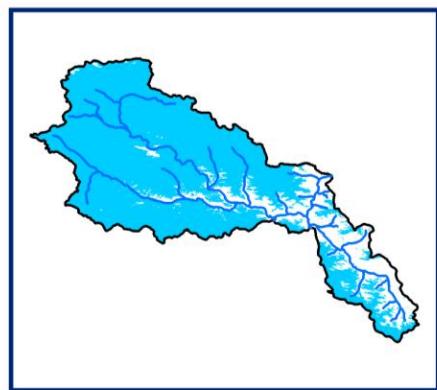


**DATA NOT AVAILABLE**



**SNOW COVER MAP**

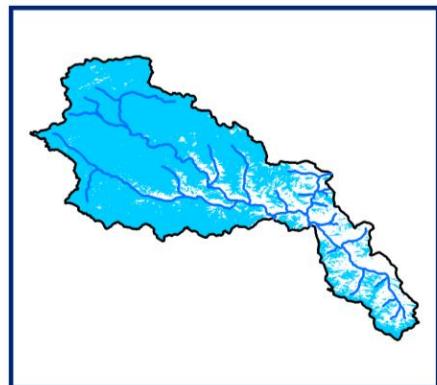
: SHIGO SUB-BASIN



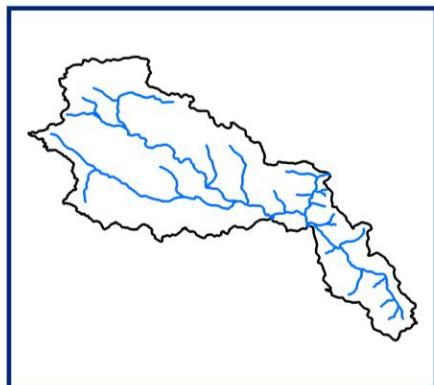
**04 DECEMBER 2015**



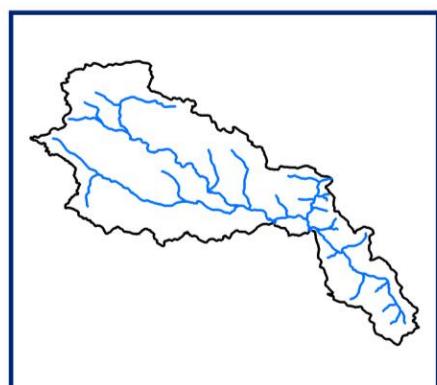
**05 DECEMBER 2015**



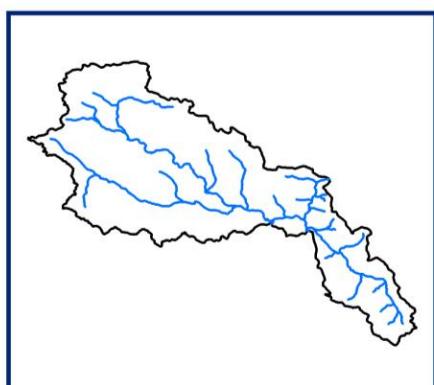
**07 DECEMBER 2015**



**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**

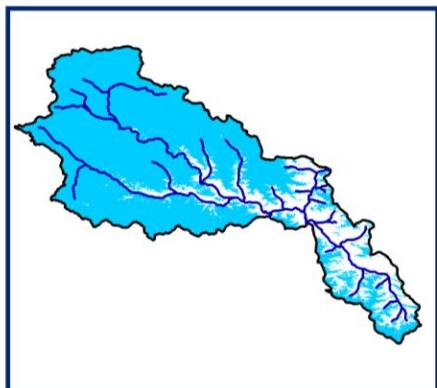


**DATA NOT AVAILABLE**

 SNOW

40 20 0 40 80 120  
Kilometers

## 10 DAILY SNOW COVER MAP : SHIGO SUB-BASIN

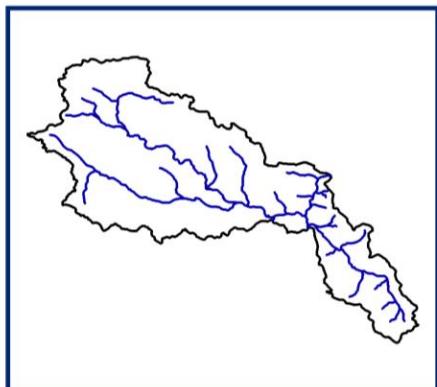


DATA USED

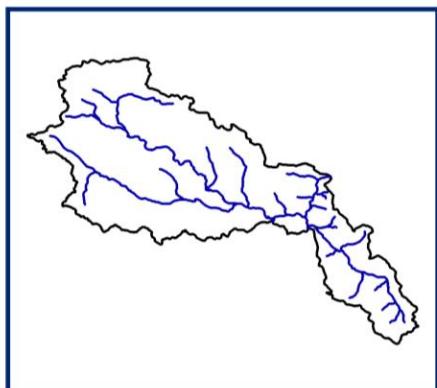
04 DECEMBER 2015

05 DECEMBER 2015

07 DECEMBER 2015



DATA NOT AVAILABLE



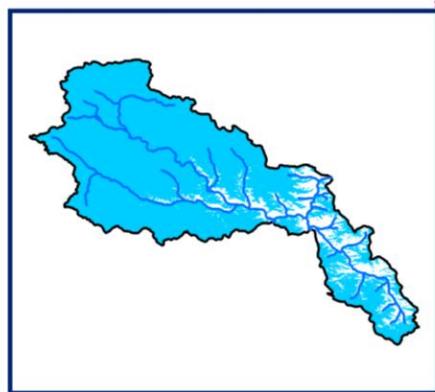
DATA NOT AVAILABLE



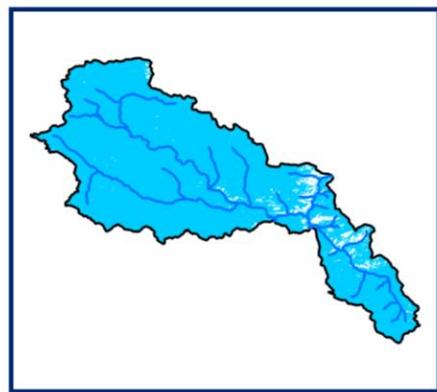
**SNOW COVER MAP : SHIGO SUB-BASIN**



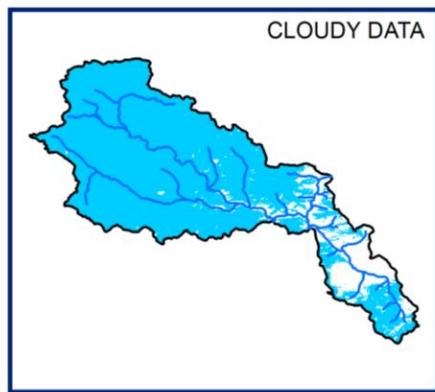
**02 JANUARY 2016**



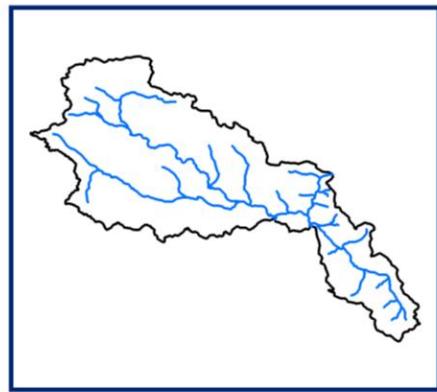
**03 JANUARY 2016**



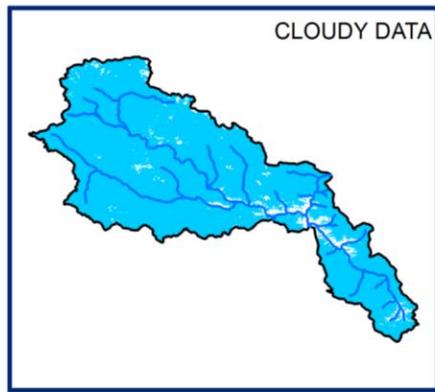
**05 JANUARY 2016**



**19 JANUARY 2016**



**DATA NOT AVAILABLE**



**27 JANUARY 2016**

 **SNOW**

40 20 0 40 80 120  
Kilometers

## 10 DAILY SNOW COVER MAP : SHIGO SUB-BASIN

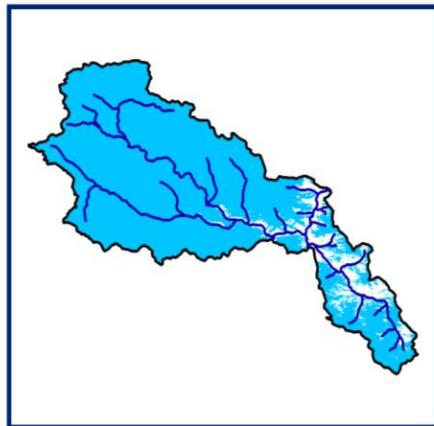


DATA USED

**02 JANUARY 2016**

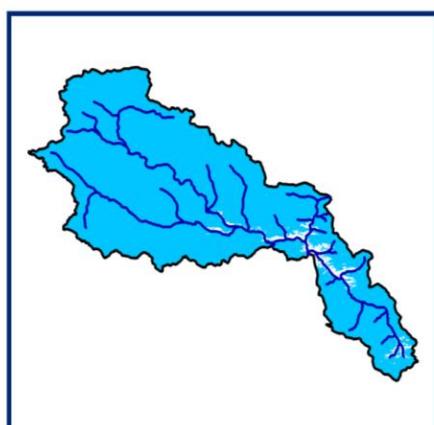
**03 JANUARY 2016**

**05 JANUARY 2016**



DATA USED

**15 JANUARY 2016**

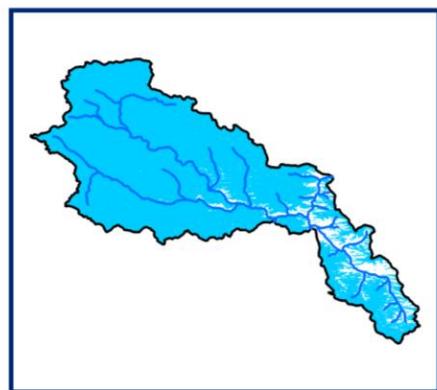


DATA USED

**25 JANUARY 2016**

 SNOW

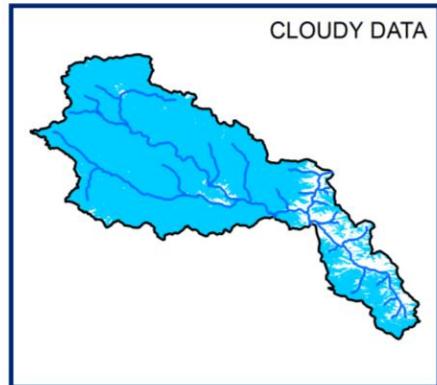
**SNOW COVER MAP : SHIGO SUB-BASIN**



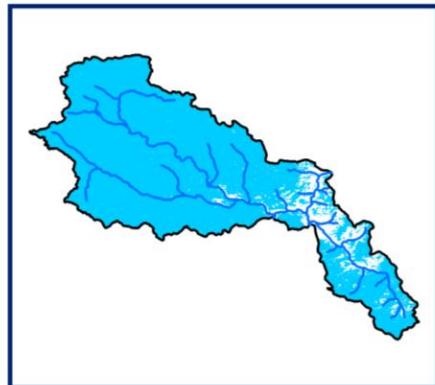
**02 FEBRUARY 2016**



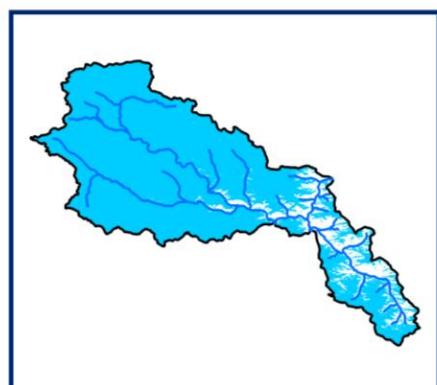
**05 FEBRUARY 2016**



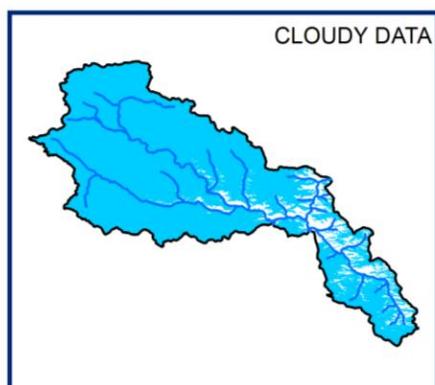
**CLOUDY DATA  
10 FEBRUARY 2016**



**12 FEBRUARY 2016**



**17 FEBRUARY 2016**

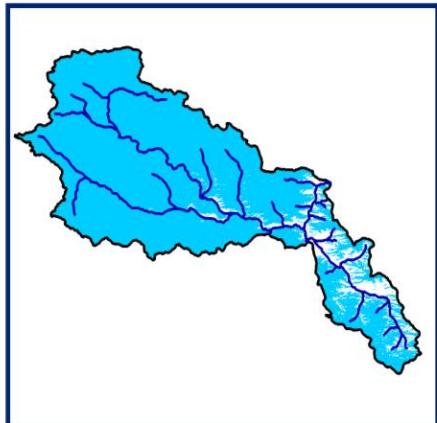


**CLOUDY DATA  
26 FEBRUARY 2016**

 **SNOW**

40 20 0 40 80 120  
  
**Kilometers**

## 10 DAILY SNOW COVER MAP : SHIGO SUB-BASIN

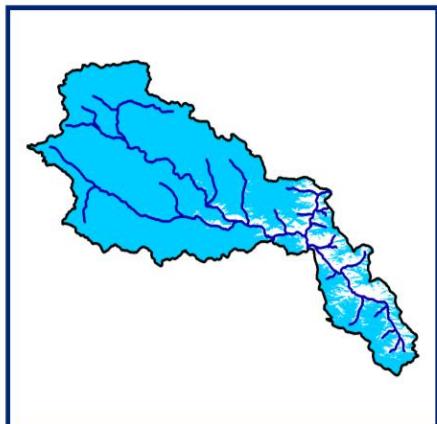


DATA USED

**02 FEBRUARY 2016**

**03 FEBRUARY 2016**

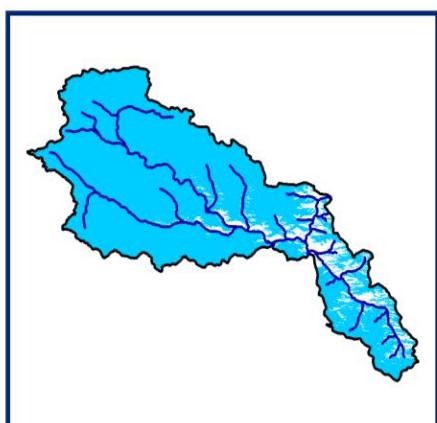
**10 FEBRUARY 2016**



DATA USED

**12 FEBRUARY 2016**

**17 FEBRUARY 2016**



DATA USED

**25 FEBRUARY 2016**



**SNOW COVER MAP**

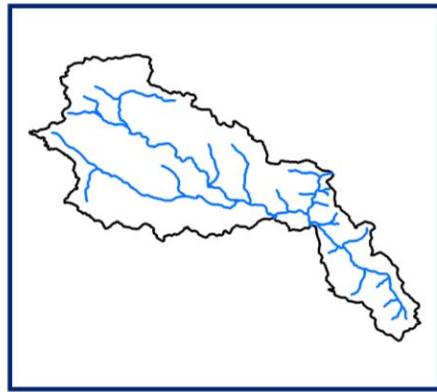
: SHIGO SUB-BASIN



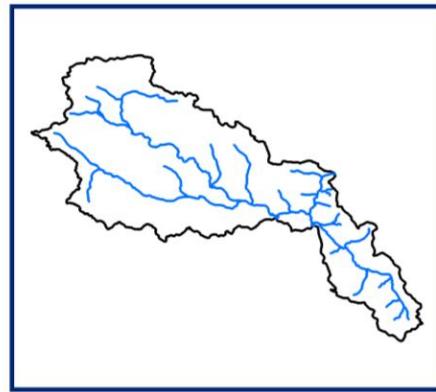
**04 MARCH 2016**



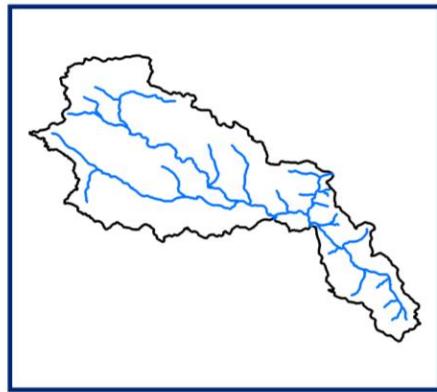
**07 MARCH 2016**



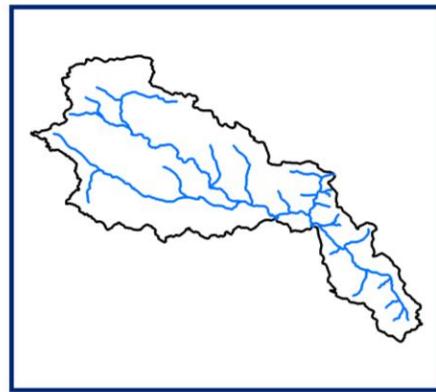
**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**



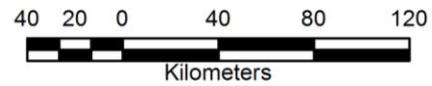
**DATA NOT AVAILABLE**



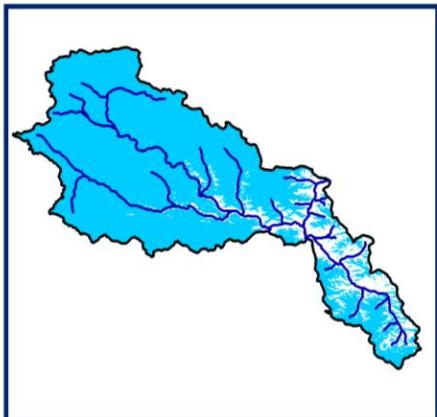
**DATA NOT AVAILABLE**



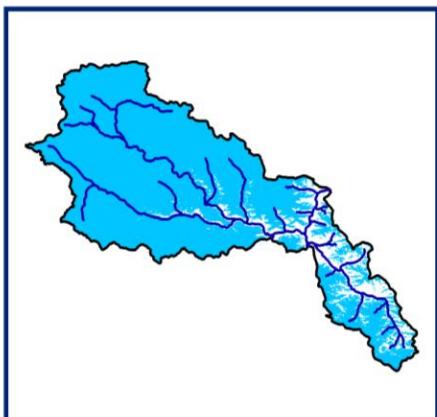
**SNOW**



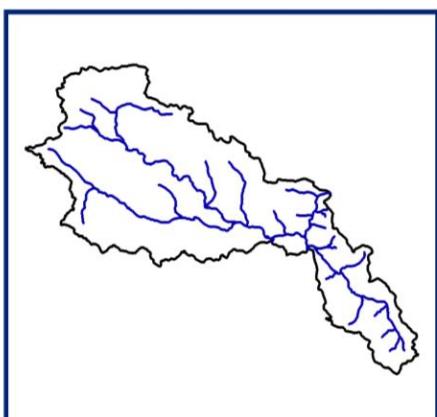
## 10 DAILY SNOW COVER MAP : SHIGO SUB-BASIN



DATA USED  
**04 MARCH 2016**  
**07 MARCH 2016**



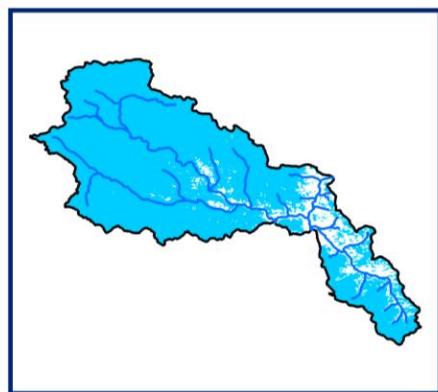
DATA USED  
**15 MARCH 2016**



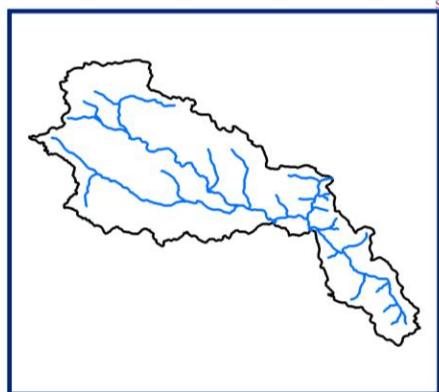
**DATA NOT AVAILABLE**



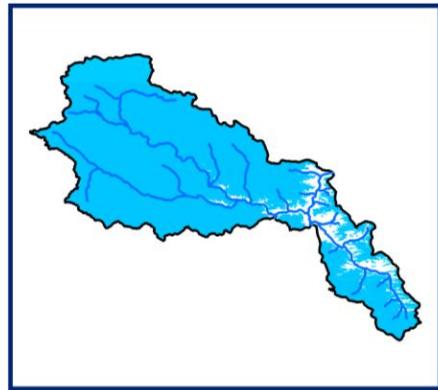
**SNOW COVER MAP : SHIGO SUB-BASIN**



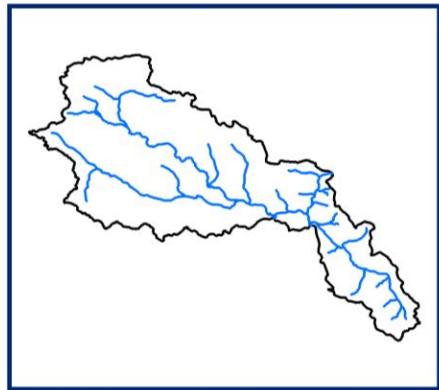
**07 APRIL 2016**



**DATA NOT AVAILABLE**



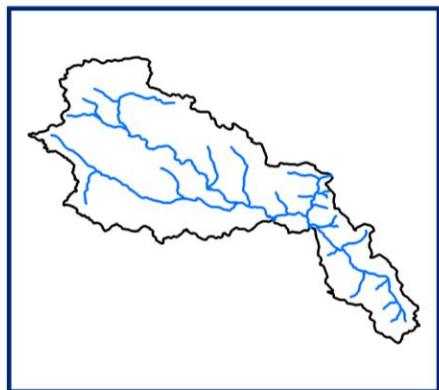
**14 APRIL 2016**



**DATA NOT AVAILABLE**

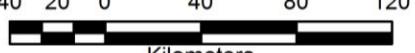


**24 APRIL 2016**

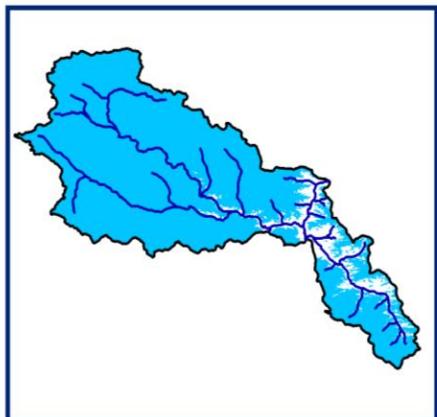


**DATA NOT AVAILABLE**

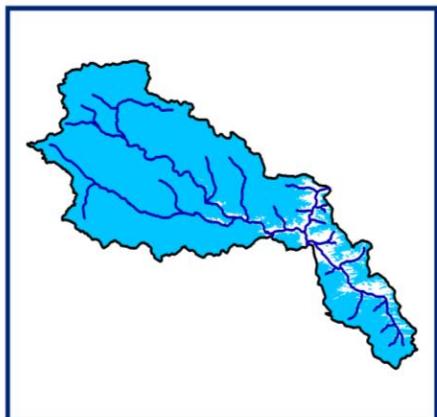
 **SNOW**

40 20 0 40 80 120  
  
Kilometers

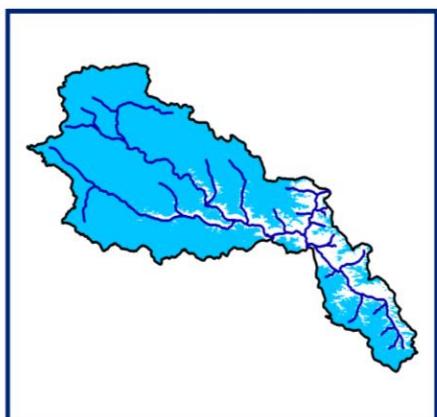
## 10 DAILY SNOW COVER MAP : SHIGO SUB-BASIN



DATA USED  
**05 APRIL 2016**



DATA USED  
**15 APRIL 2016**

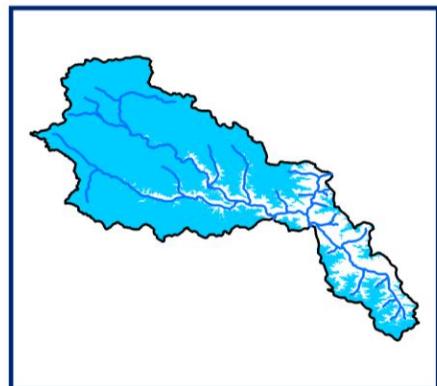


DATA USED  
**25 APRIL 2016**

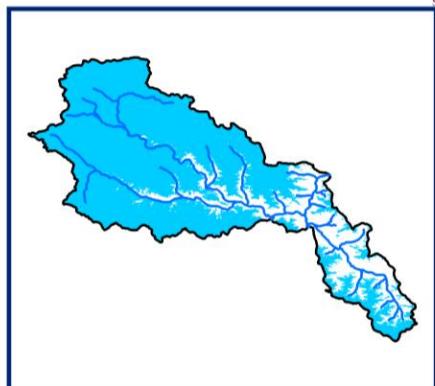
 SNOW

A legend entry consisting of a small blue square followed by the word "SNOW" in black capital letters.

**SNOW COVER MAP : SHIGO SUB-BASIN**



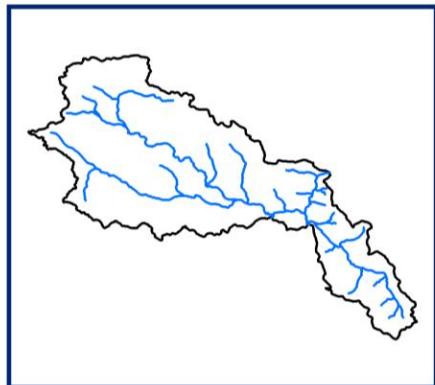
**01 MAY 2016**



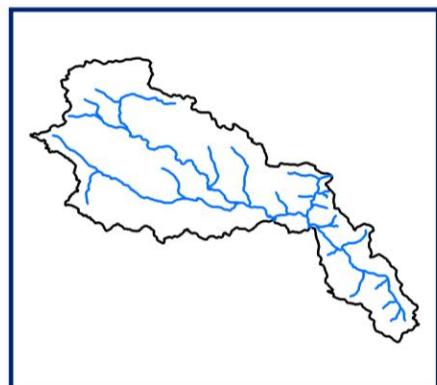
**02 MAY 2016**



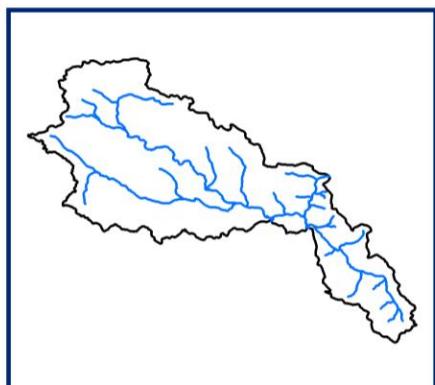
**06 MAY 2016**



**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**

 **SNOW**

40 20 0 40 80 120  
  
Kilometers

## 10 DAILY SNOW COVER MAP : SHIGO SUB-BASIN

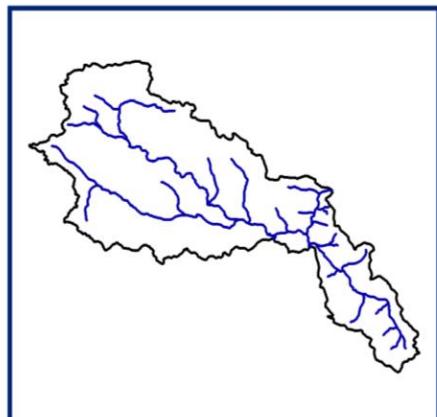


DATA USED

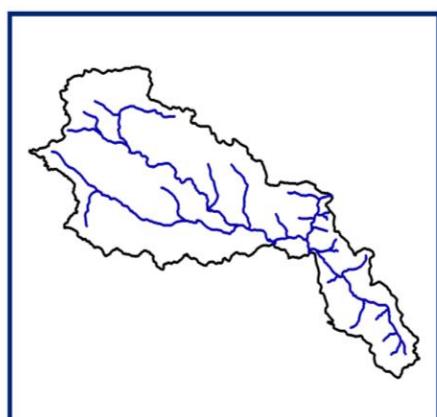
**01 MAY 2016**

**02 MAY 2016**

**06 MAY 2016**



**DATA NOT AVAILABLE**



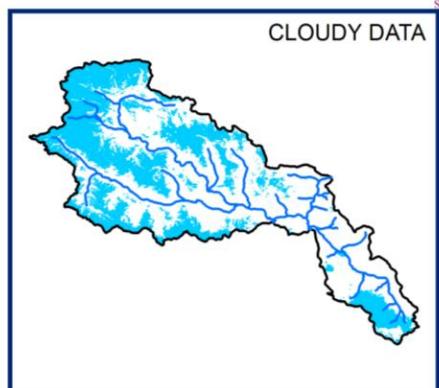
**DATA NOT AVAILABLE**



**SNOW COVER MAP : SHIGO SUB-BASIN**



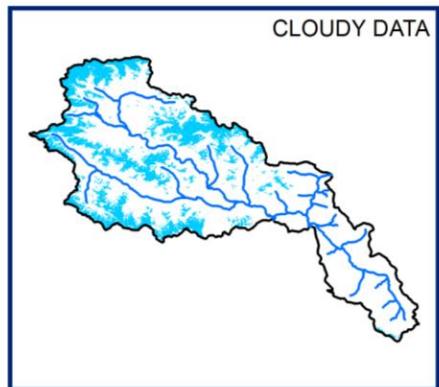
**04 JUNE 2016**



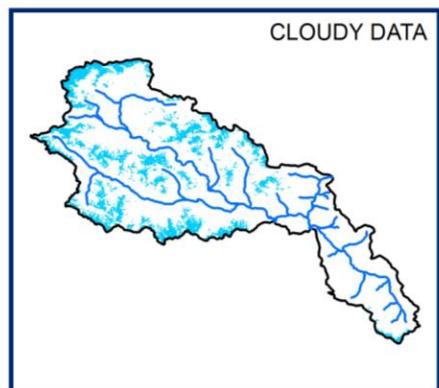
**09 JUNE 2016**



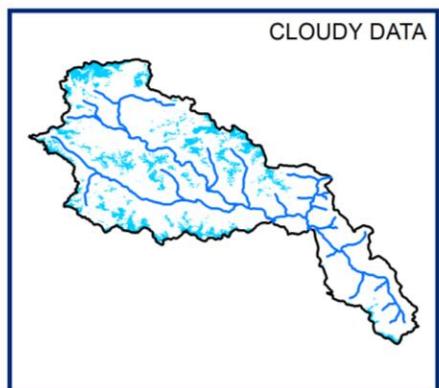
**14 JUNE 2016**



**18 JUNE 2016**



**19 JUNE 2016**

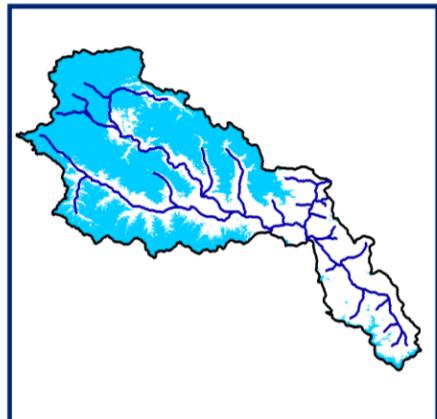


**23 JUNE 2016**

 SNOW

40 20 0 40 80 120  
Kilometers

## **10 DAILY SNOW COVER MAP : SHIGO SUB-BASIN**



**DATA USED**

**04 JUNE 2016**

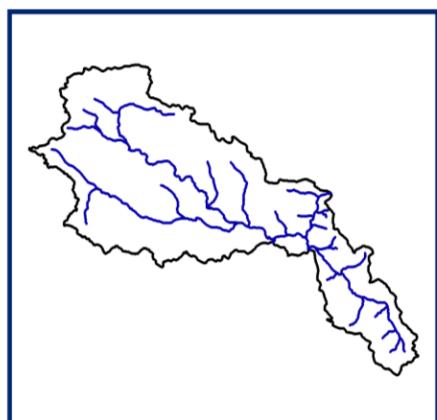
**09 JUNE 2016**



**DATA USED**

**14 JUNE 2016**

**18 JUNE 2016**



**DATA NOT AVAILABLE**



# *DRAS SUB-BASIN*

## AREAL EXTENT OF SNOW (5 DAILY)

**BASIN NAME: DRAS**

**BASIN AREA: 1683 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
<b>October 2015</b>							
<b>1</b>	01-Oct-15	850	51	<b>3</b>	05-Oct-15	634	38 (c)
<b>2</b>	03-Oct-15	759	45	<b>4</b>	15-Oct-15	378	22 (c)
<b>November 2015</b>							
<b>5</b>	01-Nov-15	1215	72	<b>7</b>	08-Nov-15	1565	93
<b>6</b>	06-Nov-15	1608	96	<b>8</b>	15-Nov-15	1374	82 (c)
<b>December 2015</b>							
<b>9</b>	04-Dec-15	1445	86	<b>11</b>	07-Dec-15	1360	81 (c)
<b>10</b>	05-Dec-15	1416	84				
<b>January 2016</b>							
<b>12</b>	02-Jan-16	1528	91	<b>15</b>	19-Jan-16	1586	94
<b>13</b>	03-Jan-16	1521	90	<b>16</b>	27-Jan-16	1602	95 (c)
<b>14</b>	05-Jan-16	1635	97				
<b>February 2016</b>							
<b>17</b>	02-Feb-16	1620	96	<b>20</b>	12-Feb-16	1606	95
<b>18</b>	03-Feb-16	1452	86 (c)	<b>21</b>	17-Feb-16	1618	96
<b>19</b>	10-Feb-16	1637	97 (c)	<b>22</b>	26-Feb-16	1619	96
<b>March 2016</b>							
<b>23</b>	05-Mar-16	1608	96	<b>24</b>	07-Mar-16	1562	93
<b>April 2016</b>							
<b>25</b>	07-Apr-16	1592	95	<b>27</b>	20-Apr-16	1465	87
<b>26</b>	14-Apr-16	1581	94	<b>28</b>	27-Apr-16	1303	77 (c)
<b>May 2016</b>							
<b>29</b>	01-May-16	1462	87	<b>31</b>	06-May-16	1322	79
<b>30</b>	02-May-16	1439	86				
<b>June 2016</b>							
<b>32</b>	04-Jun-16	915	54	<b>36</b>	18-Jun-16	314	19 (c)
<b>33</b>	09-Jun-16	679	40 (c)	<b>37</b>	19-Jun-16	393	23 (c)
<b>34</b>	13-Jun-16	686	41 (c)	<b>38</b>	23-Jun-16	241	14 (c)
<b>35</b>	14-Jun-16	682	41				

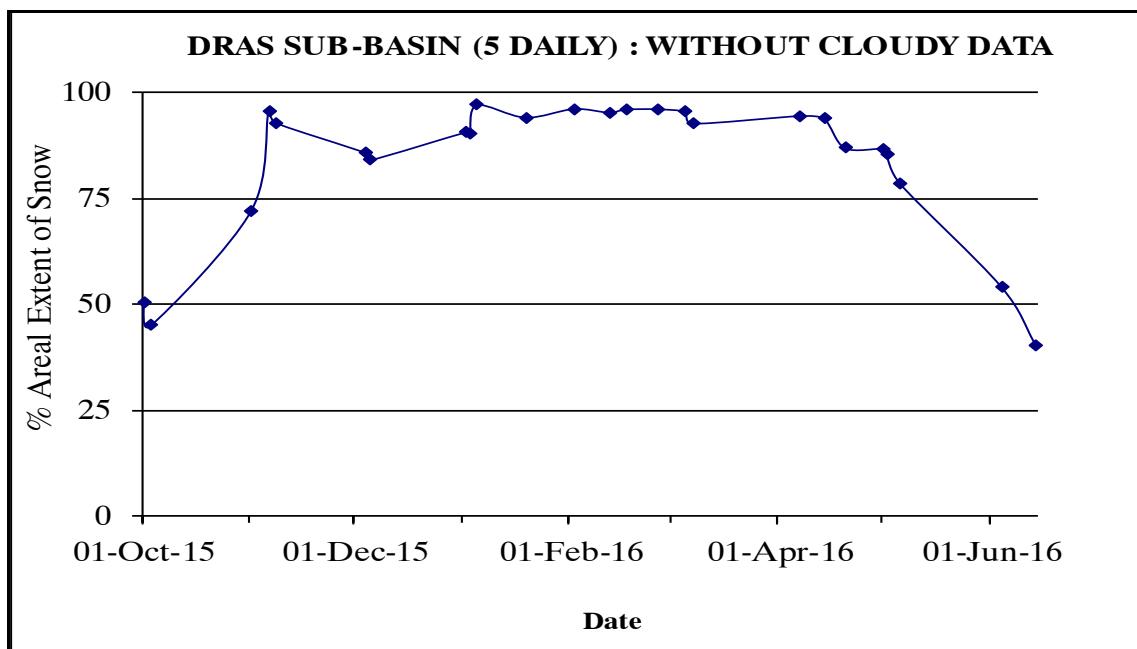
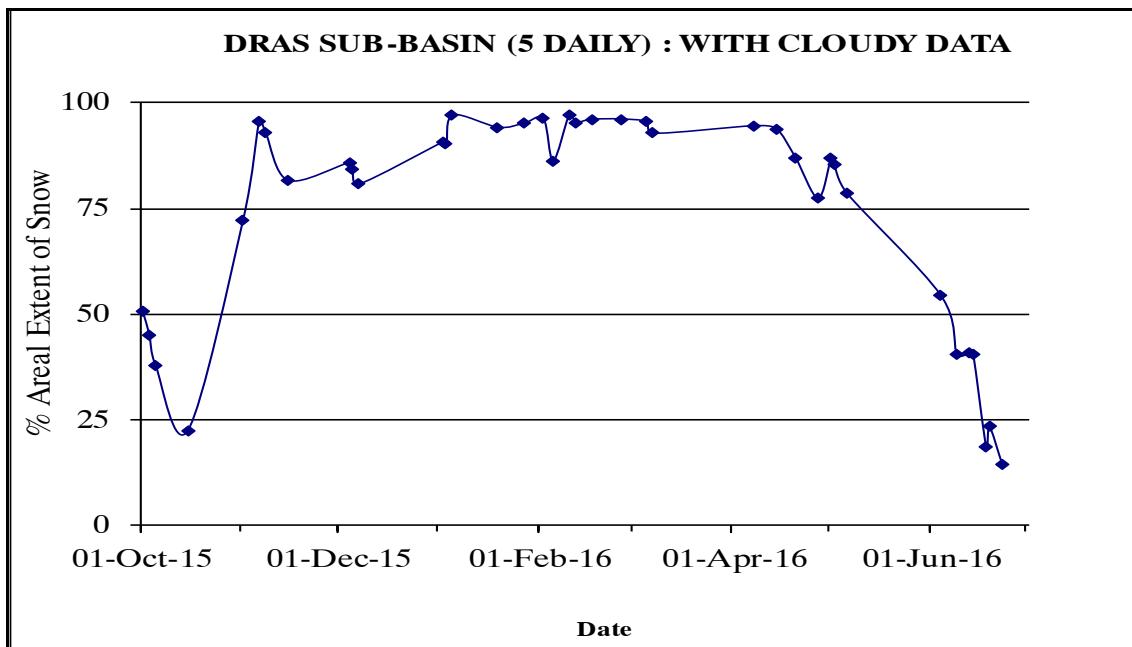
**AREAL EXTENT OF SNOW (10 DAILY)**

**BASIN NAME: DRAS**

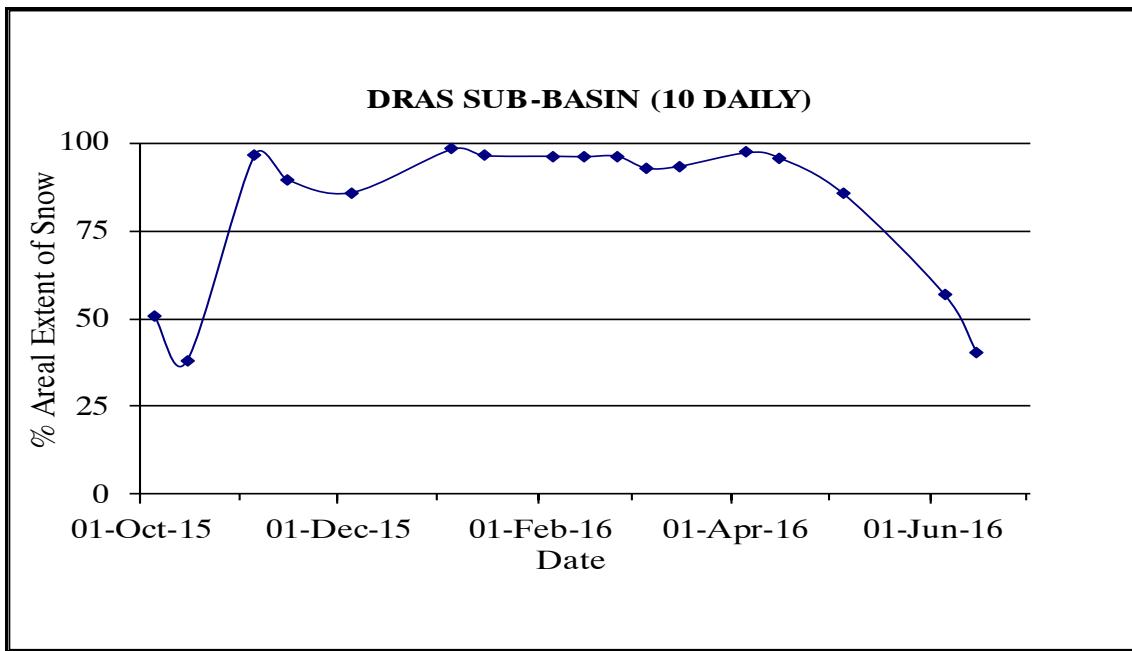
**BASIN AREA: 1683 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
<b>October 2015</b>				<b>November 2015</b>			
<b>1</b>	05-Oct-15	850	51	<b>3</b>	05-Nov-15	1626	97
<b>2</b>	15-Oct-15	636	38	<b>4</b>	15-Nov-15	1507	90
<b>December 2015</b>				<b>January 2016</b>			
<b>5</b>	05-Dec-15	1445	86	<b>6</b>	05-Jan-16	1653	98
				<b>7</b>	15-Jan-16	1622	96
<b>February 2016</b>				<b>March 2016</b>			
<b>8</b>	05-Feb-16	1619	96	<b>11</b>	05-Mar-16	1562	93
<b>9</b>	15-Feb-16	1617	96	<b>12</b>	15-Mar-16	1570	93
<b>10</b>	25-Feb-16	1619	96				
<b>April 2016</b>				<b>May 2016</b>			
<b>13</b>	05-Apr-16	1636	97	<b>15</b>	05-May-16	1438	85
<b>14</b>	15-Apr-16	1612	96				
<b>June 2016</b>							
<b>16</b>	05-Jun-2016	958	57				
<b>17</b>	15-Jun-2016	682	41				

## SNOW COVER DEPLETION CURVE

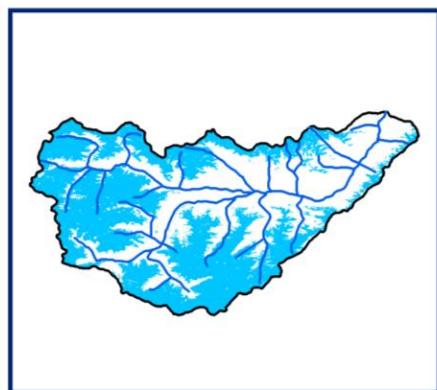


## SNOW COVER DEPLETION CURVE

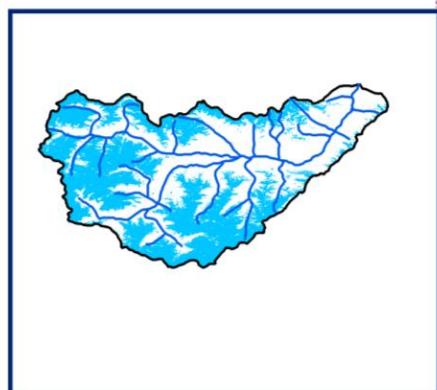


# *DRAS COVER MAP*

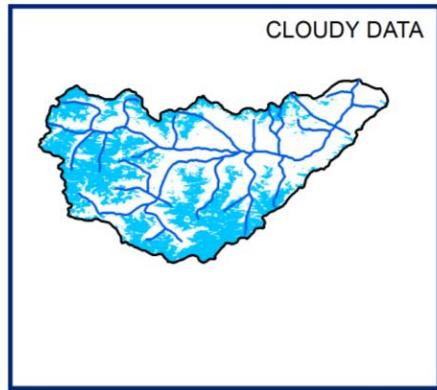
**SNOW COVER MAP : DRAS SUB-BASIN**



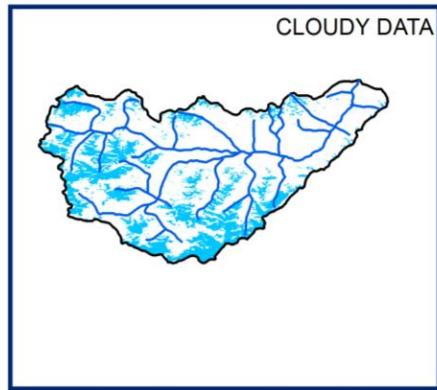
**01 OCTOBER 2015**



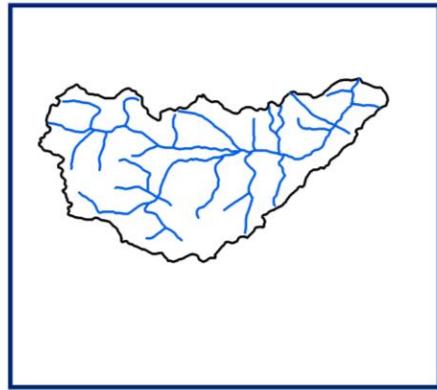
**03 OCTOBER 2015**



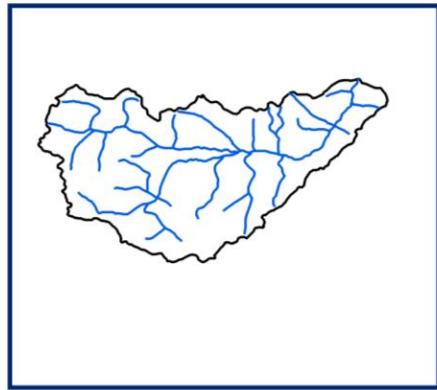
**CLOUDY DATA  
05 OCTOBER 2015**



**CLOUDY DATA  
15 OCTOBER 2015**



**DATA NOT AVAILABLE**

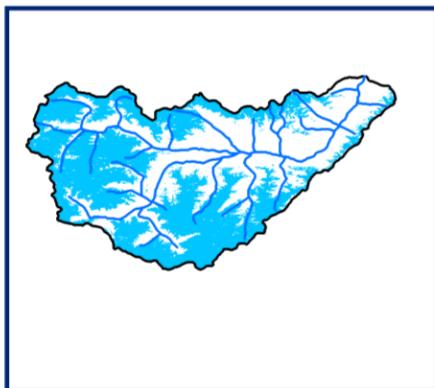


**DATA NOT AVAILABLE**

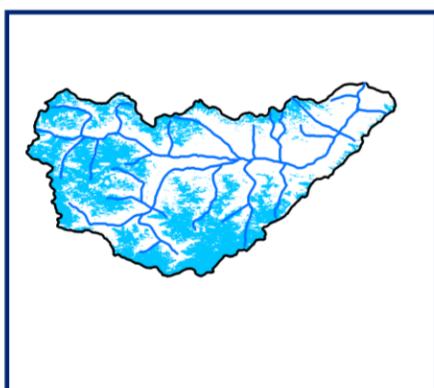
SNOW

20 10 0 20 40 60  
Kilometers

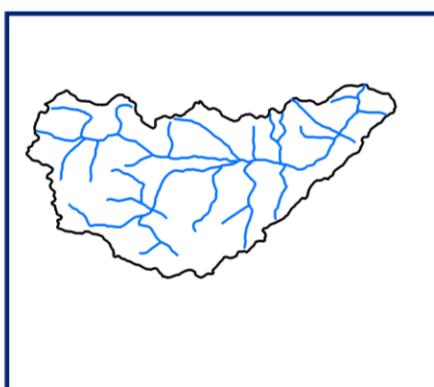
**10 DAILY SNOW COVER MAP : DRAS SUB-BASIN**



**DATA USED  
01 OCTOBER 2015  
03 OCTOBER 2015  
05 OCTOBER 2015**



**DATA USED  
15 OCTOBER 2015**

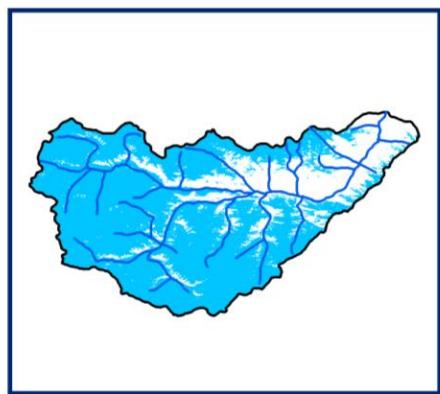


**DATA NOT AVAILABLE**

 SNOW

20 10 0 20 40 60  
  
Kilometers

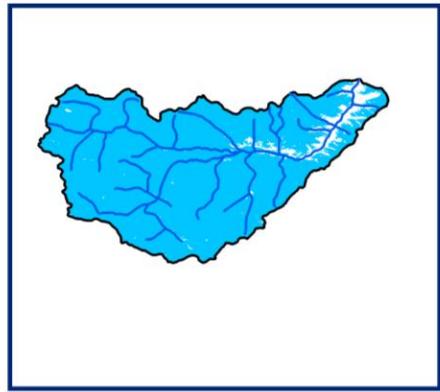
**SNOW COVER MAP : DRAS SUB-BASIN**



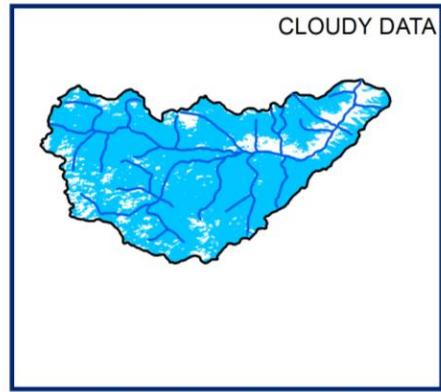
**01 NOVEMBER 2015**



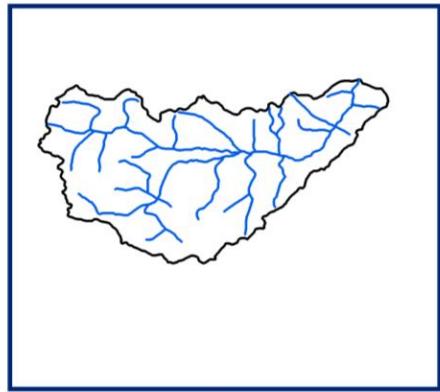
**06 NOVEMBER 2015**



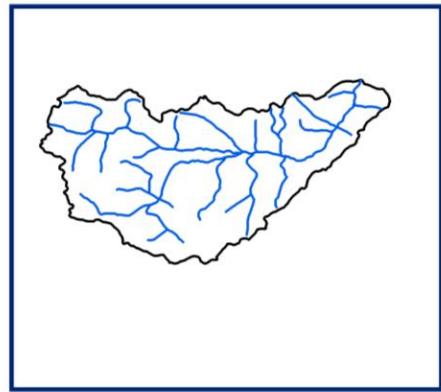
**08 NOVEMBER 2015**



**15 NOVEMBER 2015**



**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**

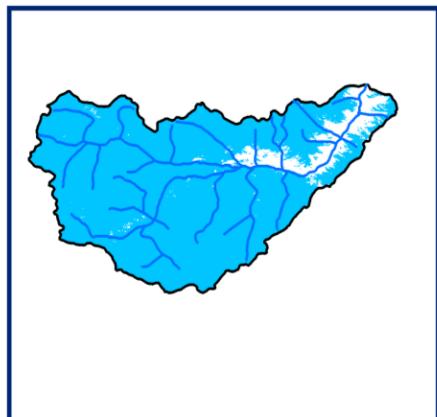
SNOW

20 10 0 20 40 60  
Kilometers

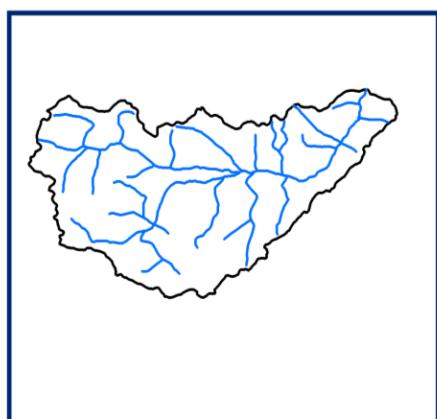
## 10 DAILY SNOW COVER MAP : DRAS SUB-BASIN



DATA USED  
**01 NOVEMBER 2015**  
**06 NOVEMBER 2015**  
**08 NOVEMBER 2015**



DATA USED  
**15 NOVEMBER 2015**

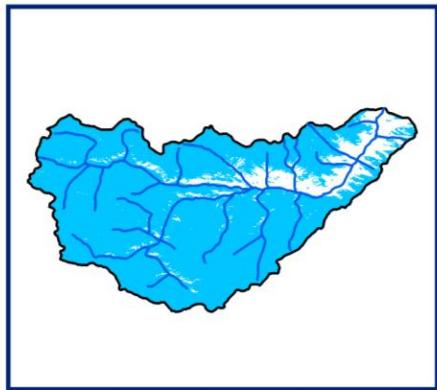


DATA NOT AVAILABLE

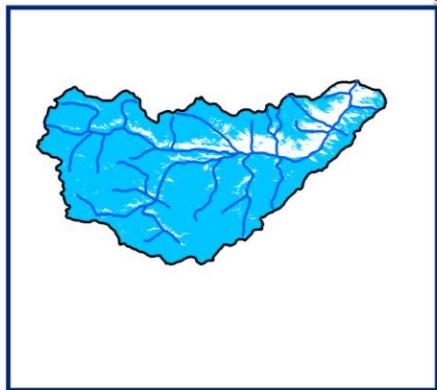
SNOW

20 10 0 20 40 60  
Kilometers

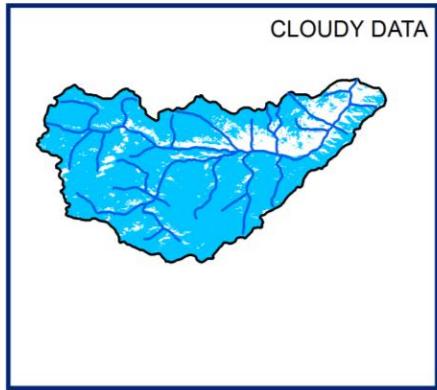
**SNOW COVER MAP : DRAS SUB-BASIN**



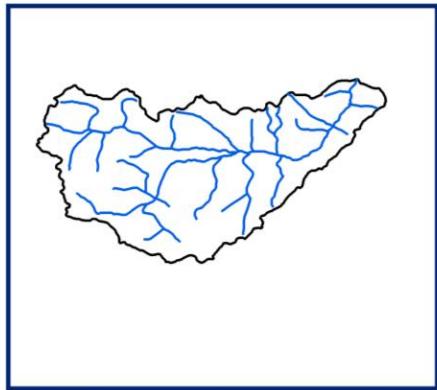
**04 DECEMBER 2015**



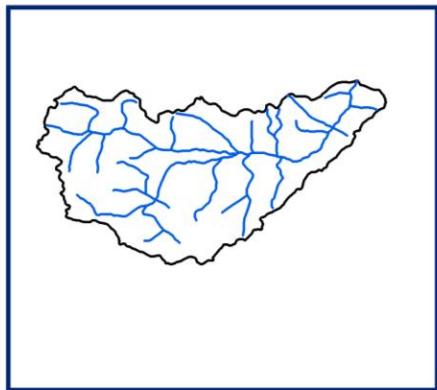
**05 DECEMBER 2015**



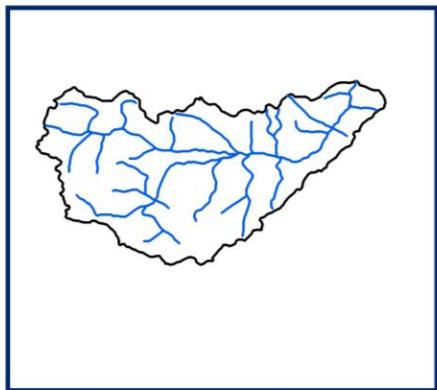
**CLOUDY DATA  
07 DECEMBER 2015**



**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**

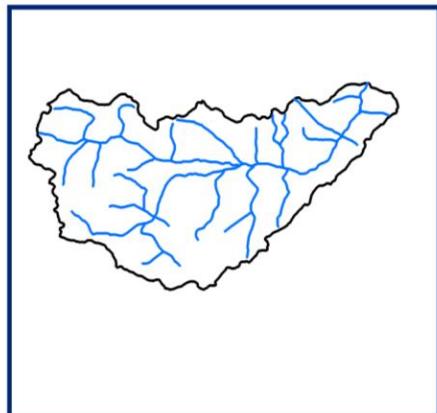
 **SNOW**

20 10 0 20 40 60  
Kilometers

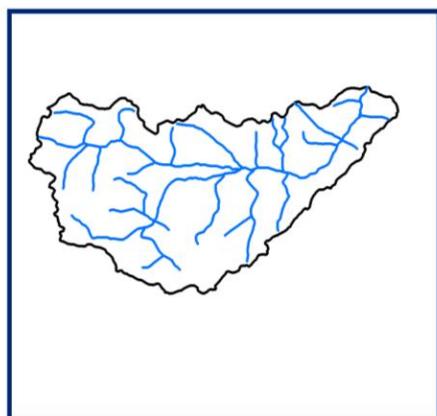
## 10 DAILY SNOW COVER MAP : DRAS SUB-BASIN



DATA USED  
**04 DECEMBER 2015**  
**05 DECEMBER 2015**  
**07 DECEMBER 2015**



**DATA NOT AVAILABLE**

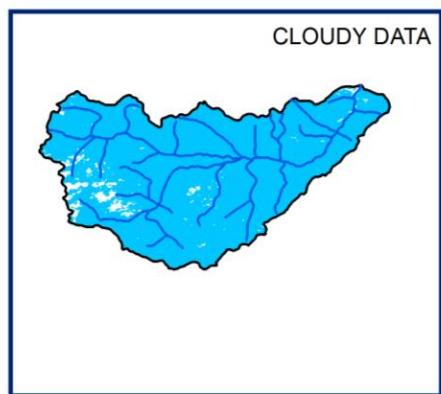
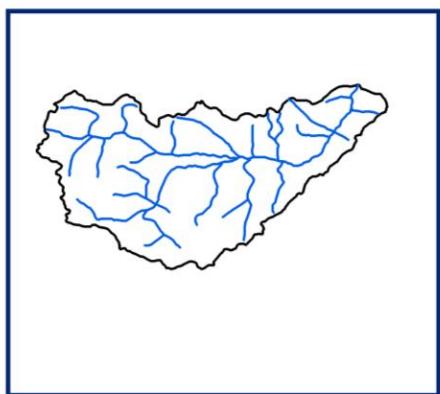
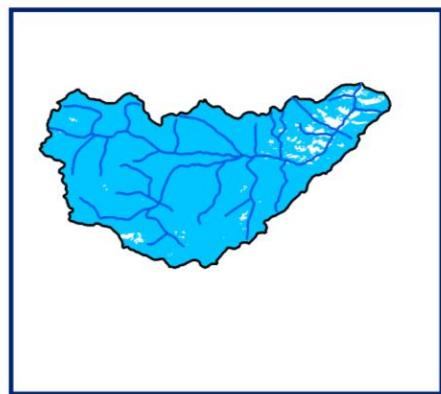
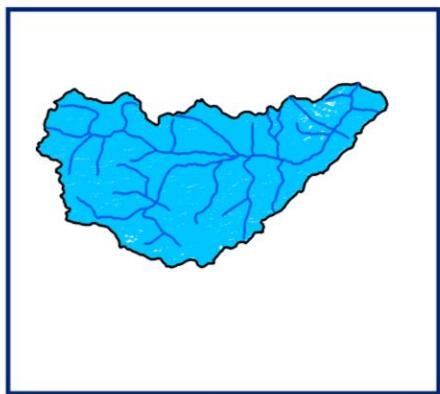
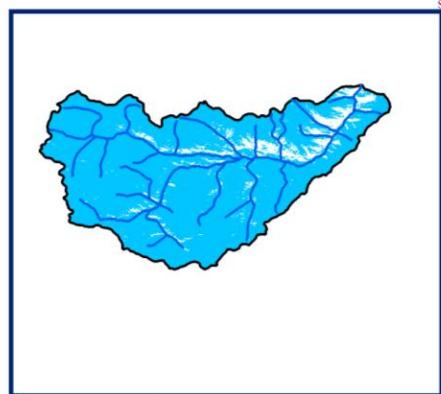
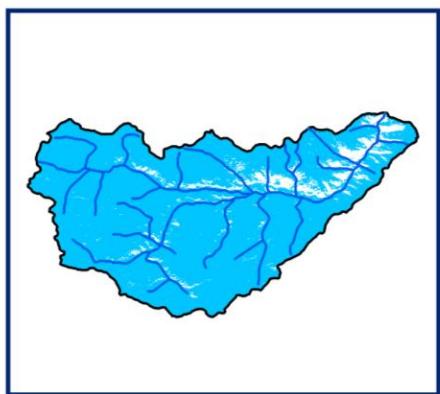


**DATA NOT AVAILABLE**

SNOW

20 10 0 20 40 60  
Kilometers

**SNOW COVER MAP : DRAS SUB-BASIN**



 SNOW

20 10 0 20 40 60  
Kilometers

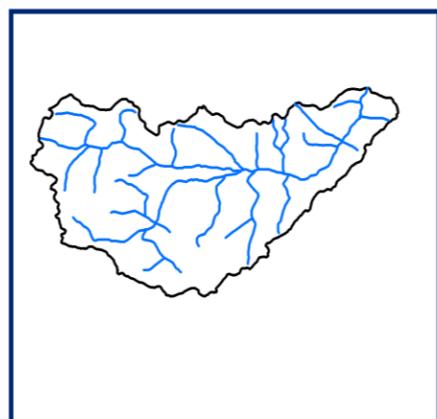
## 10 DAILY SNOW COVER MAP : DRAS SUB-BASIN



DATA USED  
**02 JANUARY 2016**  
**03 JANUARY 2016**  
**05 JANUARY 2016**



DATA USED  
**15 JANUARY 2016**

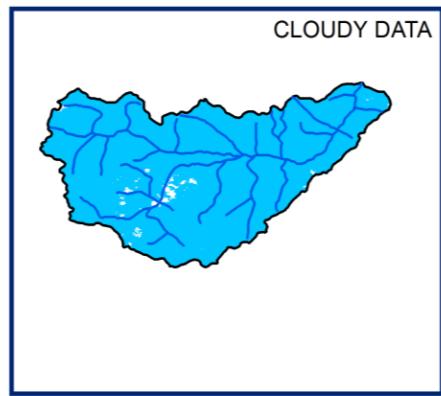
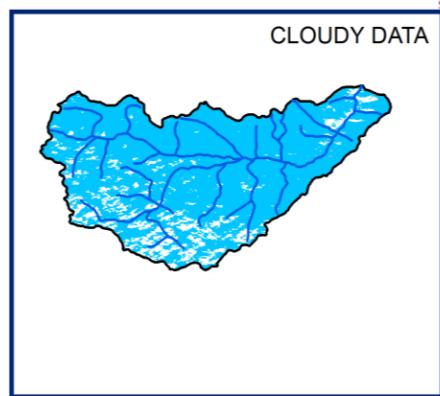
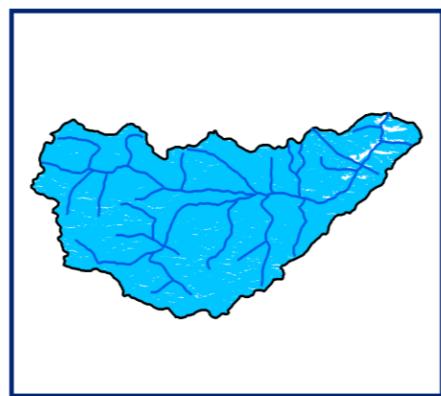


**DATA NOT AVAILABLE**

SNOW

20 10 0 20 40 60  
Kilometers

**SNOW COVER MAP** : **DRAS SUB-BASIN**



 SNOW

20 10 0 20 40 60  
Kilometers

## 10 DAILY SNOW COVER MAP : DRAS SUB-BASIN



DATA USED  
**02 FEBRUARY 2016**  
**05 FEBRUARY 2016**



DATA USED  
**12 FEBRUARY 2016**  
**17 FEBRUARY 2016**



DATA USED  
**25 FEBRUARY 2016**

SNOW

20 10 0 20 40 60  
Kilometers

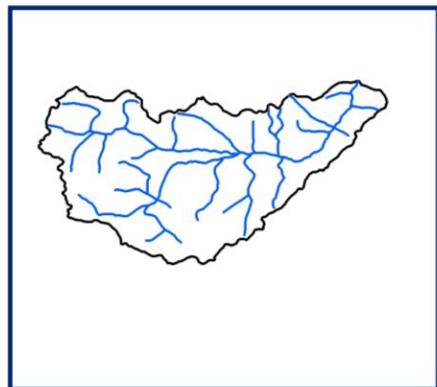
**SNOW COVER MAP : DRAS SUB-BASIN**



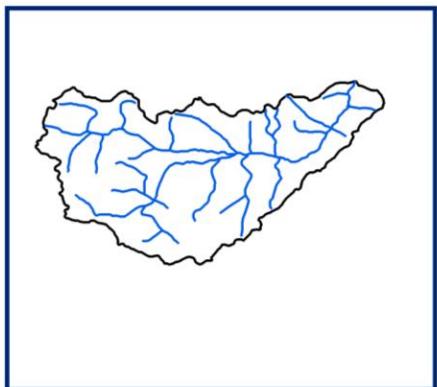
**05 MARCH 2016**



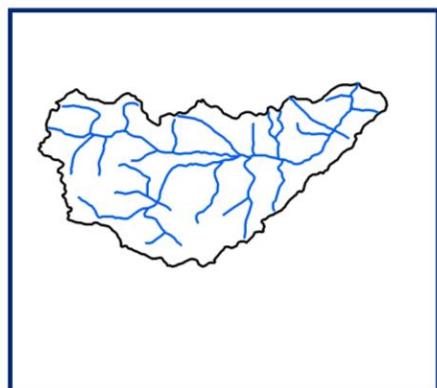
**07 MARCH 2016**



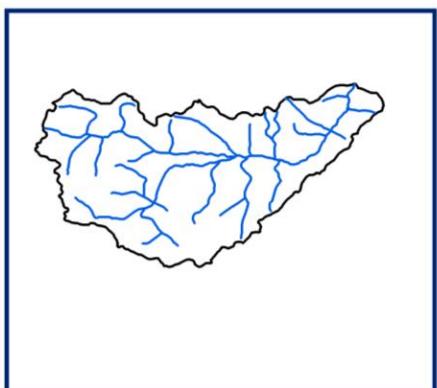
**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**

 **SNOW**

20 10 0 20 40 60  
  
Kilometers

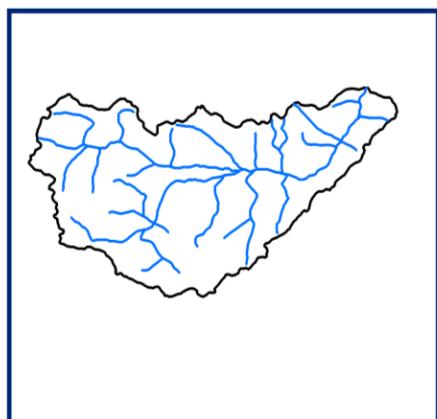
## 10 DAILY SNOW COVER MAP : DRAS SUB-BASIN



DATA USED  
**05 MARCH 2016**  
**07 MARCH 2016**



DATA USED  
**15 MARCH 2016**

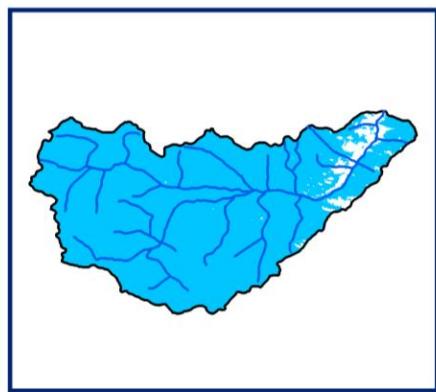


**DATA NOT AVAILABLE**

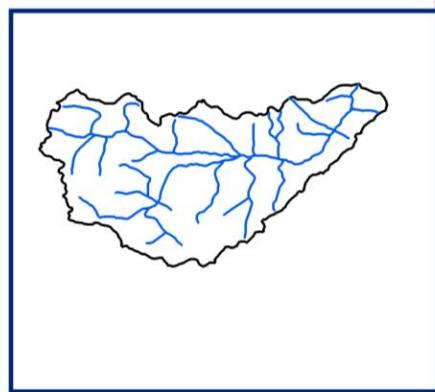
 SNOW

20 10 0 20 40 60  
 Kilometers

**SNOW COVER MAP : DRAS SUB-BASIN**



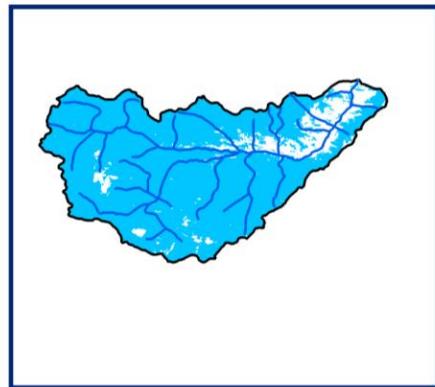
**07 APRIL 2016**



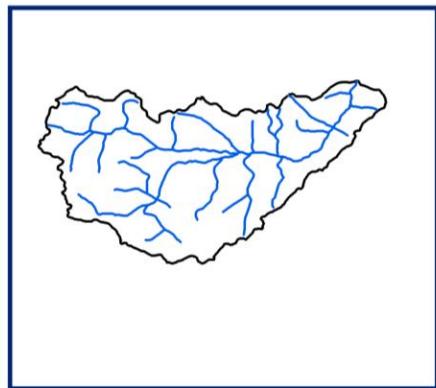
**DATA NOT AVAILABLE**



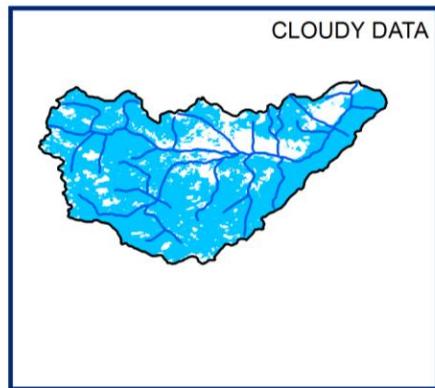
**14 APRIL 2016**



**20 APRIL 2016**



**DATA NOT AVAILABLE**



**27 APRIL 2016**

 **SNOW**

20 10 0 20 40 60  
  
Kilometers

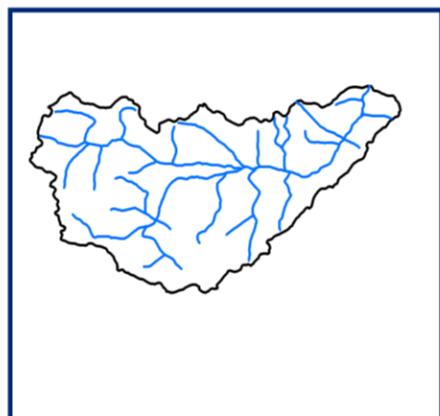
## 10 DAILY SNOW COVER MAP : DRAS SUB-BASIN



DATA USED  
**05 APRIL 2016**

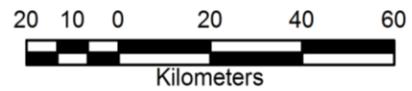


DATA USED  
**14 APRIL 2016**  
**20 APRIL 2016**



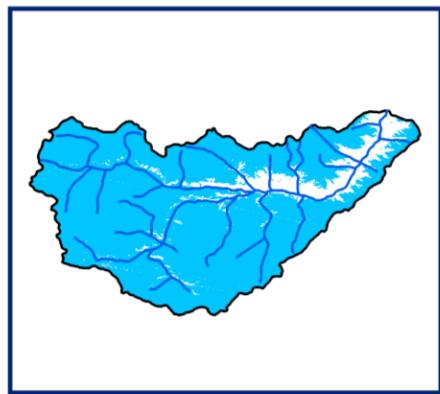
**DATA NOT AVAILABLE**

SNOW

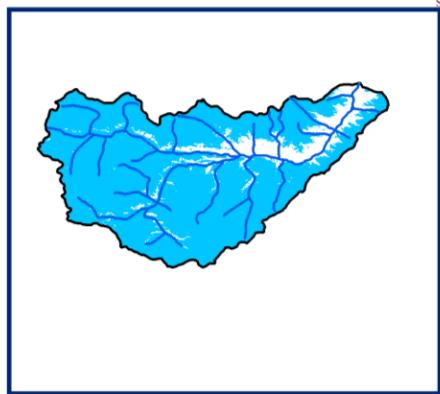


**SNOW COVER MAP**

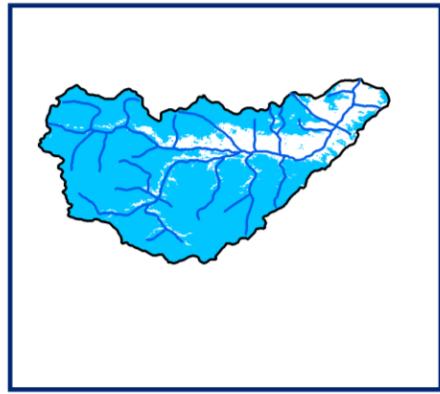
: DRAS SUB-BASIN



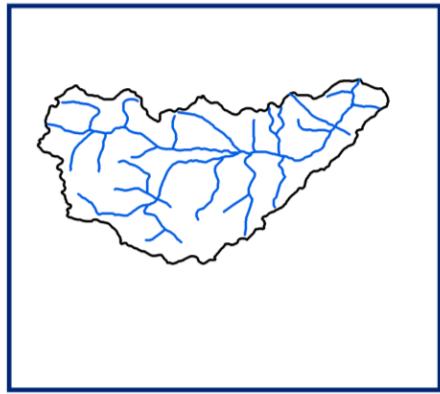
**01MAY 2016**



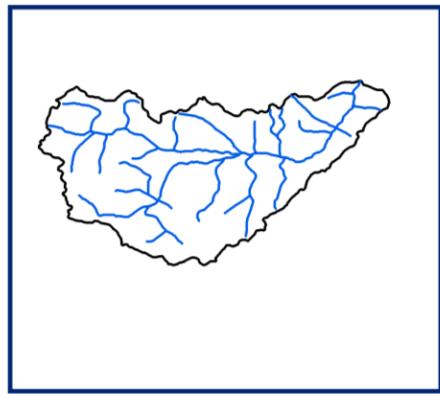
**02MAY 2016**



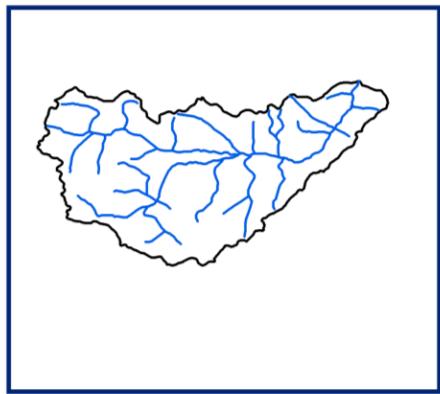
**06 MAY 2016**



**DATA NOT AVAILABLE**



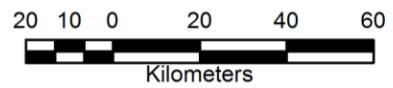
**DATA NOT AVAILABLE**



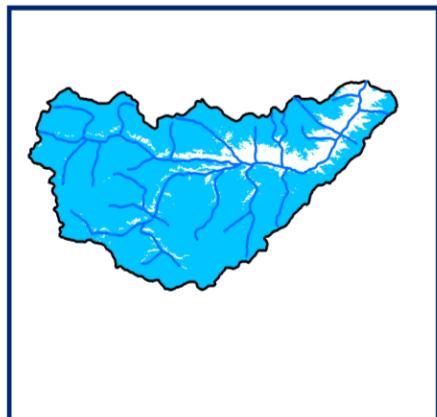
**DATA NOT AVAILABLE**



**SNOW**



## 10 DAILY SNOW COVER MAP : DRAS SUB-BASIN

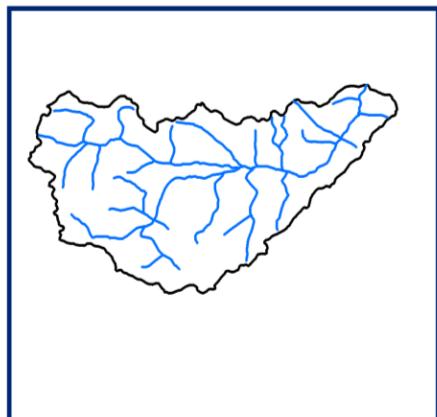


DATA USED

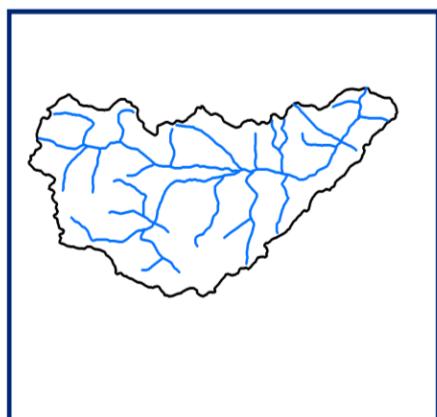
**01 MAY 2016**

**02 MAY 2016**

**06 MAY 2016**



**DATA NOT AVAILABLE**



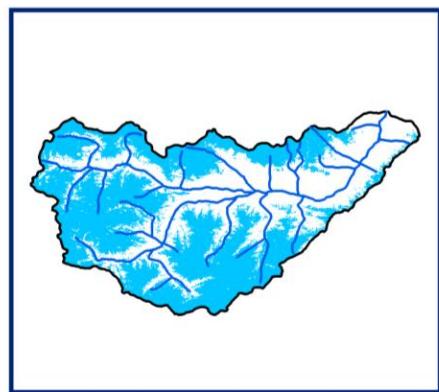
**DATA NOT AVAILABLE**

 SNOW

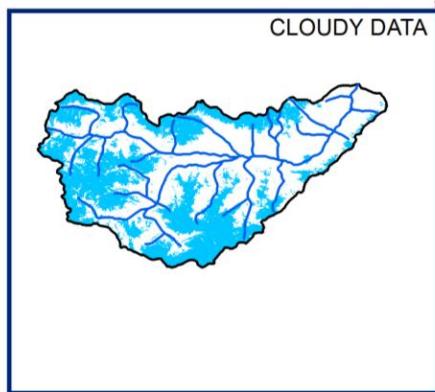
20 10 0 20 40 60  
 Kilometers

**SNOW COVER MAP**

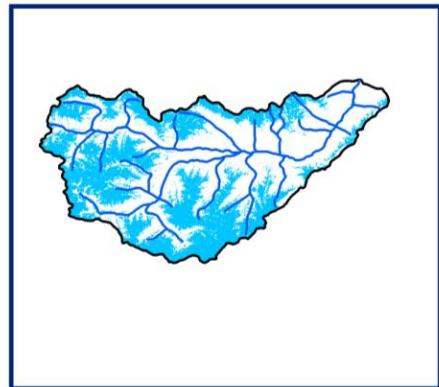
: DRAS SUB-BASIN



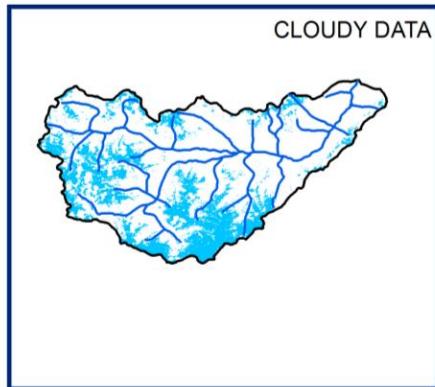
**04 JUNE 2016**



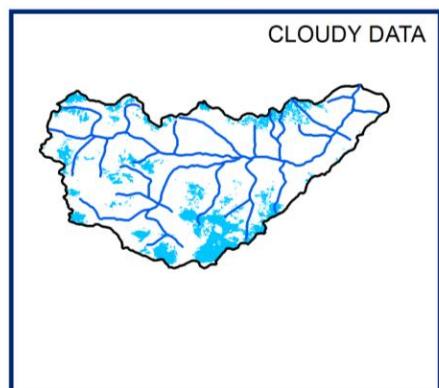
**09 JUNE 2016**



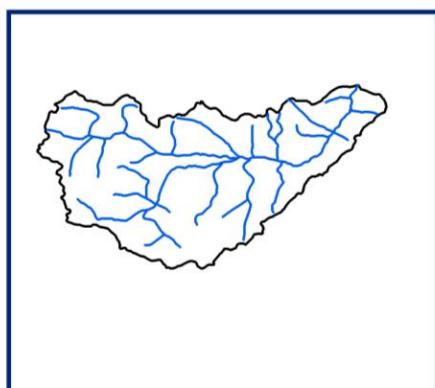
**14 JUNE 2016**



**19 JUNE 2016**



**23 JUNE 2016**

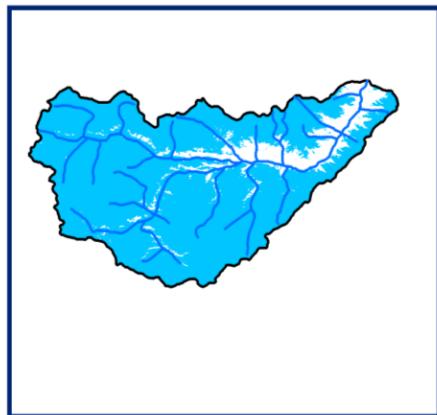


**DATA NOT AVAILABLE**

 SNOW

20 10 0 20 40 60  
Kilometers

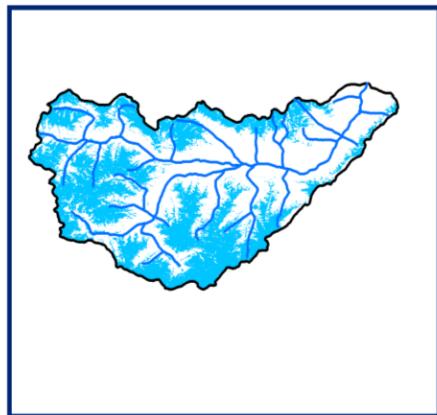
## **10 DAILY SNOW COVER MAP : DRAS SUB-BASIN**



**DATA USED**

**01 JUNE 2016**

**09 JUNE 2016**

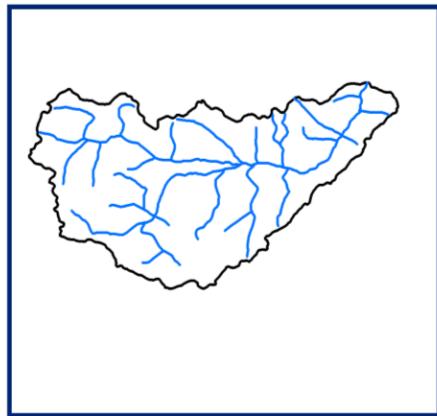


**DATA USED**

**13 JUNE 2016**

**14 JUNE 2016**

**18 JUNE 2016**



**DATA NOT AVAILABLE**

**SNOW**

20 10 0 20 40 60  
 Kilometers

# *SURV SURB-BASIN*

### AREAL EXTENT OF SNOW (5 DAILY)

**BASIN NAME: SURU**

**BASIN AREA: 3575 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
<b>October 2015</b>							
<b>1</b>	01-Oct-15	1960	55	<b>2</b>	03-Oct-15	1811	51
<b>November 2015</b>							
<b>3</b>	01-Nov-15	2486	70	<b>5</b>	08-Nov-15	2895	81 (c)
<b>4</b>	06-Nov-15	3228	90	<b>6</b>	15-Nov-15	2823	79(c)
<b>December 2015</b>							
<b>7</b>	04-Dec-15	3063	86 (c)	<b>9</b>	07-Dec-15	2765	77
<b>8</b>	05-Dec-15	2877	80				
<b>January 2016</b>							
<b>10</b>	02-Jan-16	2959	83	<b>13</b>	19-Jan-16	2736	77 (c)
<b>11</b>	03-Jan-16	2960	83	<b>14</b>	27-Jan-16	3402	95
<b>12</b>	05-Jan-16	3451	97				
<b>February 2016</b>							
<b>15</b>	05-Feb-16	2443	68 (c)	<b>18</b>	17-Feb-16	3218	90
<b>16</b>	10-Feb-16	3177	89 (c)	<b>19</b>	26-Feb-16	3280	92
<b>17</b>	12-Feb-16	3248	91				
<b>March 2016</b>							
<b>20</b>	05-Mar-16	3221	90	<b>21</b>	07-Mar-16	3036	85
<b>April 2016</b>							
<b>22</b>	07-Apr-16	3342	93	<b>24</b>	20-Apr-16	3124	87
<b>23</b>	14-Apr-16	3296	92				
<b>May 2016</b>							
<b>25</b>	02-May-16	2997	84	<b>26</b>	06-May-16	2799	78

<b>June 2016</b>							
<b>27</b>	04-Jun-16	1937	54	<b>32</b>	19-Jun-16	1112	31 (c)
<b>28</b>	09-Jun-16	1369	38 (c)	<b>33</b>	23-Jun-16	951	27 (c)
<b>29</b>	13-Jun-16	1458	41 (c)				
<b>30</b>	14-Jun-16	1545	43				
<b>31</b>	18-Jun-16	361	10 (c)				

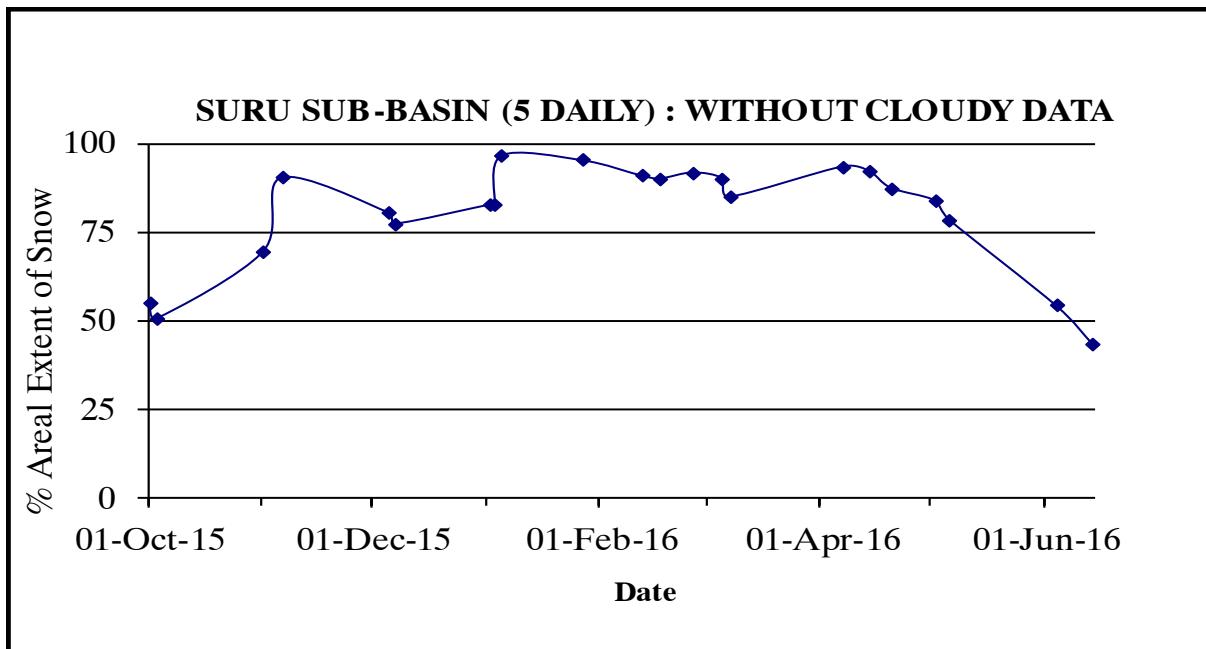
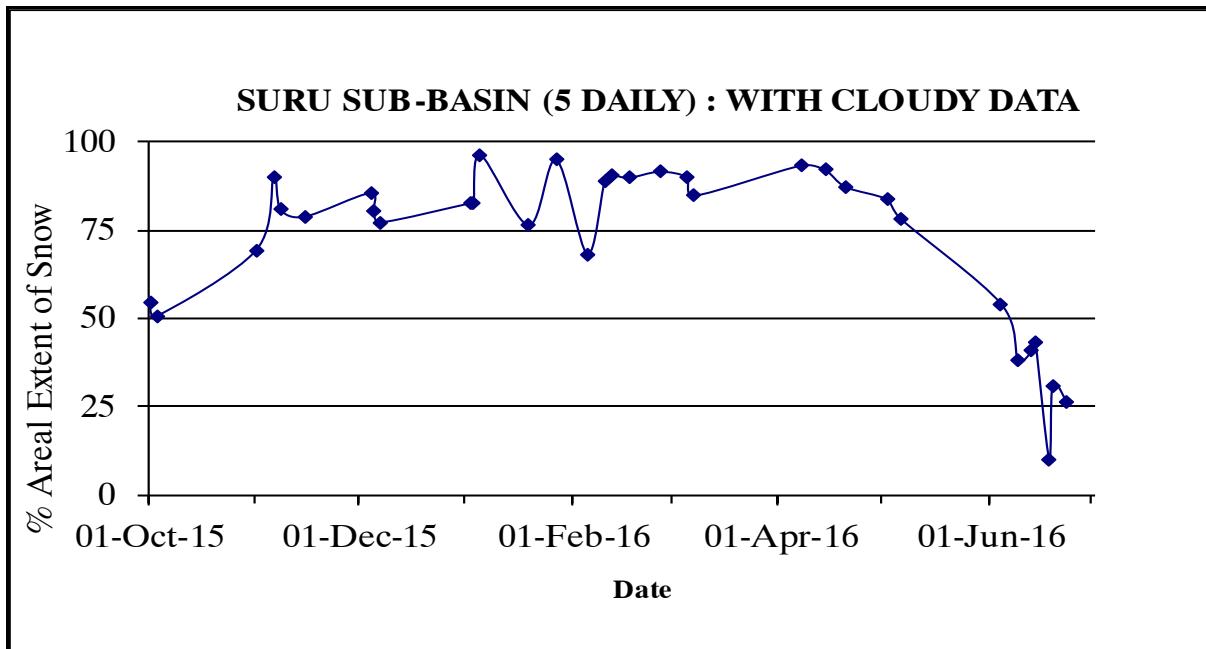
### AREAL EXTENT OF SNOW (10 DAILY)

**BASIN NAME: SURU**

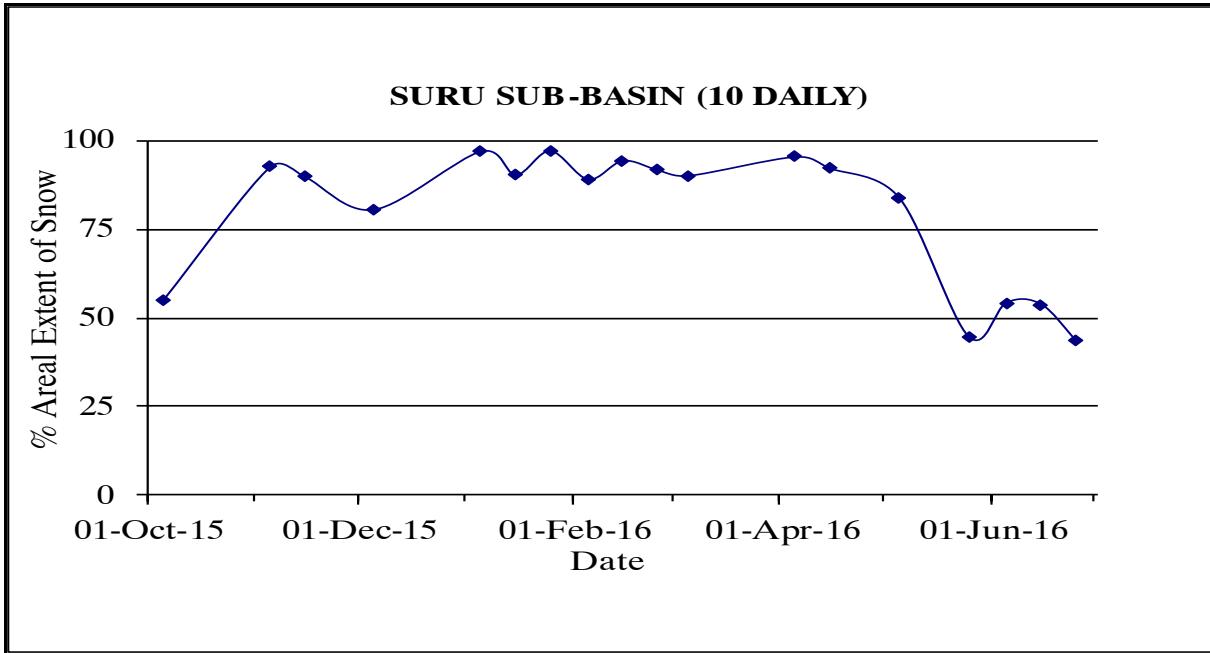
**BASIN AREA: 3575 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
<b>October 2015</b>				<b>November 2015</b>			
<b>1</b>	05-Oct-15	1960	55	<b>2</b>	05-Nov-15	3311	93
				<b>3</b>	15-Nov-15	3210	90
<b>December 2015</b>				<b>January 2016</b>			
<b>4</b>	05-Dec-15	2878	81	<b>5</b>	05-Jan-16	2957	97
				<b>6</b>	15-Jan-16	3230	90
				<b>7</b>	25-Jan-16	3472	97
<b>February 2016</b>				<b>March 2016</b>			
<b>8</b>	05-Feb-16	3185	89	<b>11</b>	05-Mar-16	3221	90
<b>9</b>	15-Feb-16	3373	94				
<b>10</b>	25-Feb-16	3280	92				
<b>April 2016</b>				<b>May 2016</b>			
<b>12</b>	05-Apr-16	3412	95	<b>14</b>	05-May-16	2997	84
<b>13</b>	15-Apr-16	3296	92	<b>15</b>	25-May-16	1596	45
<b>June 2016</b>							
<b>16</b>	5-Jun-2016	1938	54				
<b>17</b>	15-Jun-2016	1922	54				
<b>18</b>	25-Jun-2016	1560	44				

## SNOW COVER DEPLETION CURVE

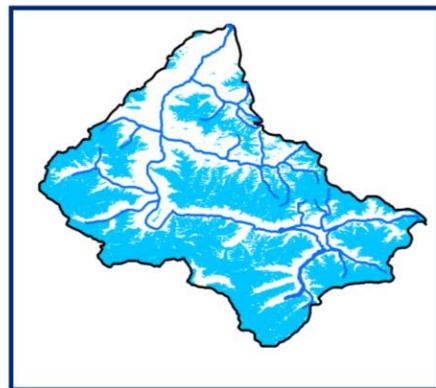


## SNOW COVER DEPLETION CURVE

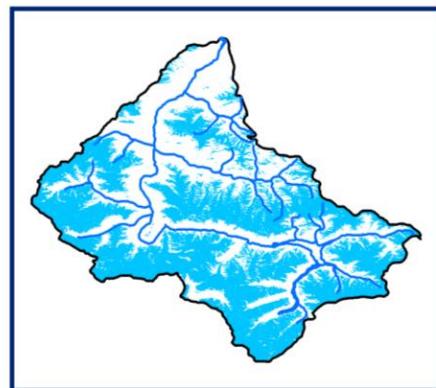


# *SNOW COVER MAP*

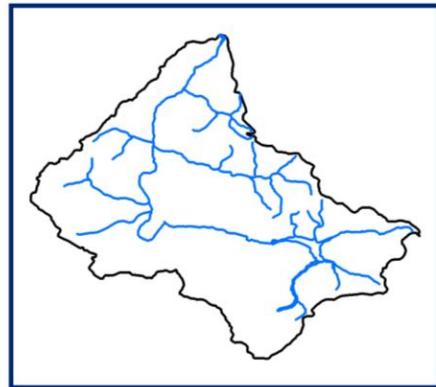
**SNOW COVER MAP : SURU SUB-BASIN**



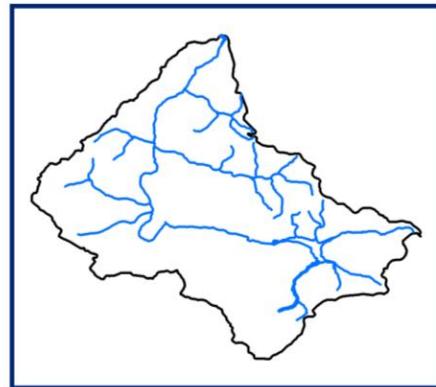
**01 OCTOBER 2015**



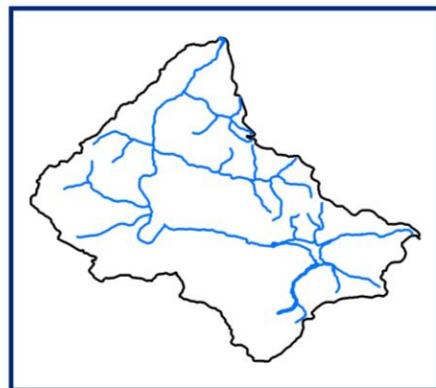
**03 OCTOBER 2015**



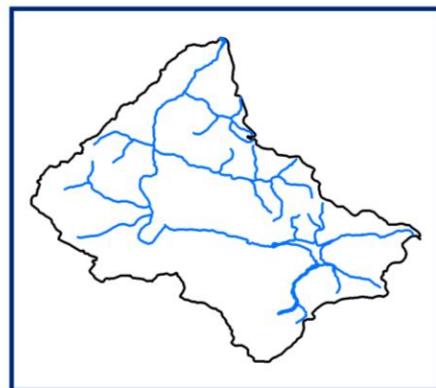
**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**



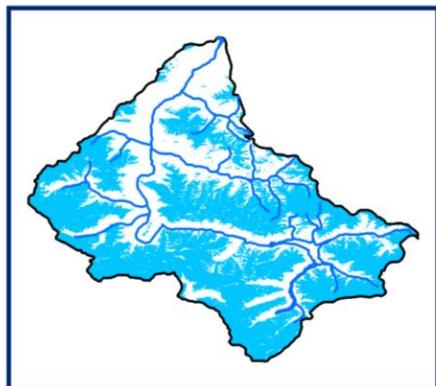
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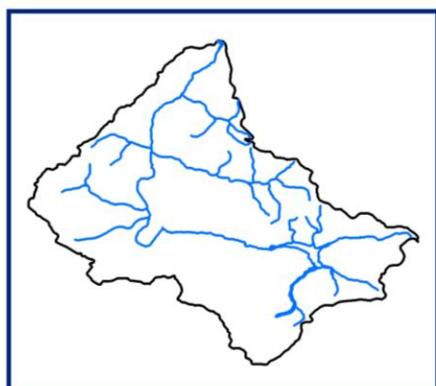
**DATA NOT AVAILABLE**



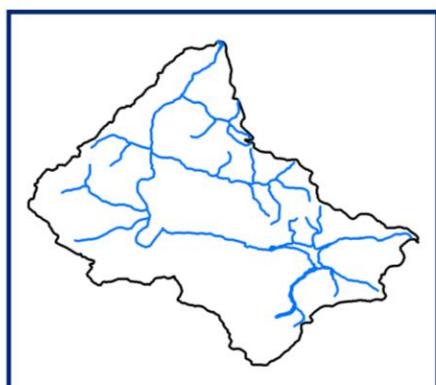
## 10 DAILY SNOW COVER MAP : SURU SUB-BASIN



DATA USED  
**01 OCTOBER 2015**  
**03 OCTOBER 2015**



**DATA NOT AVAILABLE**

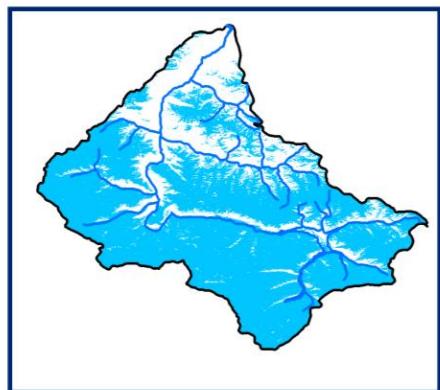


**DATA NOT AVAILABLE**

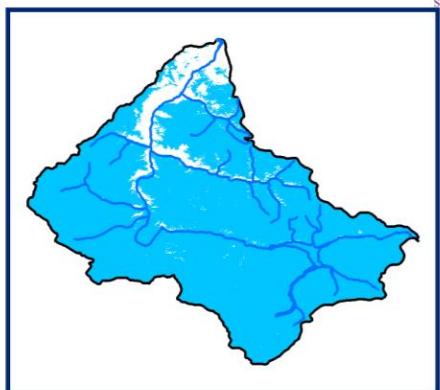
 SNOW

25 12.5 0 25 50 75  
Kilometers

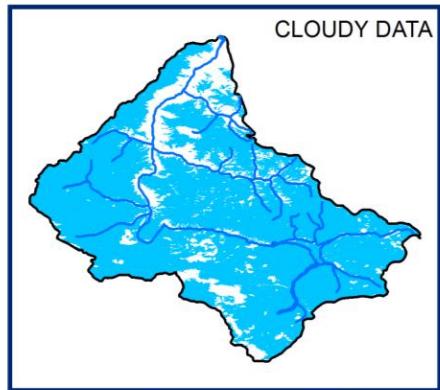
**SNOW COVER MAP : SURU SUB-BASIN**



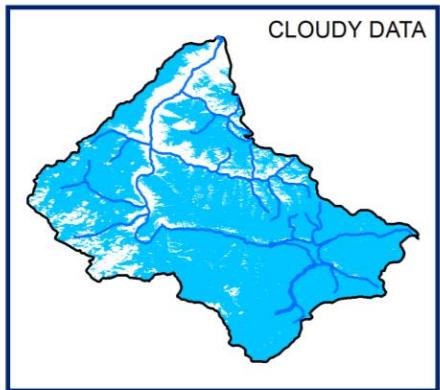
**01 NOVEMBER 2015**



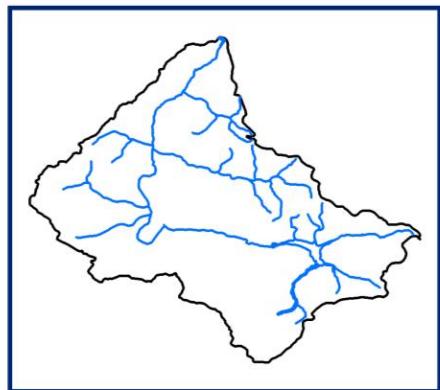
**06 NOVEMBER 2015**



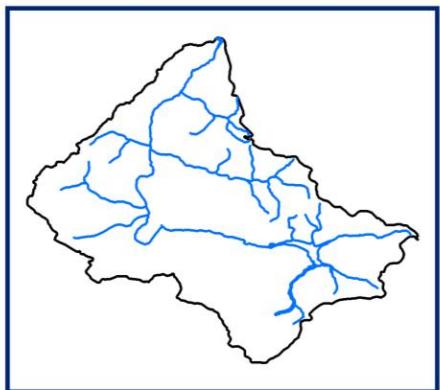
**08 NOVEMBER 2015**



**15 NOVEMBER 2015**



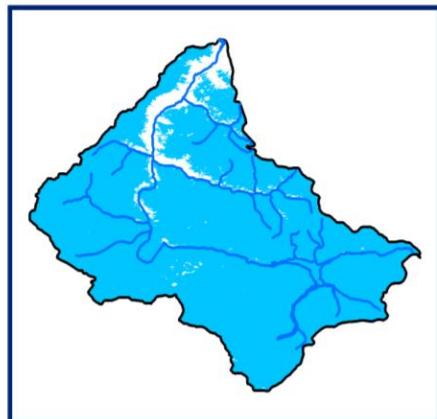
**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**

 **SNOW**

## 10 DAILY SNOW COVER MAP : SURU SUB-BASIN

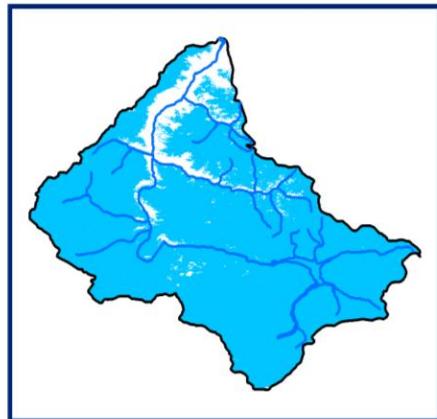


DATA USED

**01 NOVEMBER 2015**

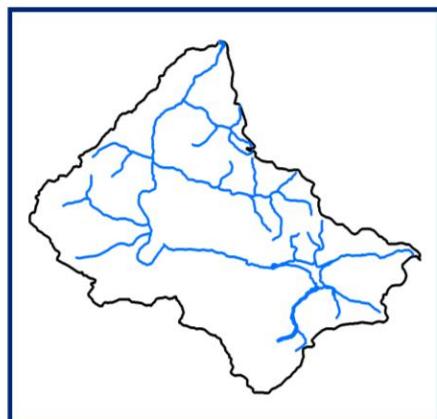
**06 NOVEMBER 2015**

**08 NOVEMBER 2015**

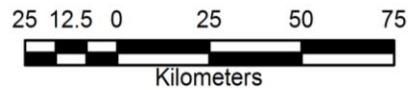


DATA USED

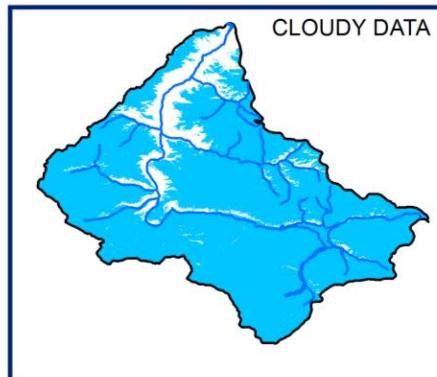
**15 NOVEMBER 2015**



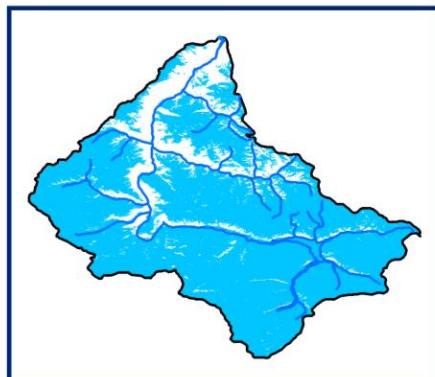
**DATA NOT AVAILABLE**



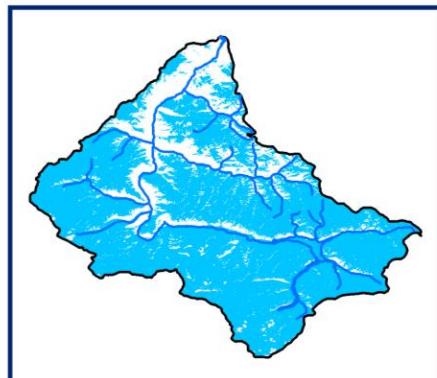
**SNOW COVER MAP : SURU SUB-BASIN**



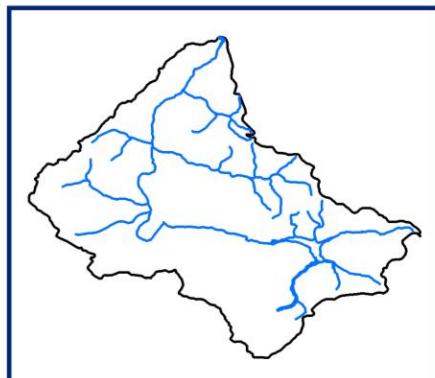
**04 DECEMBER 2015**



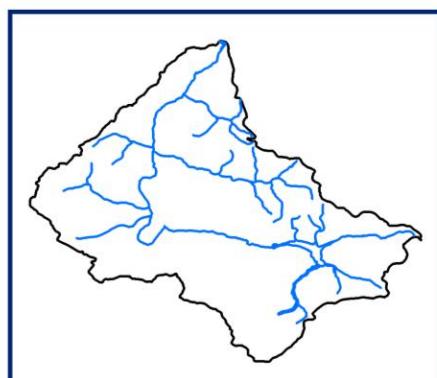
**05 DECEMBER 2015**



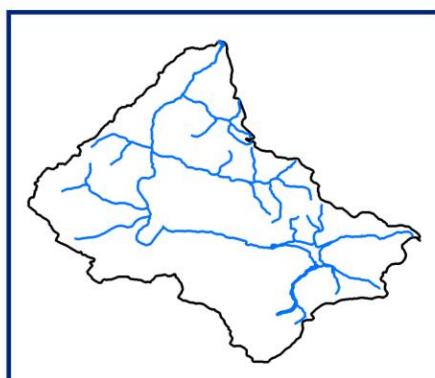
**07 DECEMBER 2015**



**DATA NOT AVAILABLE**



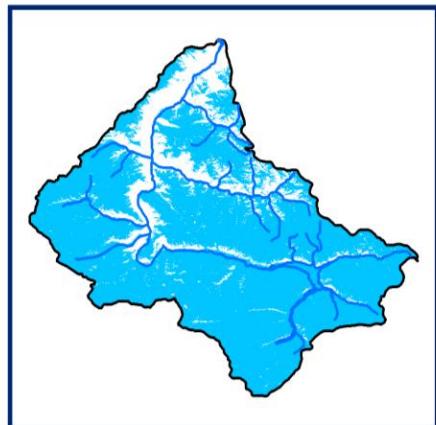
**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**

 **SNOW**

## 10 DAILY SNOW COVER MAP : SURU SUB-BASIN

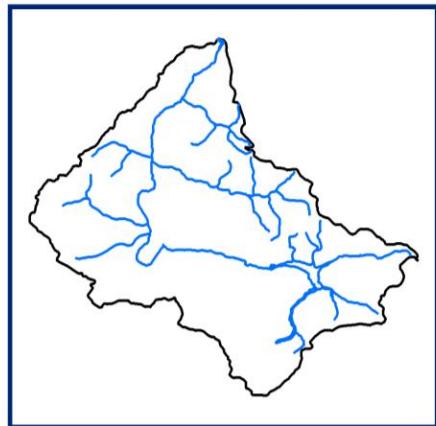


DATA USED

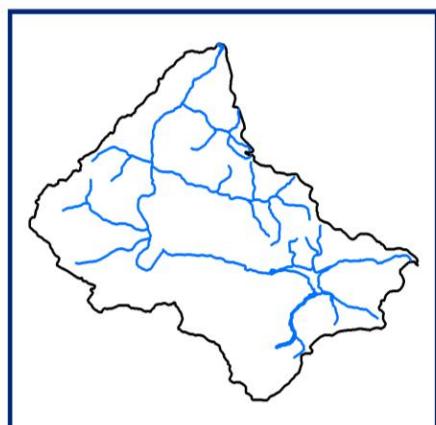
04 DECEMBER 2015

05 DECEMBER 2015

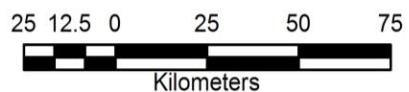
07 DECEMBER 2015



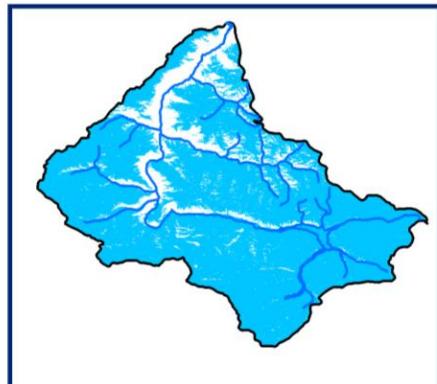
DATA NOT AVAILABLE



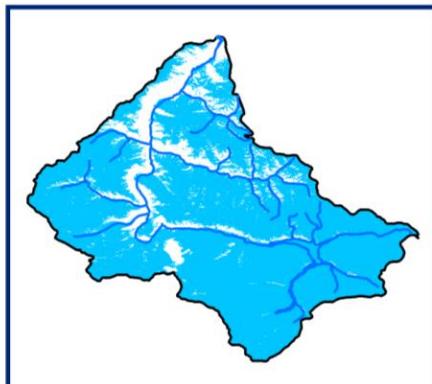
DATA NOT AVAILABLE



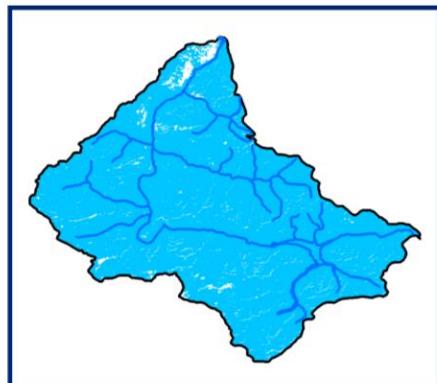
**SNOW COVER MAP : SURU SUB-BASIN**



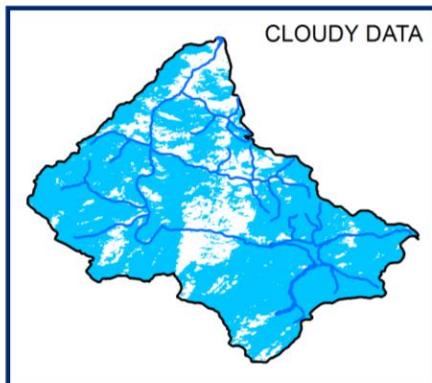
**02 JANUARY 2016**



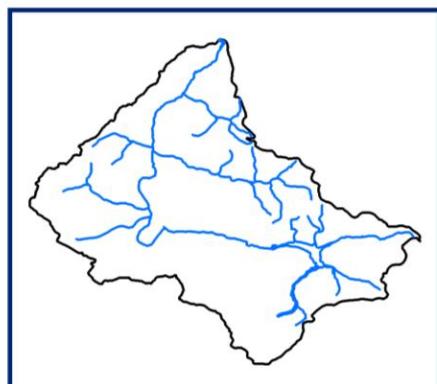
**03 JANUARY 2016**



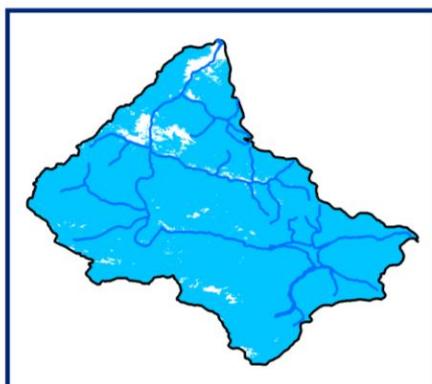
**05 JANUARY 2016**



**CLOUDY DATA**  
**19 JANUARY 2016**



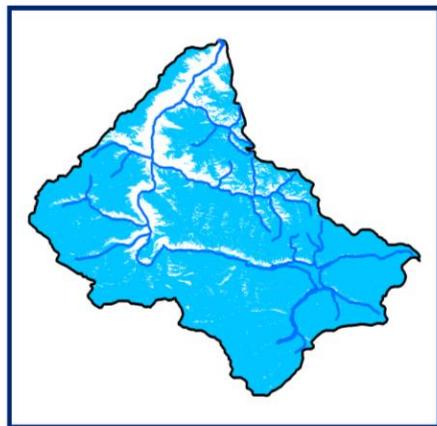
**DATA NOT AVAILABLE**



**27 JANUARY 2016**



## 10 DAILY SNOW COVER MAP : SURU SUB-BASIN

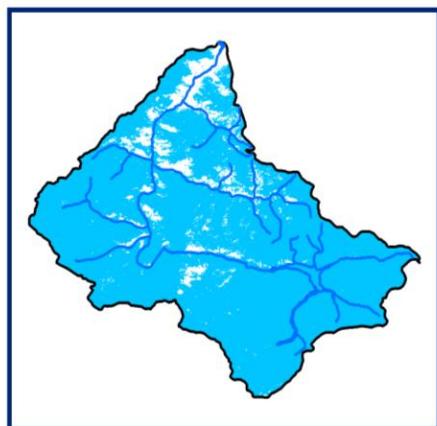


DATA USED

**02 JANUARY 2016**

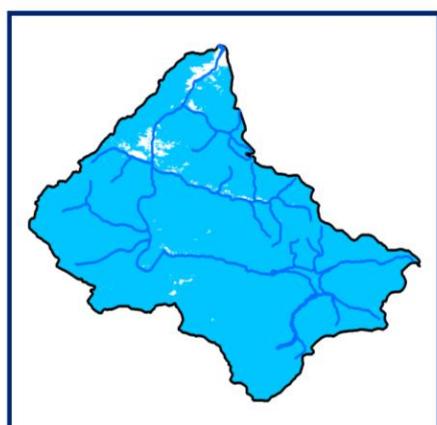
**03 JANUARY 2016**

**05 JANUARY 2016**



DATA USED

**15 JANUARY 2016**



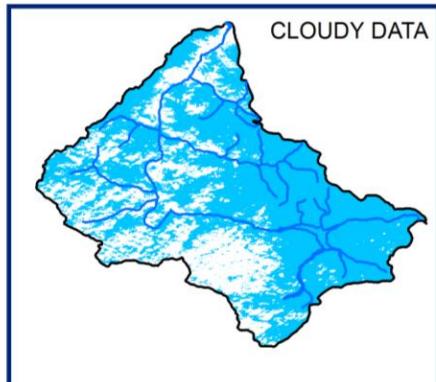
DATA USED

**25 JANUARY 2016**

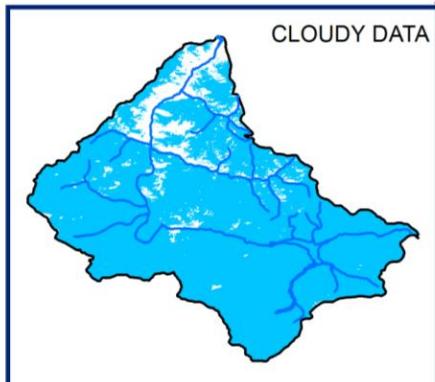
 SNOW

25 12.5 0 25 50 75  
  
Kilometers

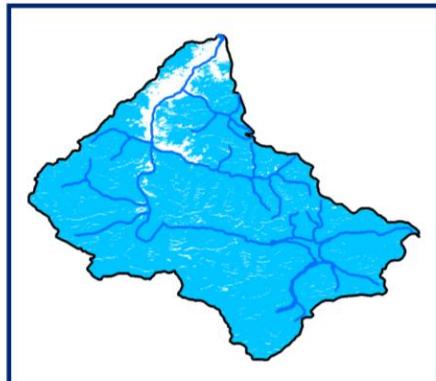
**SNOW COVER MAP : SURU SUB-BASIN**



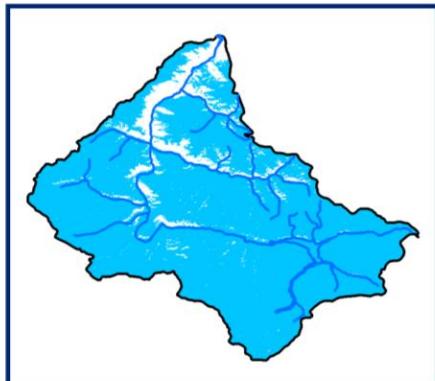
**05 FEBRUARY 2016**



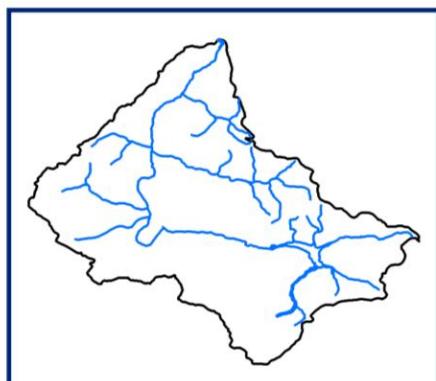
**10 FEBRUARY 2016**



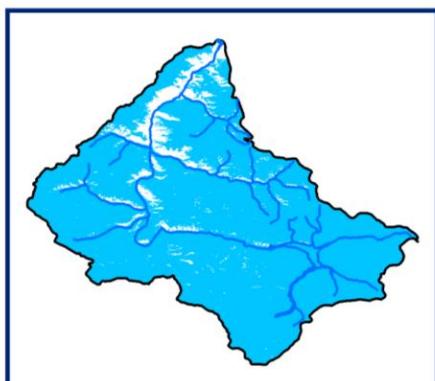
**12 FEBRUARY 2016**



**17 FEBRUARY 2016**



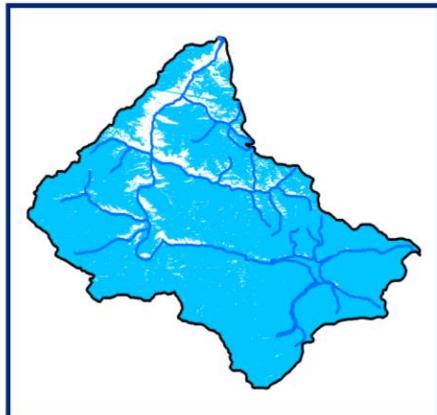
**DATA NOT AVAILABLE**



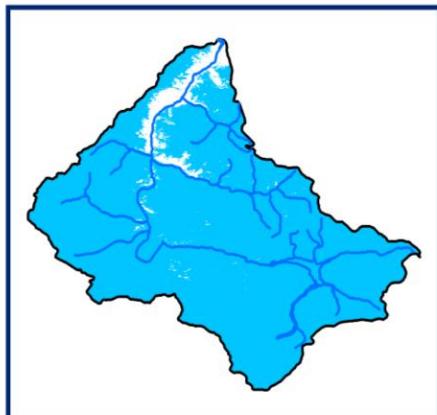
**26 FEBRUARY 2016**



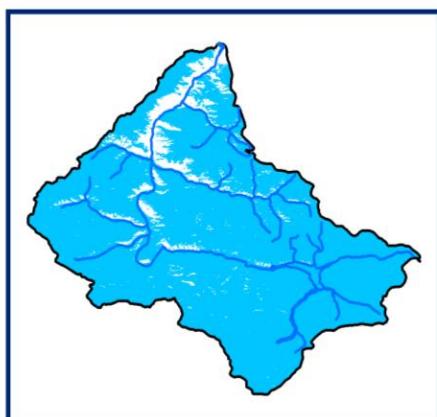
## 10 DAILY SNOW COVER MAP : SURU SUB-BASIN



DATA USED  
**05 FEBRUARY 2016**  
**10 FEBRUARY 2016**



DATA USED  
**15 FEBRUARY 2016**

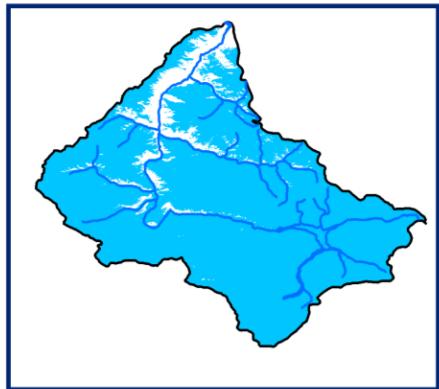


DATA USED  
**25 FEBRUARY 2016**

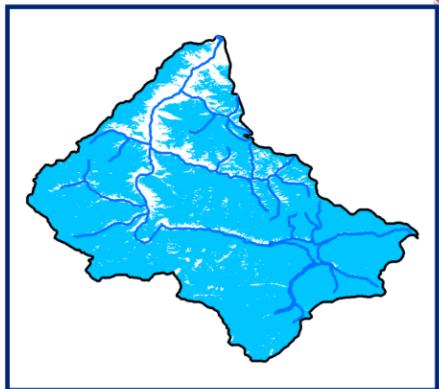
 SNOW

25 12.5 0 25 50 75  
Kilometers

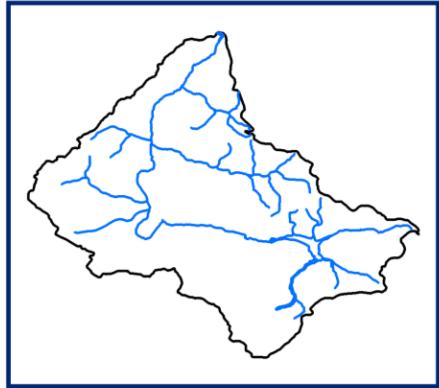
**SNOW COVER MAP : SURU SUB-BASIN**



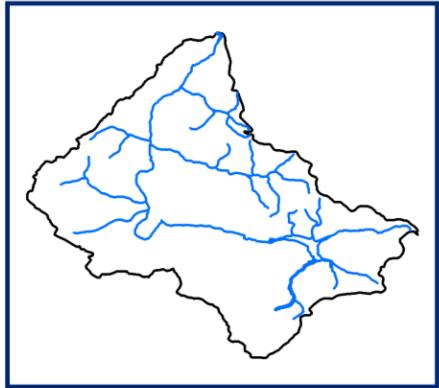
**05 MARCH 2016**



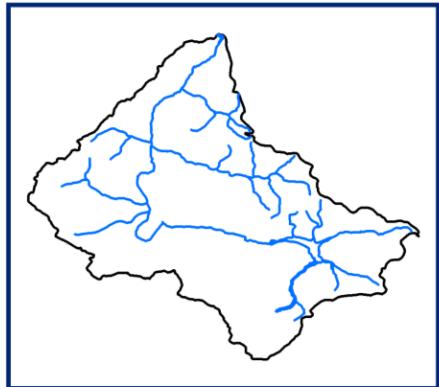
**07 MARCH 2016**



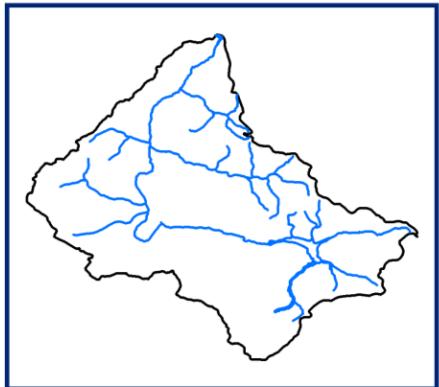
**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**



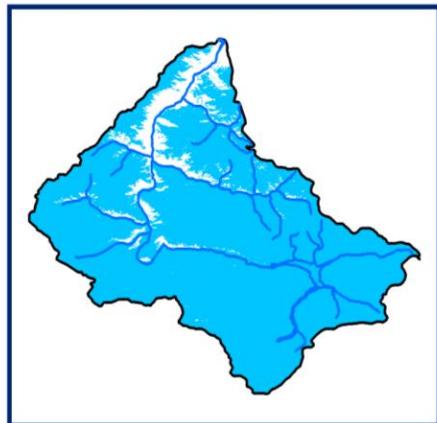
**DATA NOT AVAILABLE**



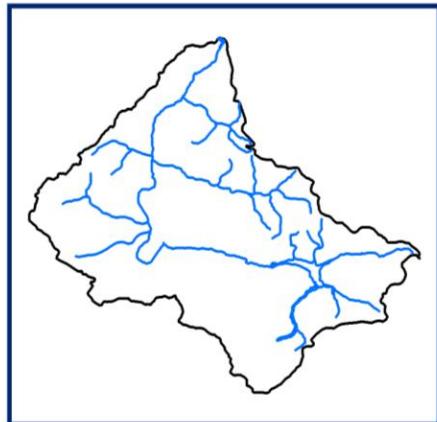
**DATA NOT AVAILABLE**

 SNOW

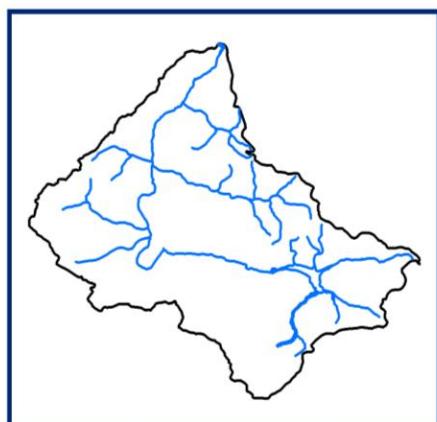
## 10 DAILY SNOW COVER MAP : SURU SUB-BASIN



DATA USED  
**05 MARCH 2016**  
**07 MARCH 2016**



**DATA NOT AVAILABLE**

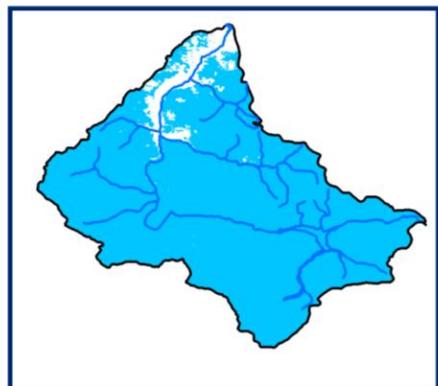


**DATA NOT AVAILABLE**

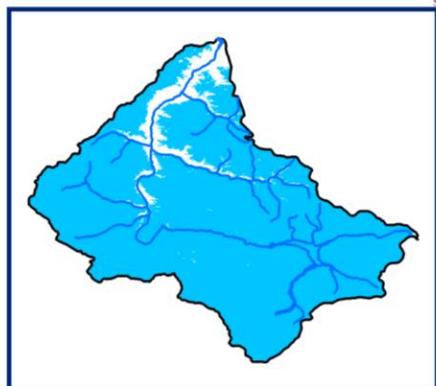
SNOW

25 12.5 0 25 50 75  
 Kilometers

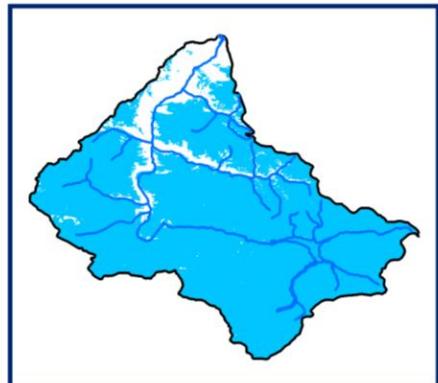
**SNOW COVER MAP : SURU SUB-BASIN**



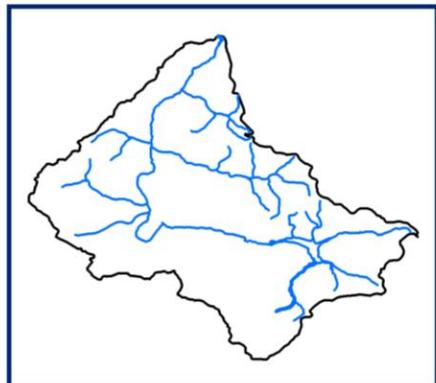
**07 APRIL 2016**



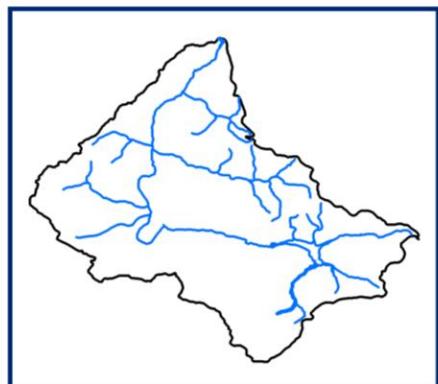
**14 APRIL 2016**



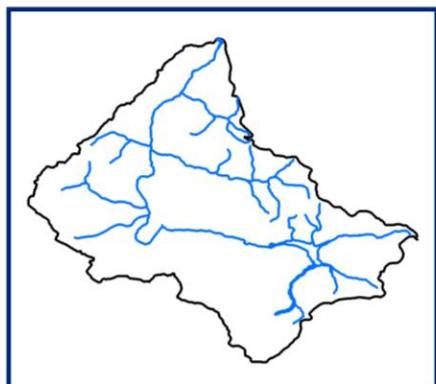
**20 APRIL 2016**



**DATA NOT AVAILABLE**



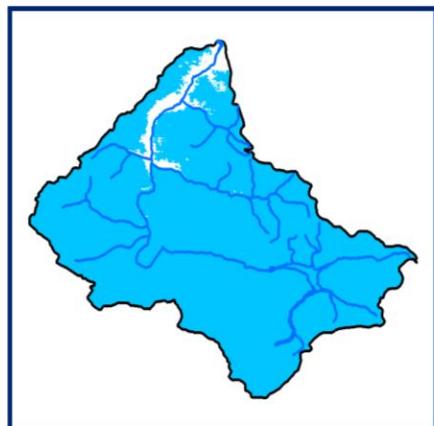
**DATA NOT AVAILABLE**



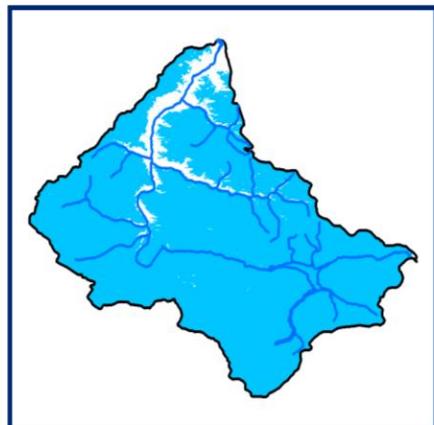
**DATA NOT AVAILABLE**

SNOW

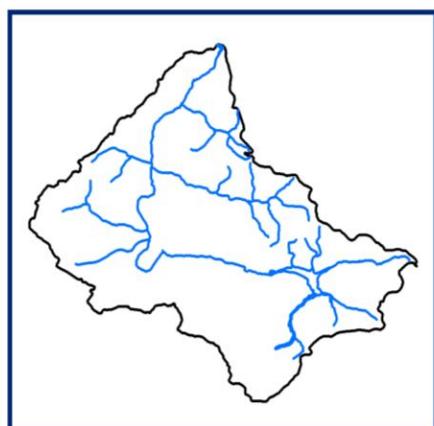
## 10 DAILY SNOW COVER MAP : SURU SUB-BASIN



DATA USED  
05 APRIL 2016



DATA USED  
14 APRIL 2016  
20 APRIL 2016

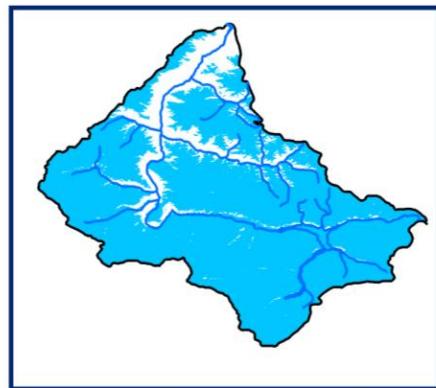


DATA NOT AVAILABLE

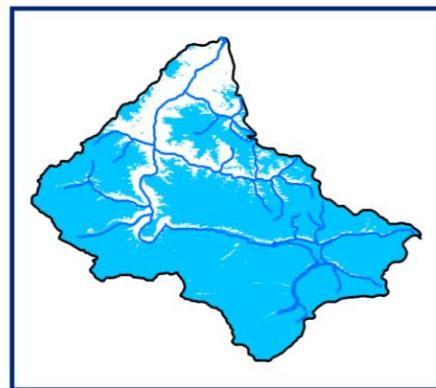
SNOW

25 12.5 0 25 50 75  
 Kilometers

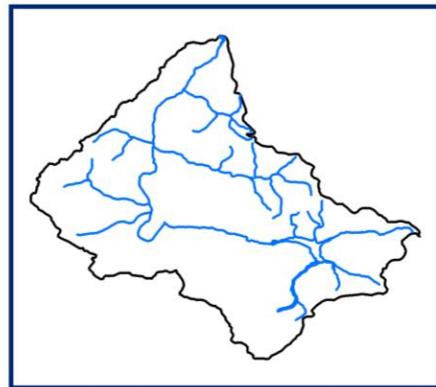
**SNOW COVER MAP : SURU SUB-BASIN**



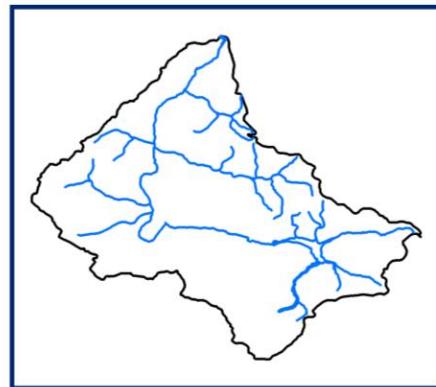
**02 MAY 2016**



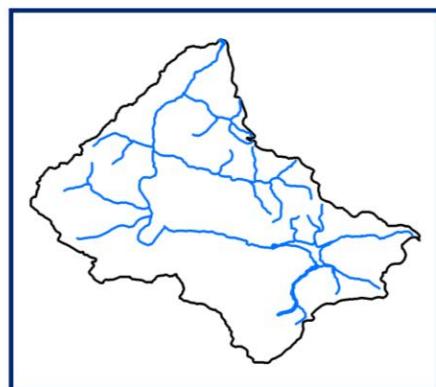
**06 MAY 2016**



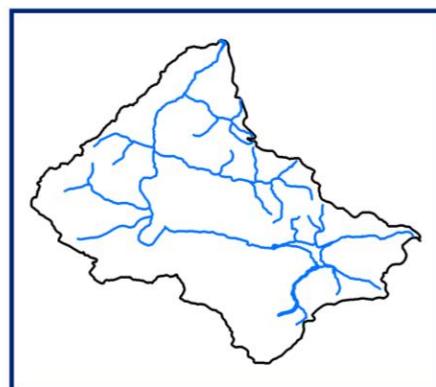
**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**



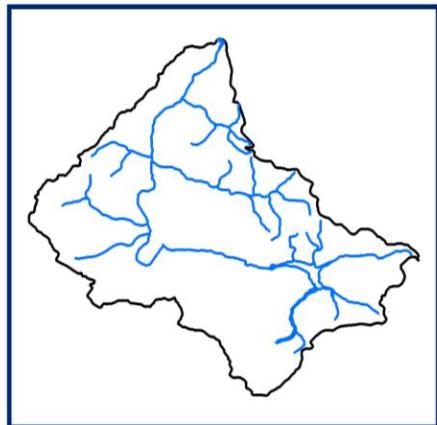
**DATA NOT AVAILABLE**

 **SNOW**

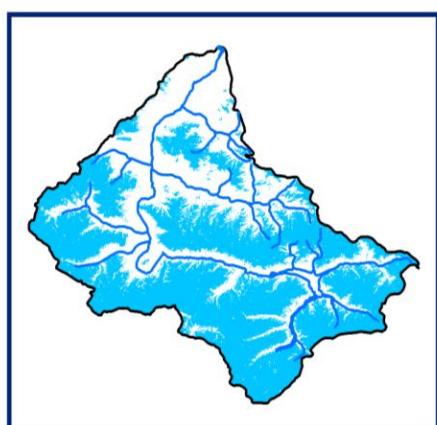
## 10 DAILY SNOW COVER MAP : SURU SUB-BASIN



DATA USED  
**02 MAY 2016**  
**06 MAY 2016**



**DATA NOT AVAILABLE**



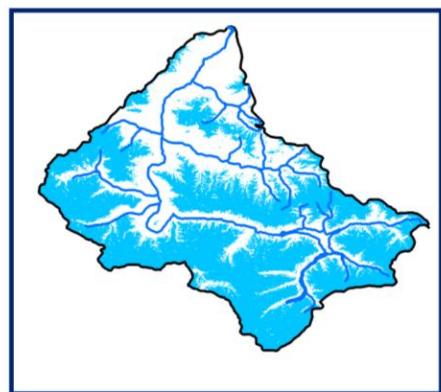
DATA USED  
**25 MAY 2016**

 SNOW

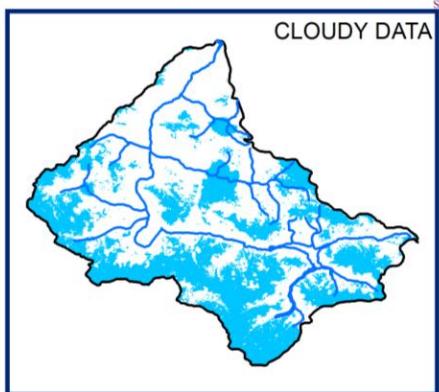
25 12.5 0 25 50 75  
  
Kilometers

**SNOW COVER MAP**

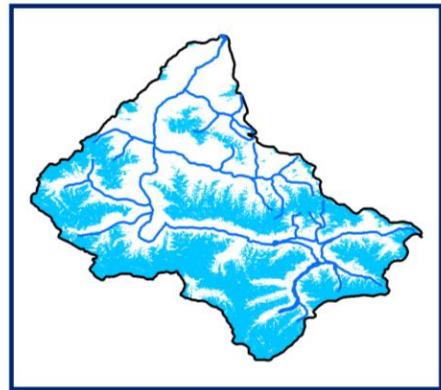
: SURU SUB-BASIN



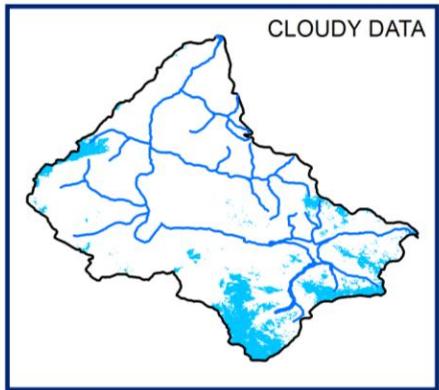
**04 JUNE 2016**



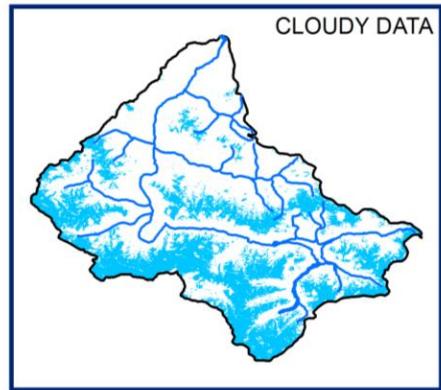
**09 JUNE 2016**



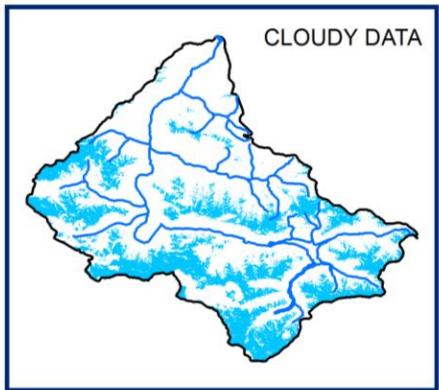
**14 JUNE 2016**



**18 JUNE 2016**



**19 JUNE 2016**

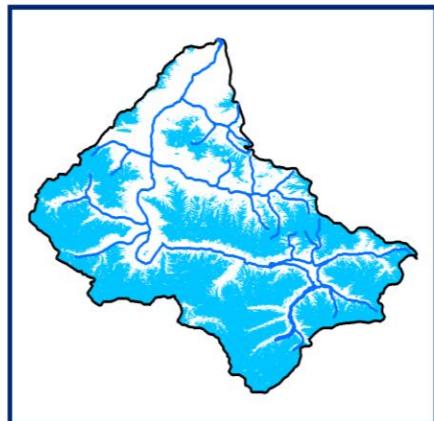


**23 JUNE 2016**

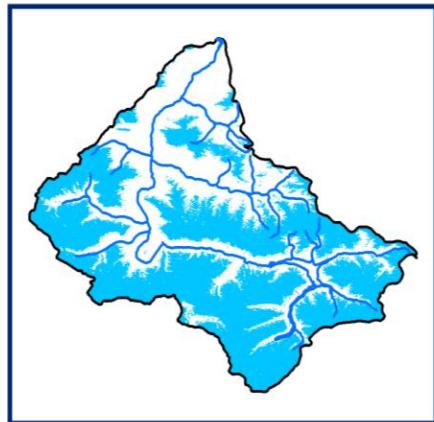


**SNOW**

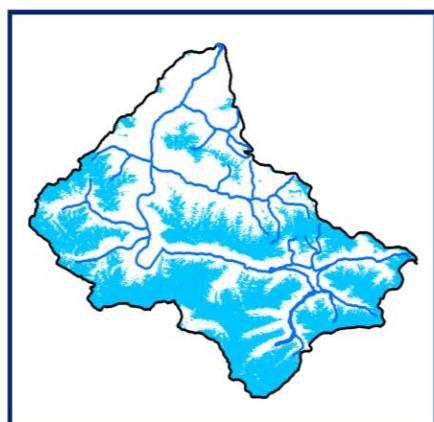
## 10 DAILY SNOW COVER MAP : SURU SUB-BASIN



DATA USED  
**04 JUNE 2016**  
**09 JUNE 2016**



DATA USED  
**14 JUNE 2016**  
**18 JUNE 2016**  
**19 JUNE 2016**



DATA USED  
**25 JUNE 2016**

SNOW

25 12.5 0 25 50 75  
 Kilometers

# *ZANSKAR SUB-BASIN*

### AREAL EXTENT OF SNOW (5 DAILY)

**BASIN NAME: ZANSKAR**

**BASIN AREA: 14914 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
<b>October 2015</b>							
<b>1</b>	01-Oct-15	4856	33	<b>3</b>	28-Oct-15	5464	37
<b>2</b>	03-Oct-15	4722	32	<b>4</b>	30-Oct-15	5011	34
<b>November 2015</b>							
<b>5</b>	01-Nov-15	4543	30	<b>7</b>	08-Nov-15	5283	35 (c)
<b>6</b>	06-Nov-15	7738	52				
<b>December 2015</b>							
<b>8</b>	05-Dec-15	8276	55	<b>10</b>	20-Dec-15	7435	50 (c)
<b>9</b>	07-Dec-15	7623	51				
<b>January 2016</b>							
<b>11</b>	03-Jan-16	10084	68	<b>13</b>	19-Jan-16	7618	51 (c)
<b>12</b>	05-Jan-16	11166	75	<b>14</b>	27-Jan-16	10716	72
<b>February 2016</b>							
<b>15</b>	01-Feb-16	11460	77	<b>18</b>	10-Feb-16	9206	62 (c)
<b>16</b>	05-Feb-16	9086	61 (c)	<b>19</b>	12-Feb-16	12008	81
<b>17</b>	08-Feb-16	10387	70	<b>20</b>	17-Feb-16	10354	69
<b>March 2016</b>							
<b>21</b>	05-Mar-16	12137	81 (c)				
<b>April 2016</b>							
<b>22</b>	03-Apr-16	8771	59 (c)	<b>24</b>	27-Apr-16	9148	61
<b>23</b>	20-Apr-16	9028	61				
<b>May 2016</b>							
<b>25</b>	02-May-16	8771	59	<b>27</b>	19-May-16	4886	33 (c)
<b>26</b>	07-May-16	7796	52	<b>28</b>	31-May-16	4341	29
<b>June 2016</b>							
<b>29</b>	04-Jun-16	4009	27	<b>32</b>	19-Jun-16	2086	14 (c)
<b>30</b>	09-Jun-16	2715	18 (c)	<b>33</b>	23-Jun-16	2235	15
<b>31</b>	14-Jun-16	2550	17 (c)	<b>34</b>	24-Jun-16	2064	14

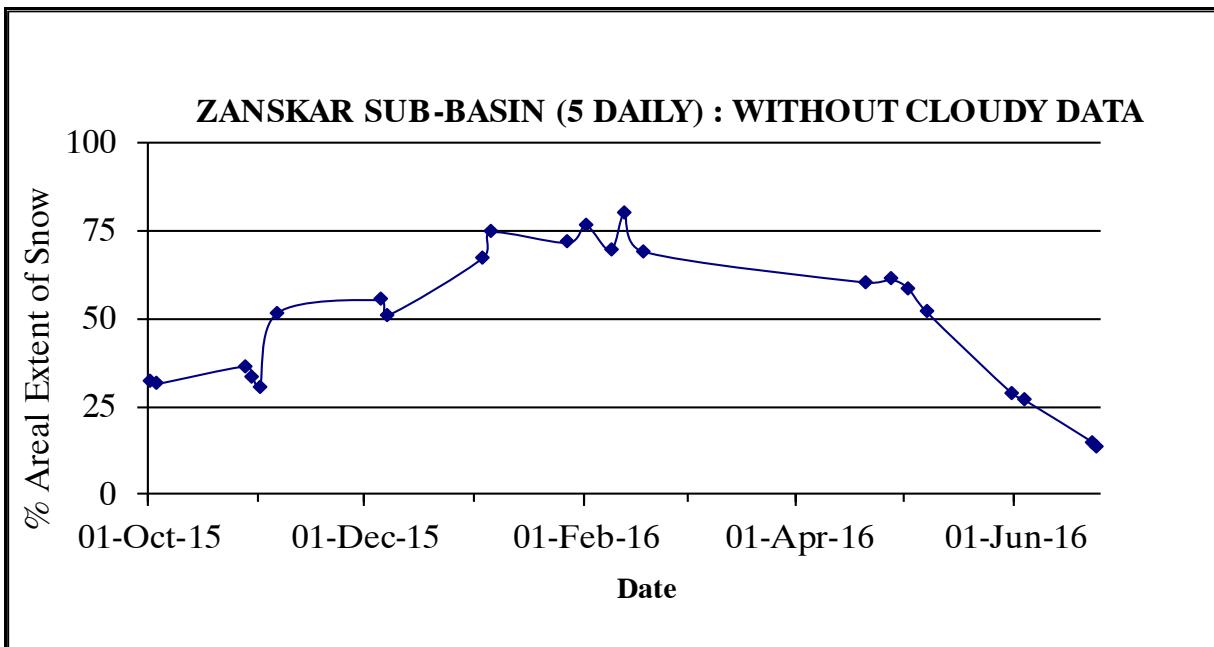
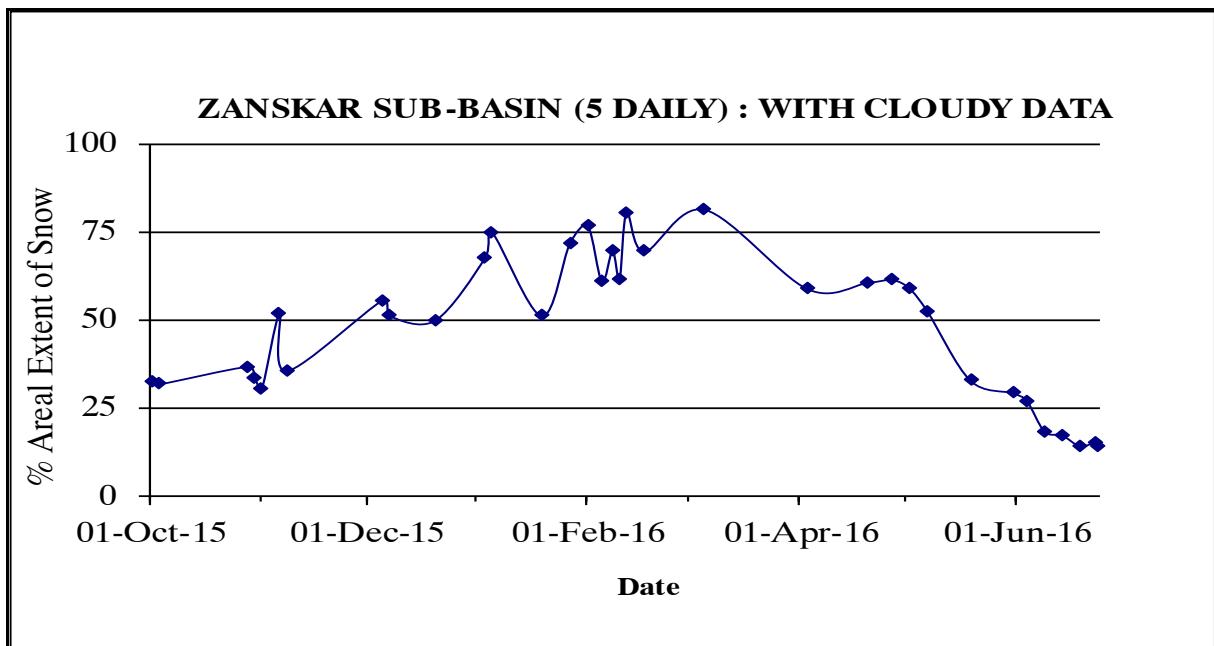
**AREAL EXTENT OF SNOW (10 DAILY)**

**BASIN NAME: ZANSKAR**

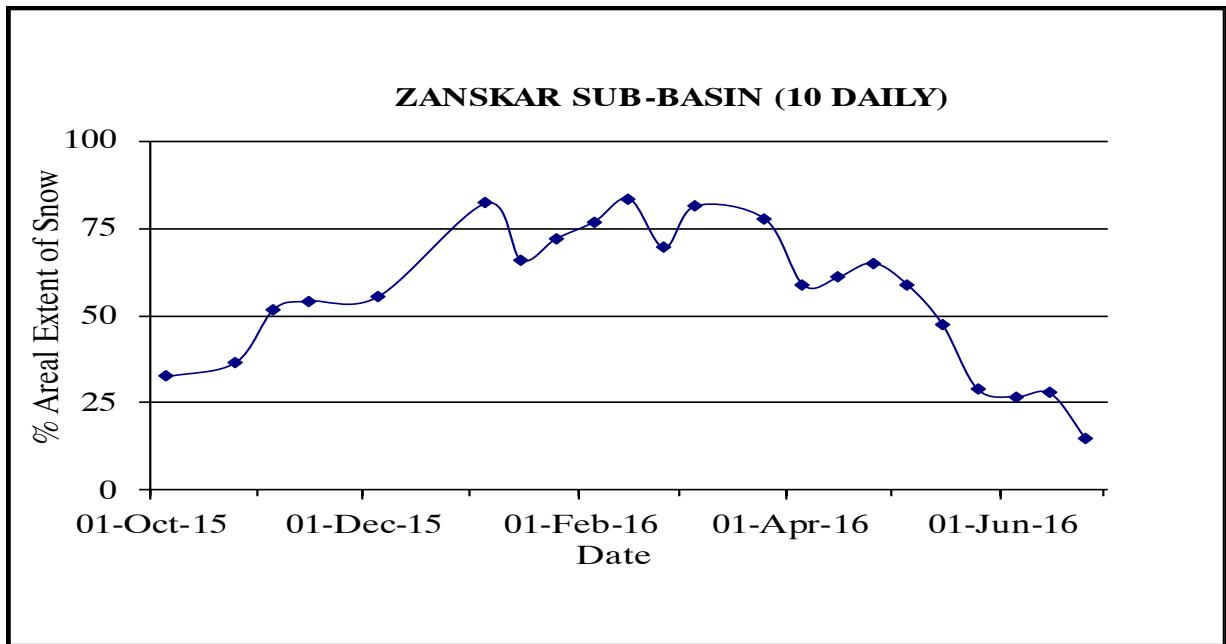
**BASIN AREA: 14914 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
<b>October 2015</b>				<b>November 2015</b>			
<b>1</b>	05-Oct-15	4858	33	<b>3</b>	05-Nov-15	7736	52
<b>2</b>	25-Oct-15	5465	37		15-Nov-15	8090	54
<b>December 2015</b>				<b>January 2016</b>			
<b>4</b>	05-Dec-15	8274	55	<b>6</b>	05-Jan-16	12255	82
				<b>7</b>	15-Jan-16	9835	66
<b>February 2016</b>				<b>March 2016</b>			
<b>9</b>	05-Feb-16	11460	77	<b>12</b>	05-Mar-16	12137	81
<b>10</b>	15-Feb-16	12450	83	<b>13</b>	25-Mar-16	11579	78
<b>11</b>	25-Feb-16	10355	69				
<b>April 2016</b>				<b>May 2016</b>			
<b>15</b>	5-Apr-16	8768	59	<b>17</b>	05-May-16	8768	59
<b>16</b>	15-Apr-16	7935	61	<b>18</b>	15-May-16	7083	47
	25-Apr-16	9710	65	<b>19</b>	25-May-16	4339	29
<b>June 2016</b>							
<b>20</b>	05-Jun-2016	4009	27				
	15-Jun-2016	4151	28				
	25-Jun-2016	2065	15				

### SNOW COVER DEPLETION CURVE



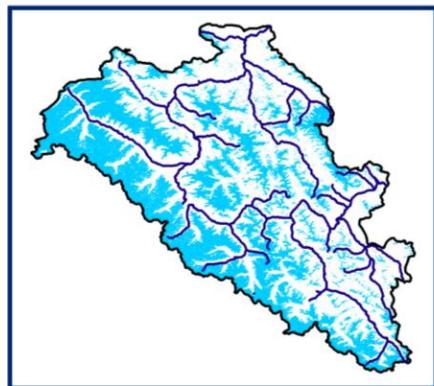
## SNOW COVER DEPLETION CURVE



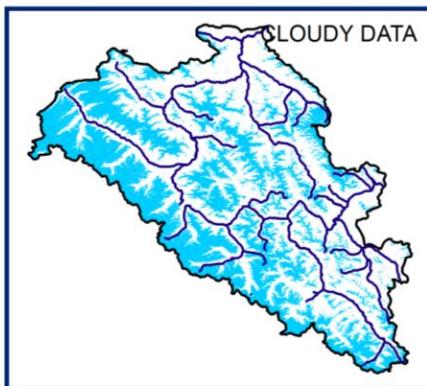
# *SNOW COVER MAP*

**SNOW COVER MAP**

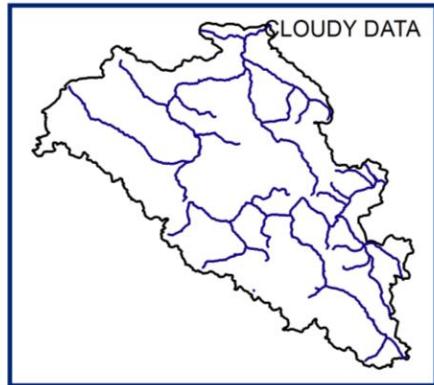
: **ZANSKAR SUB-BASIN**



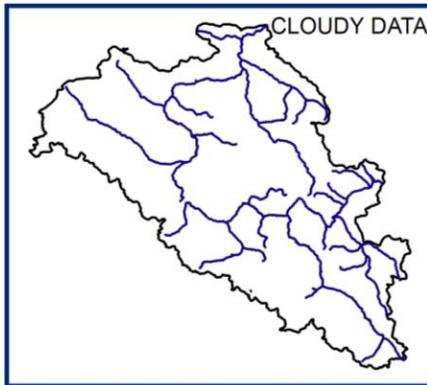
**01 OCTOBER 2015**



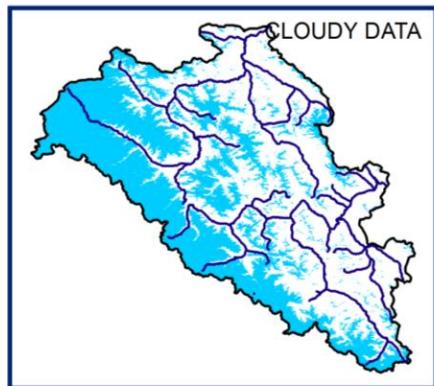
**03 OCTOBER 2015**



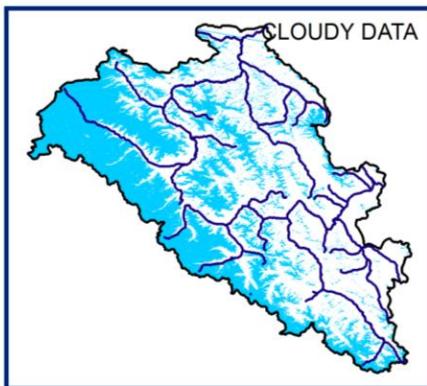
**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**



**28 OCTOBER 2015**



**30 OCTOBER 2015**

**SNOW**

50 25 0 50 100 150  
Kilometers

## 10 DAILY SNOW COVER MAP : ZANSKAR SUB-BASIN



DATA USED  
**01 OCTOBER 2015**  
**03 OCTOBER 2015**



**DATA NOT AVAILABLE**



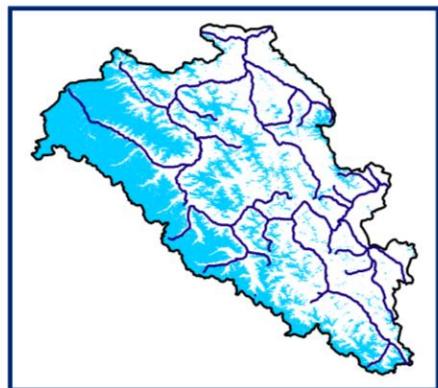
DATA USED  
**28 OCTOBER 2015**  
**30 OCTOBER 2015**

 SNOW

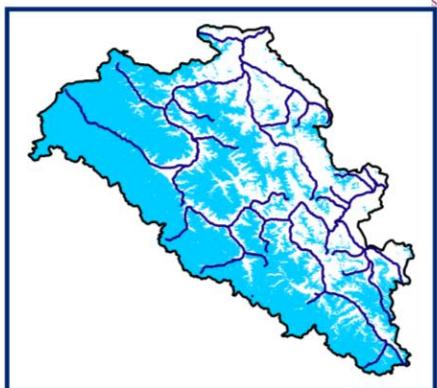
30 15 0 30 60 90  
  
Kilometers

**SNOW COVER MAP**

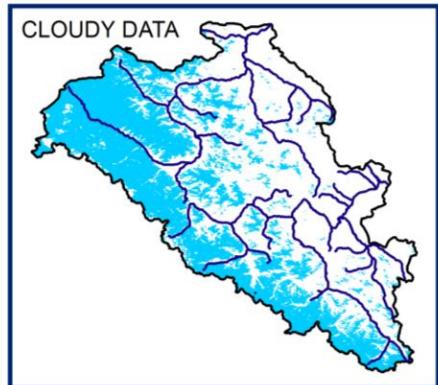
: ZANSKAR SUB-BASIN



**01 NOVEMBER 2015**



**06 NOVEMBER 2015**



**CLOUDY DATA  
08 NOVEMBER 2015**



**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**

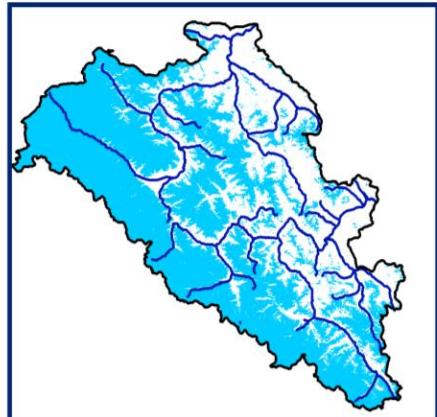


**DATA NOT AVAILABLE**

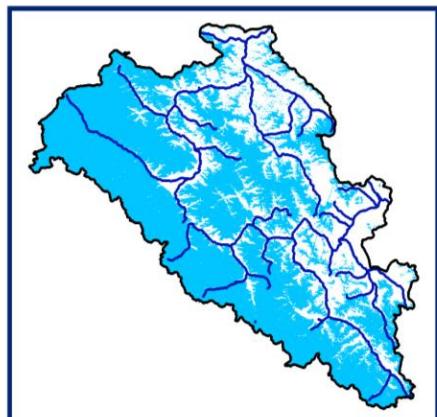
 **SNOW**

40 20 0 40 80 120  
Kilometers

## 10 DAILY SNOW COVER MAP : ZANSKAR SUB-BASIN



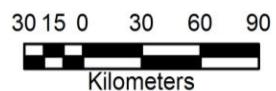
DATA USED  
01 NOVEMBER 2015  
06 NOVEMBER 2015



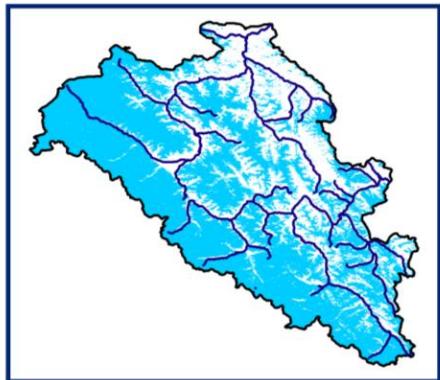
DATA USED  
15 NOVEMBER 2015



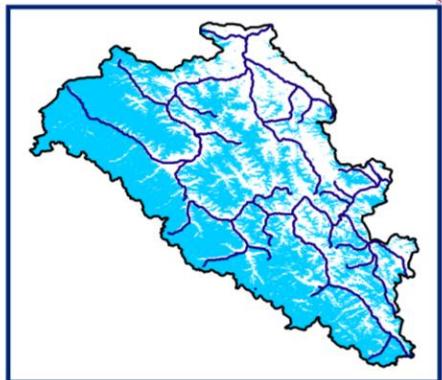
DATA NOT AVAILABLE



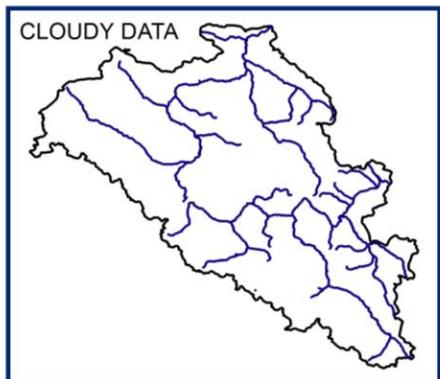
**SNOW COVER MAP : ZANSKAR SUB-BASIN**



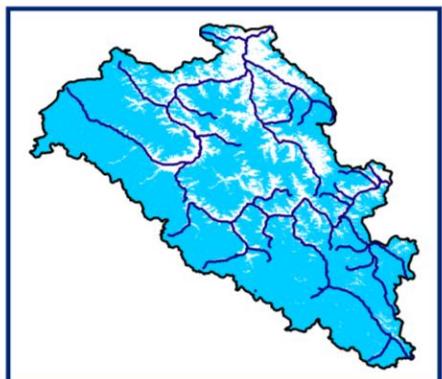
**05 DECEMBER 2015**



**07 DECEMBER 2015**



**DATA NOT AVAILABLE**



**20 DECEMBER 2015**



**DATA NOT AVAILABLE**

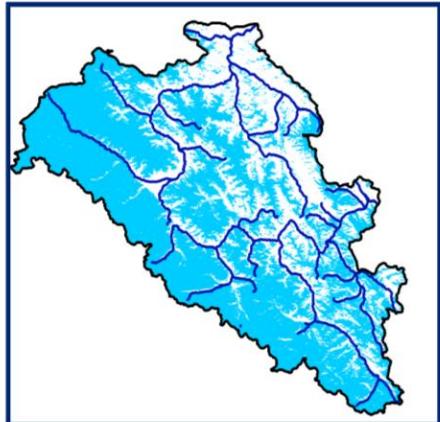


**DATA NOT AVAILABLE**

SNOW

40 20 0 40 80 120  
Kilometers

## 10 DAILY SNOW COVER MAP : ZANSKAR SUB-BASIN



DATA USED  
05 DECEMBER 2015



DATA NOT AVAILABLE



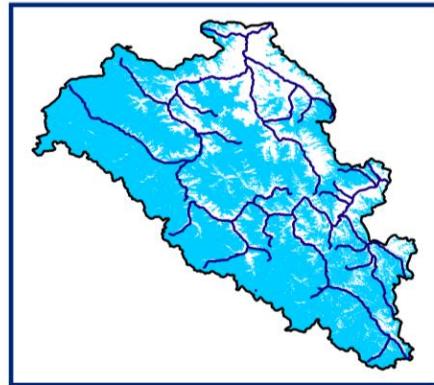
DATA NOT AVAILABLE

 SNOW

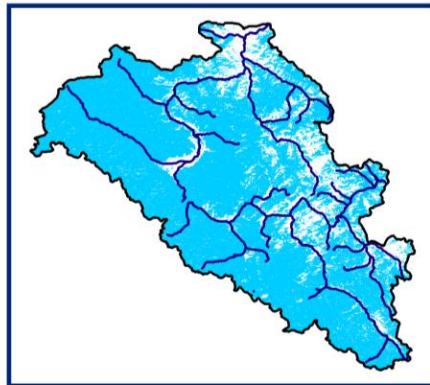
30 15 0 30 60 90  
 Kilometers

## SNOW COVER MAP

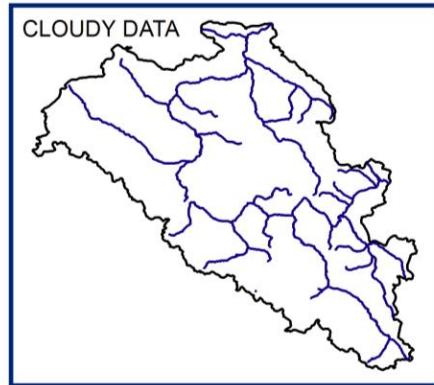
: ZANSKAR SUB-BASIN



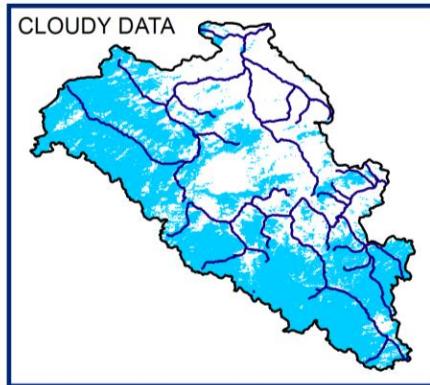
03 JANUARY 2016



05 JANUARY 2016



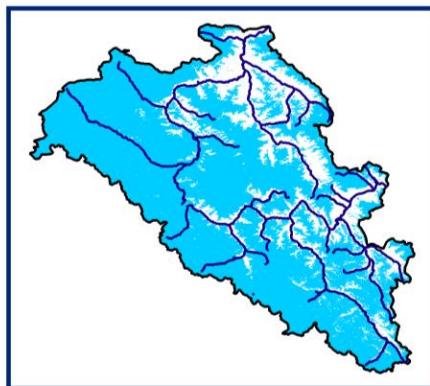
CLOUDY DATA  
DATA NOT AVAILABLE



19 JANUARY 2016



CLOUDY DATA  
DATA NOT AVAILABLE

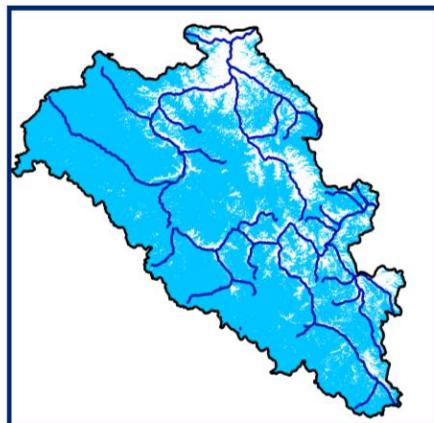


27 JANUARY 2016

SNOW

40 20 0 40 80 120  
Kilometers

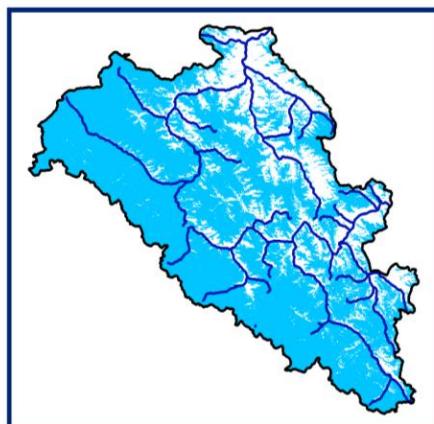
## 10 DAILY SNOW COVER MAP : ZANSKAR SUB-BASIN



DATA USED

**03 JANUARY 2016**

**05 JANUARY 2016**



DATA USED

**15 JANUARY 2016**



**DATA NOT AVAILABLE**

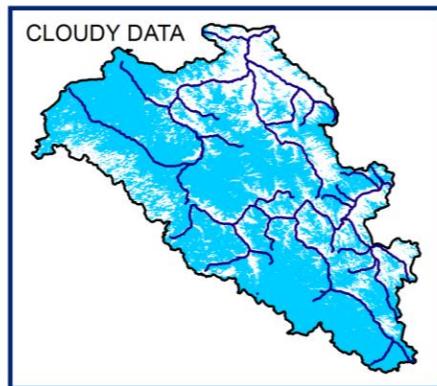


**SNOW COVER MAP**

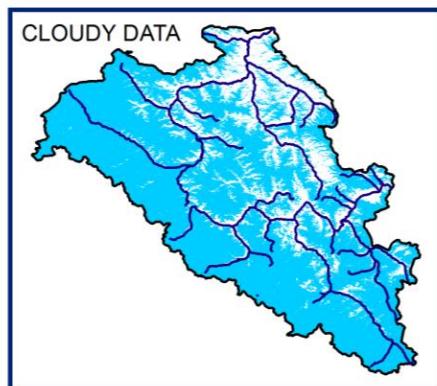
: **ZANSKAR SUB-BASIN**



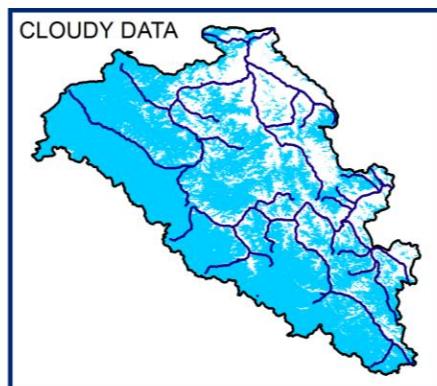
**01 FEBRUARY 2016**



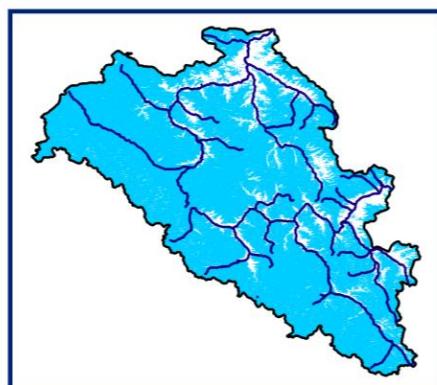
**05 FEBRUARY 2016**



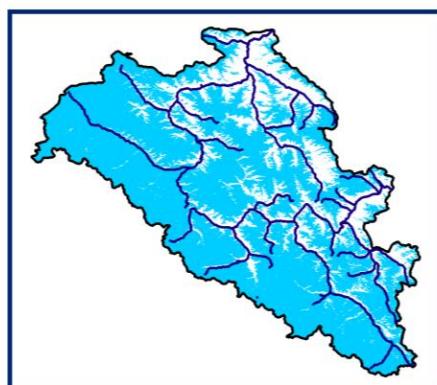
**10 FEBRUARY 2016**



**10 FEBRUARY 2016**



**12 FEBRUARY 2016**

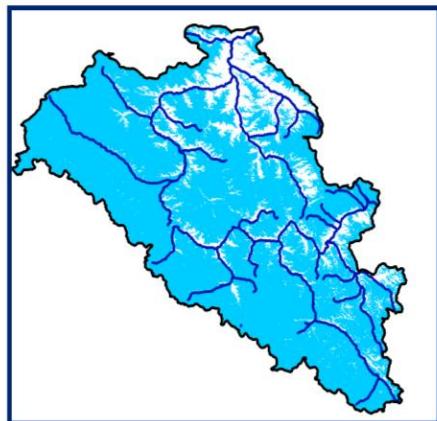


**17 FEBRUARY 2016**

 **SNOW**

40 20 0 40 80 120  
Kilometers

## 10 DAILY SNOW COVER MAP : ZANSKAR SUB-BASIN

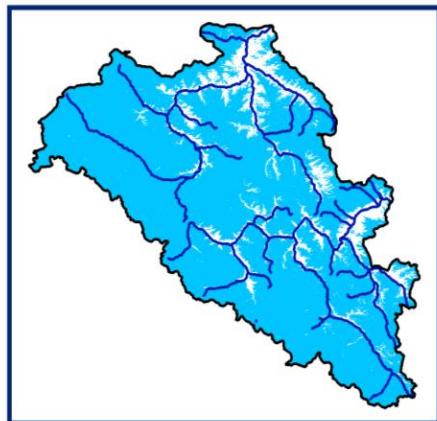


DATA USED

**01 FEBRUARY 2016**

**08 FEBRUARY 2016**

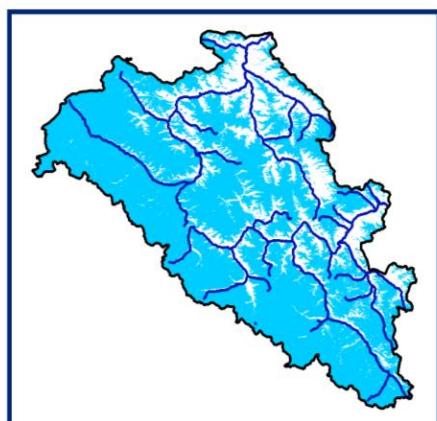
**10 FEBRUARY 2016**



DATA USED

**12 FEBRUARY 2016**

**17 FEBRUARY 2016**



DATA USED

**25 FEBRUARY 2016**

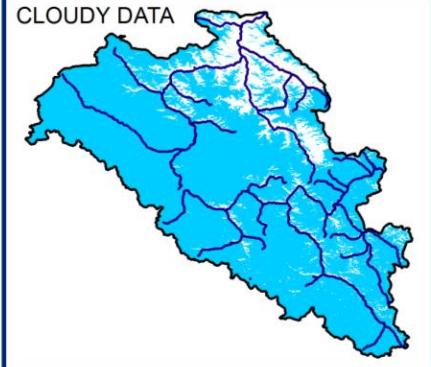
SNOW

30 15 0 30 60 90  
 Kilometers

**SNOW COVER MAP : ZANSKAR SUB-BASIN**



CLOUDY DATA



**05 MARCH 2016**



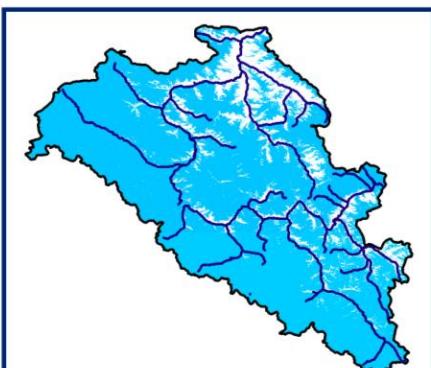
**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**



**DATA NOT AVAILABLE**

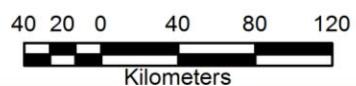


**25 MARCH 2016**

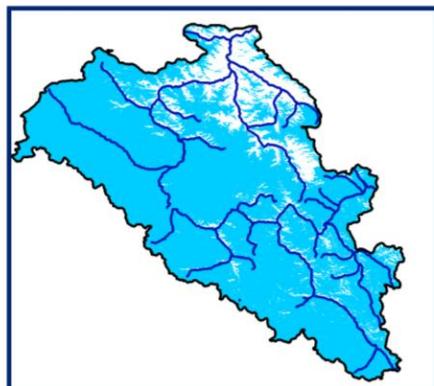
SNOW



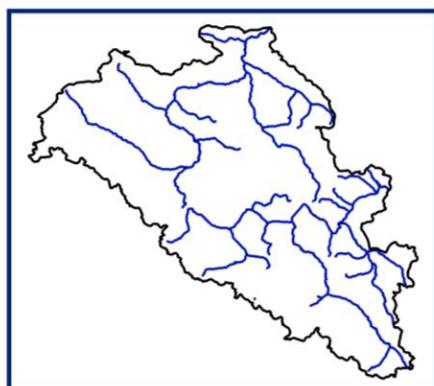
**DATA NOT AVAILABLE**



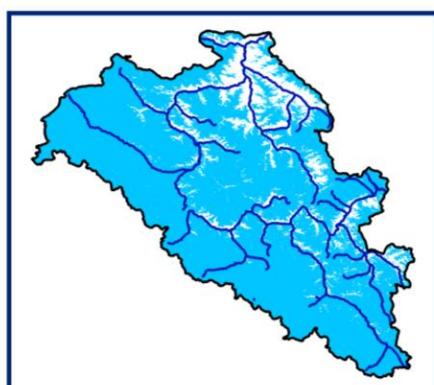
**10 DAILY SNOW COVER MAP : ZANSKAR SUB-BASIN**



**DATA USED  
05 MARCH 2016**



**DATA NOT AVAILABLE**



**DATA USED  
25 MARCH 2016**

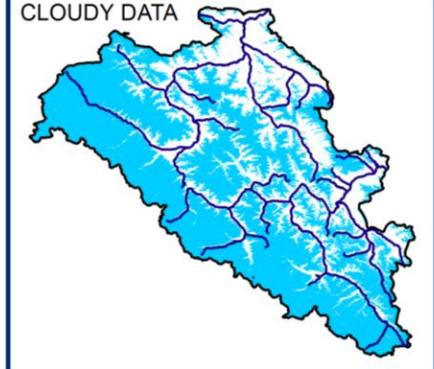
SNOW

40 20 0 40 80 120  
 Kilometers

**SNOW COVER MAP : ZANSKAR SUB-BASIN**



CLOUDY DATA



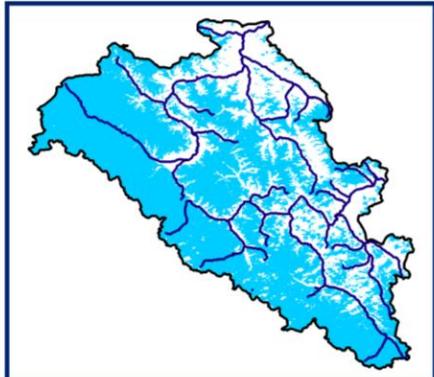
**03 APRIL 2016**



**DATA NOT AVAILABLE**



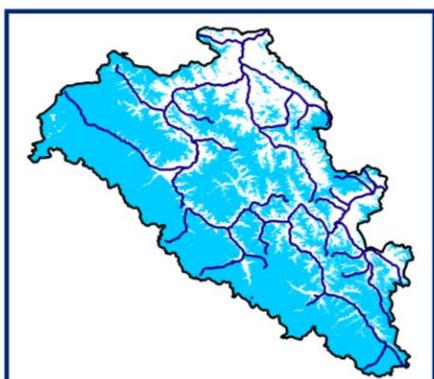
**DATA NOT AVAILABLE**



**20 APRIL 2016**



**DATA NOT AVAILABLE**

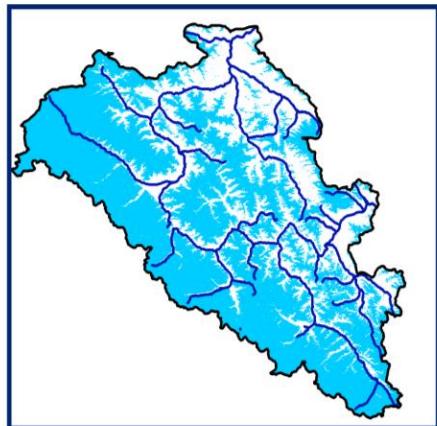


**27 APRIL 2016**

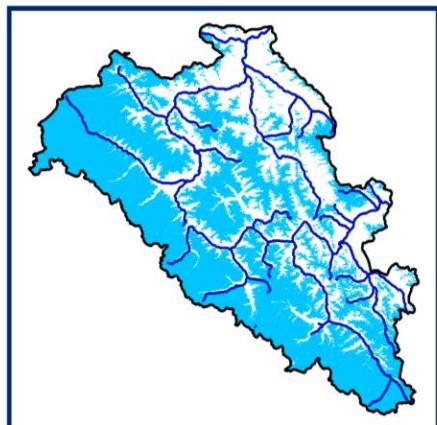
SNOW

40 20 0 40 80 120  
Kilometers

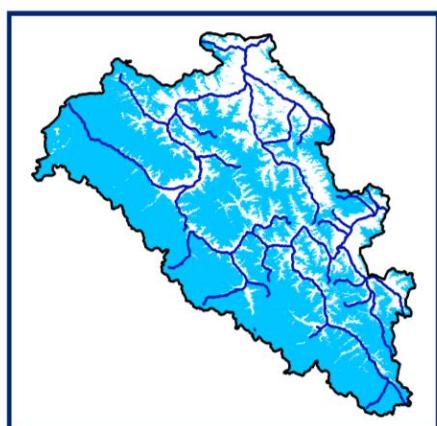
## 10 DAILY SNOW COVER MAP : ZANSKAR SUB-BASIN



DATA USED  
**05 APRIL 2016**



DATA USED  
**15 APRIL 2016**



DATA USED  
**25 APRIL 2016**

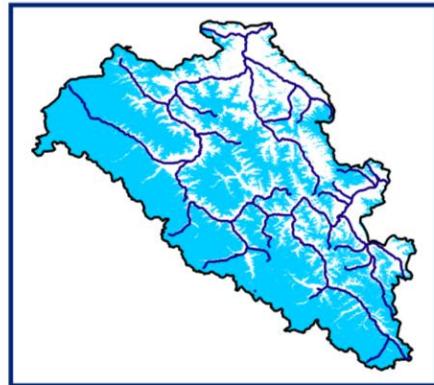
SNOW

A legend entry consisting of a small blue square followed by the word "SNOW" in black capital letters.

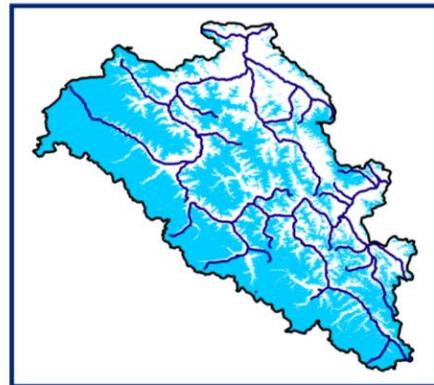
40 20 0 40 80 120  
 Kilometers

A scale bar at the bottom right of the map frame, showing distances from 0 to 120 Kilometers. The scale bar is marked with major tick marks at 0, 20, 40, 80, and 120, and minor tick marks in between.

**SNOW COVER MAP : ZANSKAR SUB-BASIN**



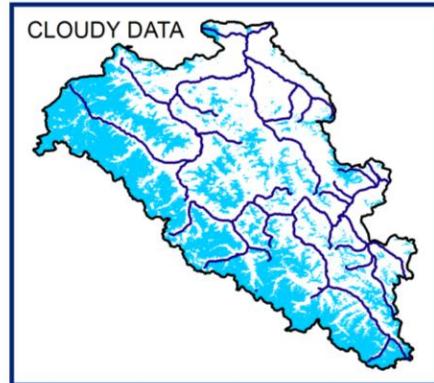
**02 MAY 2016**



**07 MAY 2016**



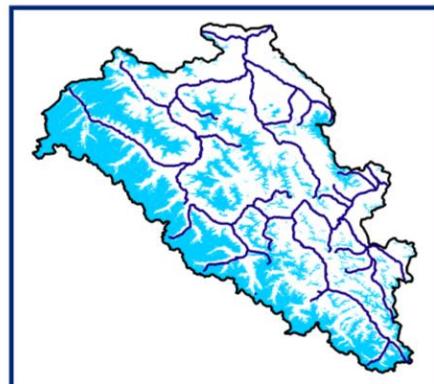
**DATA NOT AVAILABLE**



**19 MAY 2016**



**DATA NOT AVAILABLE**

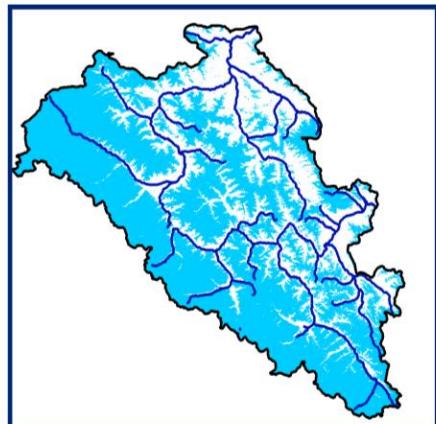


**31 MAY 2016**

**SNOW**

40 20 0 40 80 120  
Kilometers

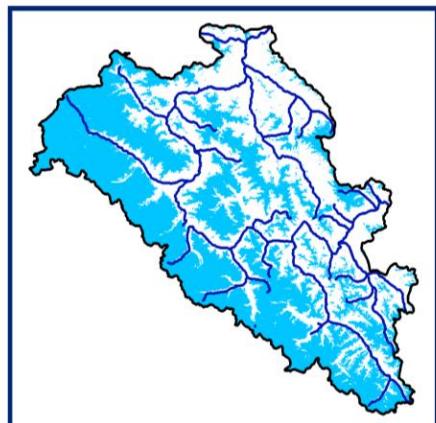
## 10 DAILY SNOW COVER MAP : ZANSKAR SUB-BASIN



DATA USED

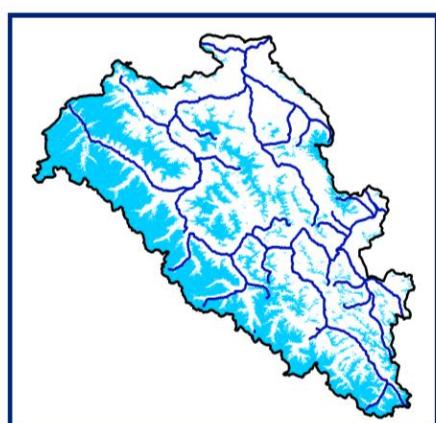
**02 MAY 2016**

**07 MAY 2016**



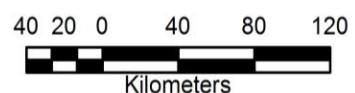
DATA USED

**15 MAY 2016**



DATA USED

**25 MAY 2016**

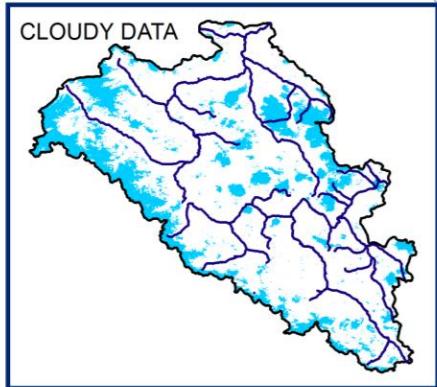


**SNOW COVER MAP**

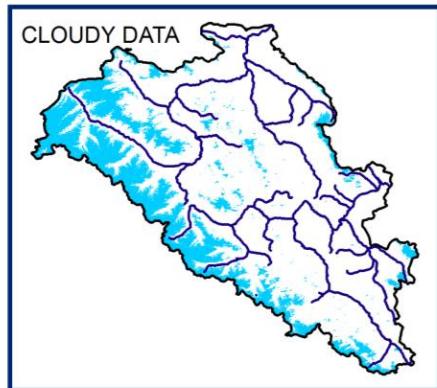
: ZANSKAR SUB-BASIN



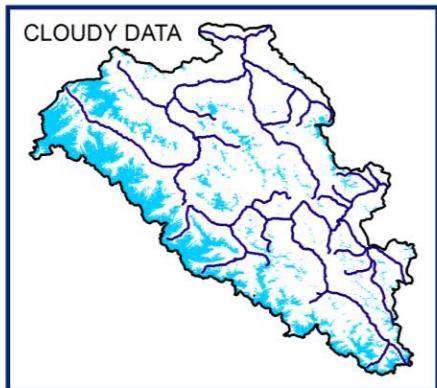
**04 JUNE 2016**



**09 JUNE 2016**



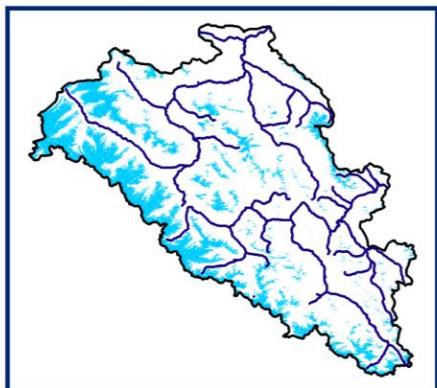
**14 JUNE 2016**



**19 JUNE 2016**



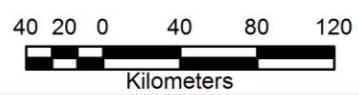
**23 JUNE 2016**



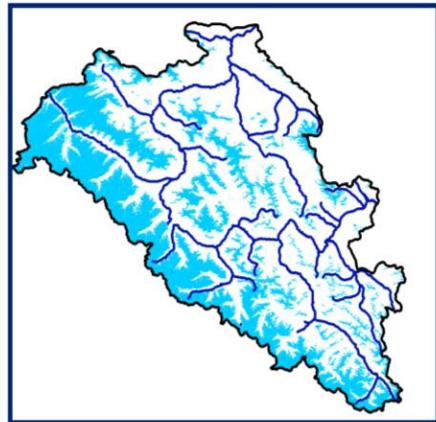
**24 JUNE 2016**



**SNOW**



## 10 DAILY SNOW COVER MAP : ZANSKAR SUB-BASIN



DATA USED

**04 JUNE 2016**

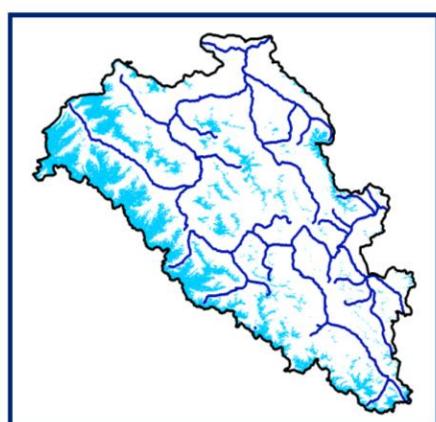
**09 JUNE 2016**



DATA USED

**14 JUNE 2016**

**19 JUNE 2016**



DATA USED

**23 JUNE 2016**

**24 JUNE 2016**

SNOW

40 20 0 40 80 120  
Kilometers