

CLIMATIC CHANGE AND ITS IMPACT ON FLOODS



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18 1:37

every drop counts

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CLIMATE CHANGE

Climate change is one of the major challenges in the 21st century faced by the citizen of planet earth.

It has affected the social, cultural, political and economical aspects of the society.

The climate change has affected the agriculture, environment, and enhanced the natural hazards.

It requires the change in the energy resources from Non-renewable to renewable. The developing countries are not yet ready for this change.

Social awareness and adaptive capacity for climate change needs to be strengthened to solve all the above critical issues.

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GLOBE



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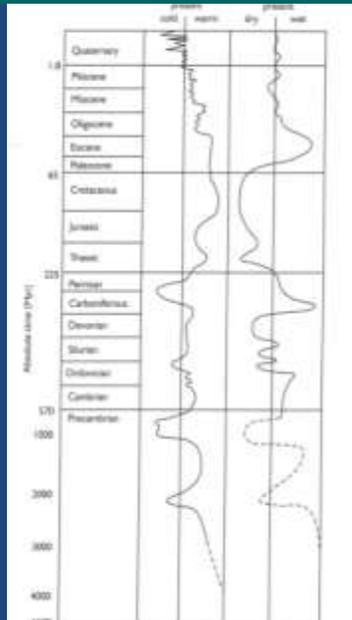
TIME FRAME OF CLIMATE CHANGE ON PLANET EARTH

TIME FRAME

Earth- 4.6 b y

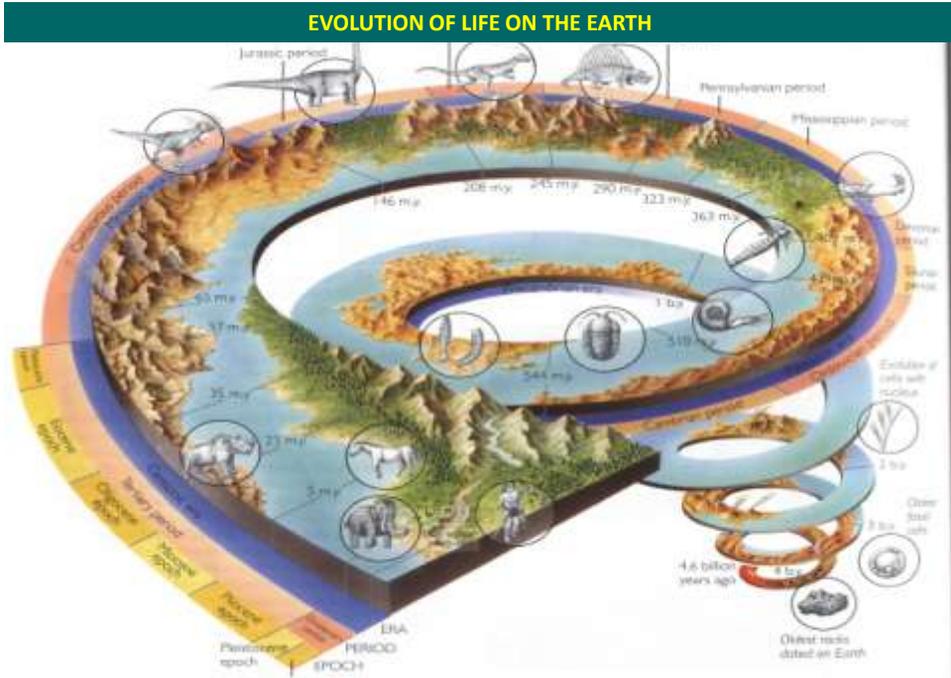
Man- 10 k a

Industry- 300 y



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GANGOTRI GLACIER AND OUR VIEW



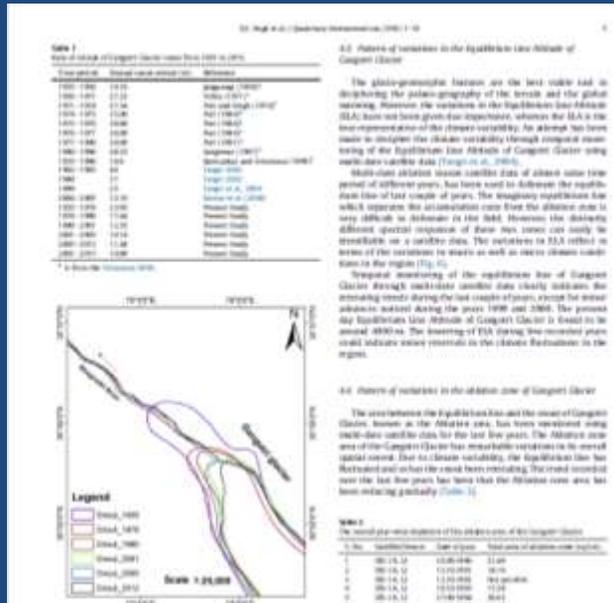
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PATTERN OF RETREAT MORPHOLOGICAL ZONES IN THE GANGOTRI GLACIER



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PATTERN OF RETREAT



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MORAINES OF GANGOTRI GLACIER



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GANGOTRI GLACIER REGION



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LAUNCHING OF FIRST INDIAN EXPEDITION TO THE ARCTIC



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INTERNATIONAL SCIENCE CITY, NY-ALESUND IN ARCTIC



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FLAG HOISTING FOR THE FIRST TIME IN THE HISTORY OF INDIA ON 15TH AUGUST 2007 IN NORTH POLE REGION



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TIRANGA WAS HOISTED FOR THE FIRST TIME IN INDIAN HISTORY IN HIMADRI ARCTIC 15 AUGUST, 2008



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LAND OF MID NIGHT SUN
SIX MONTHS DAY IN POLAR REGIONS



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TIDAL GLACIERS WITH CREVASSES



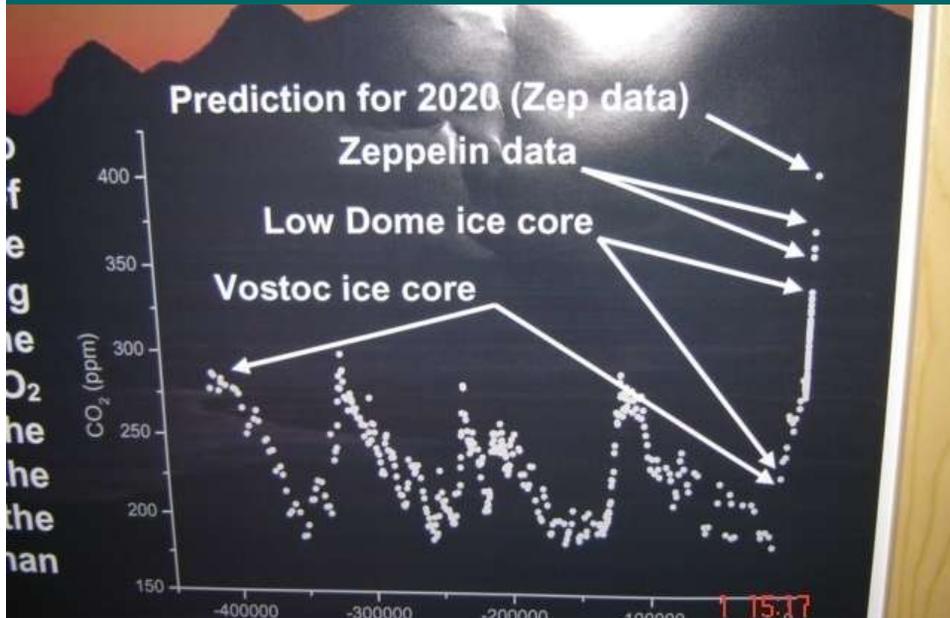
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TIDAL GLACIERS



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CO₂ CURVE IN PPM IN ATMOSPHERE



every drop counts

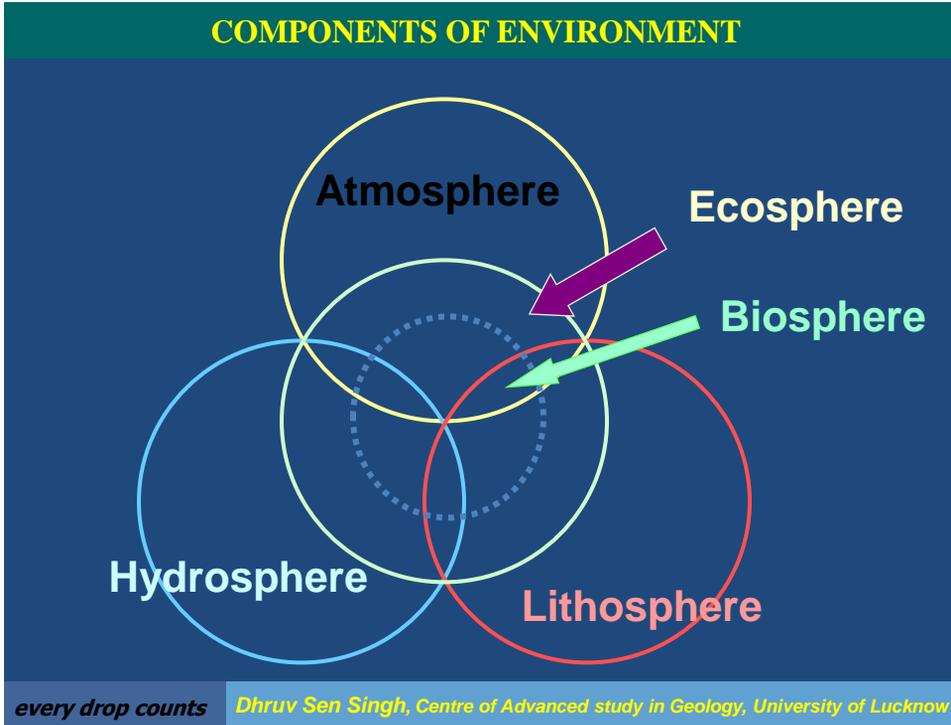
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ENVIRONMENT

Environment provides the Life Support System, Air, Water and Food.

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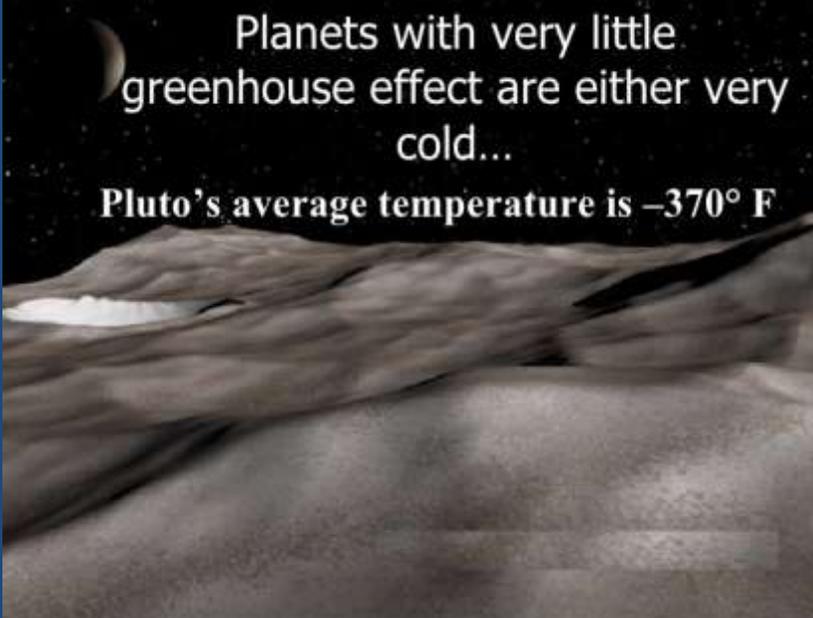
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PLANETS

Planets with very little
greenhouse effect are either very
cold...

Pluto's average temperature is -370°F



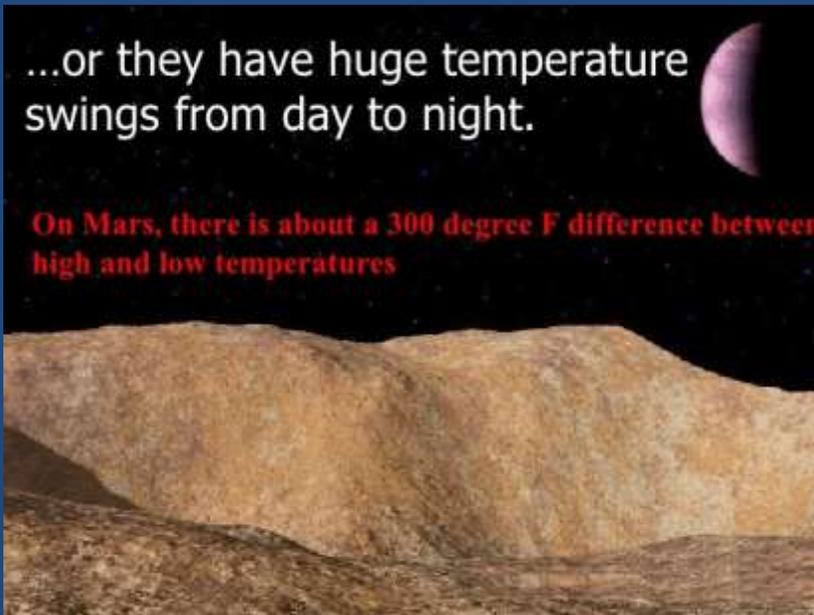
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PLANETS

...or they have huge temperature
swings from day to night.

**On Mars, there is about a 300 degree F difference between
high and low temperatures**

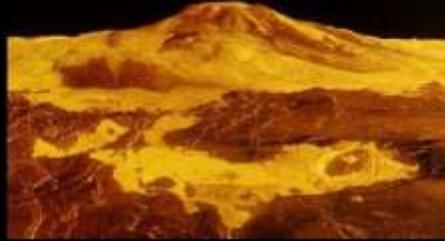


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PLANETS AND GREEN HOUSE GASES

Planets with abundant
greenhouse gases are very hot



The average temperature on Venus is about 855° F!

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GREEN HOUSE GASES

A number of greenhouse gases
occur naturally in the Earth's
atmosphere

- Water vapor
- Carbon dioxide
- Methane
- Nitrous oxide

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GREEN HOUSE GASES



With no greenhouse gases at all in its atmosphere, scientists estimate that Earth's average atmospheric temperature would be about -18°C , or about 0°F

<http://plan.afl.edu/efhsang/project2/case.html>

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EARTH AND CLIMATE CHANGE

...and then there's Earth...



...which is just right...

...for the moment, anyway.

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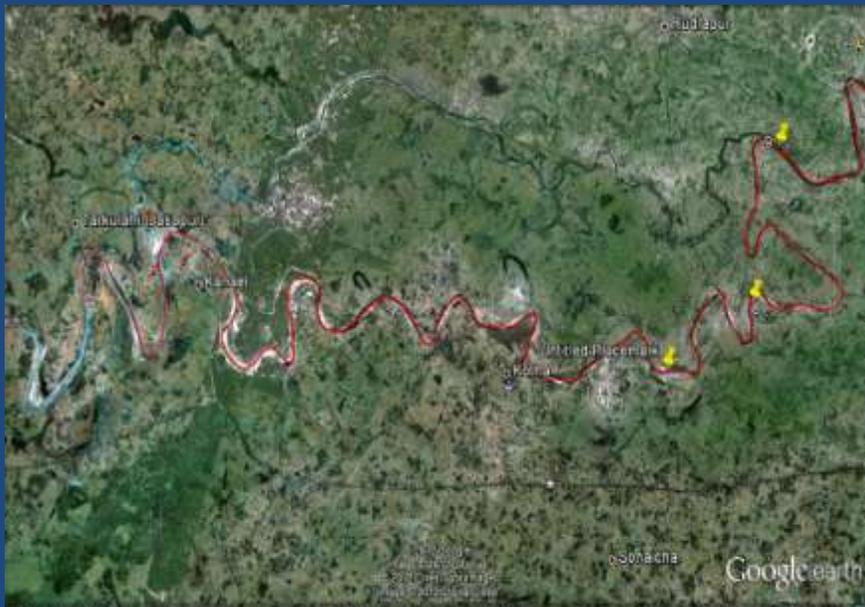
CONFLUENCE OF YAMUNA AND GANGA AT ALLAHABAD



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PATH CHANGE OF RAPTI NEAR GORAKHPUR



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CONFLUENCE OF RAPTI AND GHAGHARA



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CONFLUENCE OF CHHOTI GANDAK AND GHAGHARA



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CONFLUENCE OF GANGA AND GHAGHARA AT CHHAPRA



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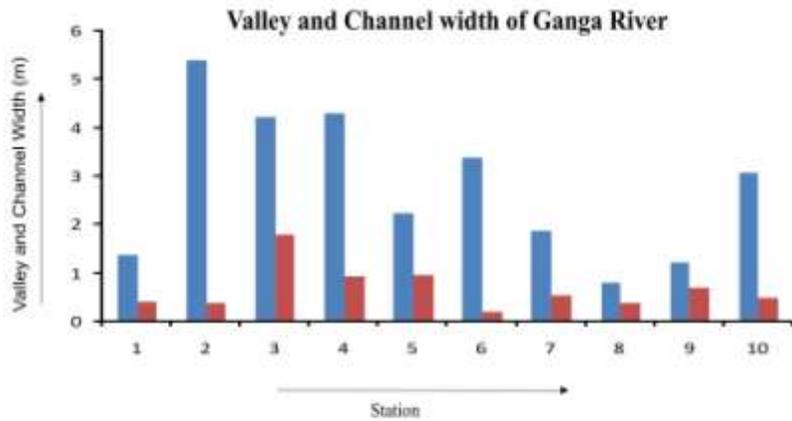
BROAD VALLEY OF GANGA NEAR KANPUR



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GANGA RIVER



Stations:

1. Bijonori, 2. Kansui, 3. Kewana, 4. Kanpur, 5. Near Unchahar,
6. Haudehwar, 7. Allahabad, 8. Mirzapur, 9. Varanasi, 10. Balla

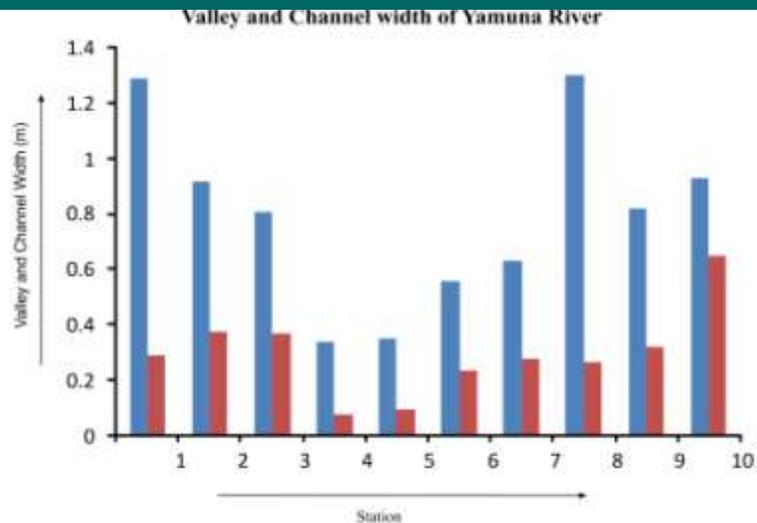
■ Valley Width (km)

■ Valley Width (km)

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YAMUNA RIVER



Stations:

1. Mathura, 2. Raigra Id, 3. Ajara, 4. Firozabad,
5. Etawah, 6. Near Hamirpur, 7. Near Azamgarh,
8. Khatampur, 9. Rajapur, 10. Allahabad

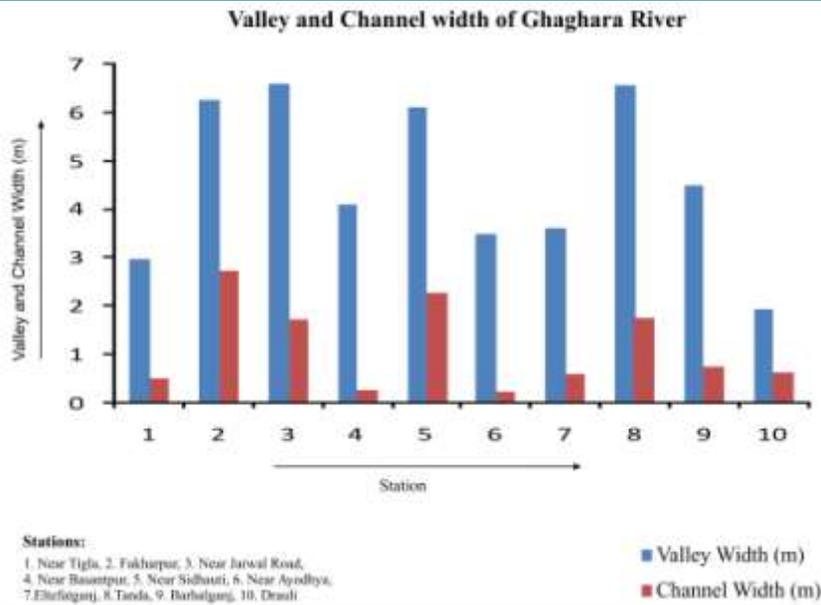
■ Valley Width (m)

■ Channel Width (m)

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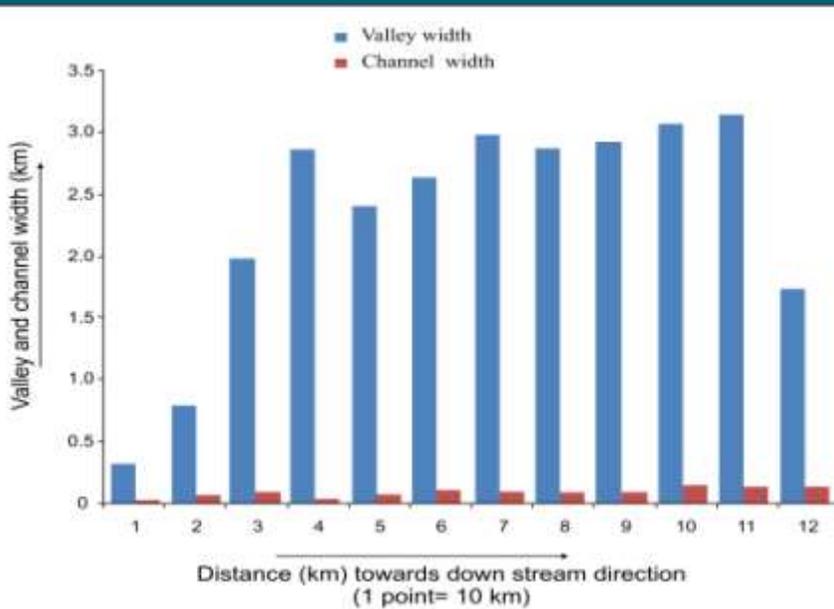
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GHAGHARA RIVER

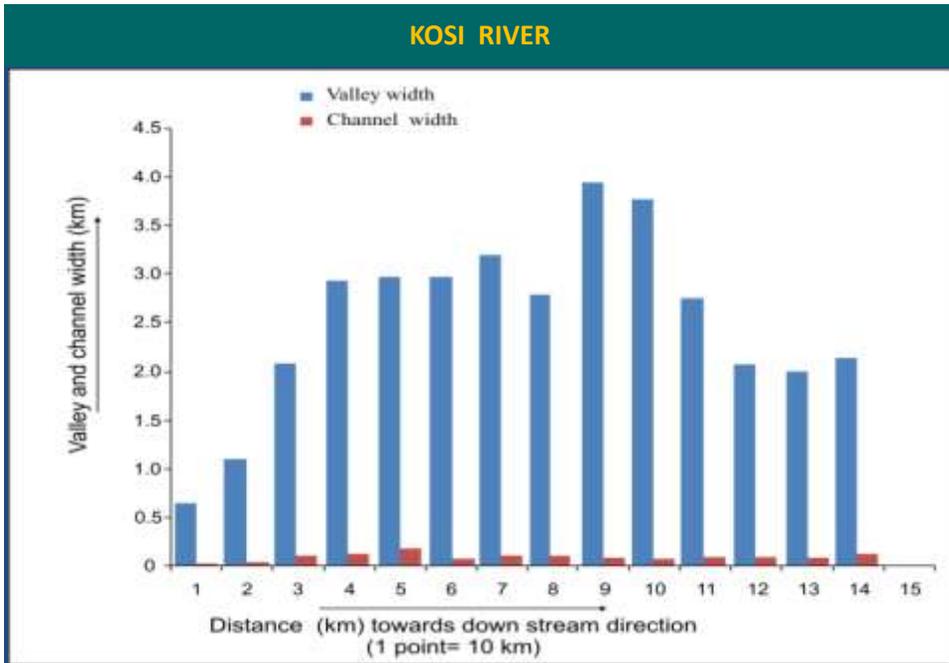


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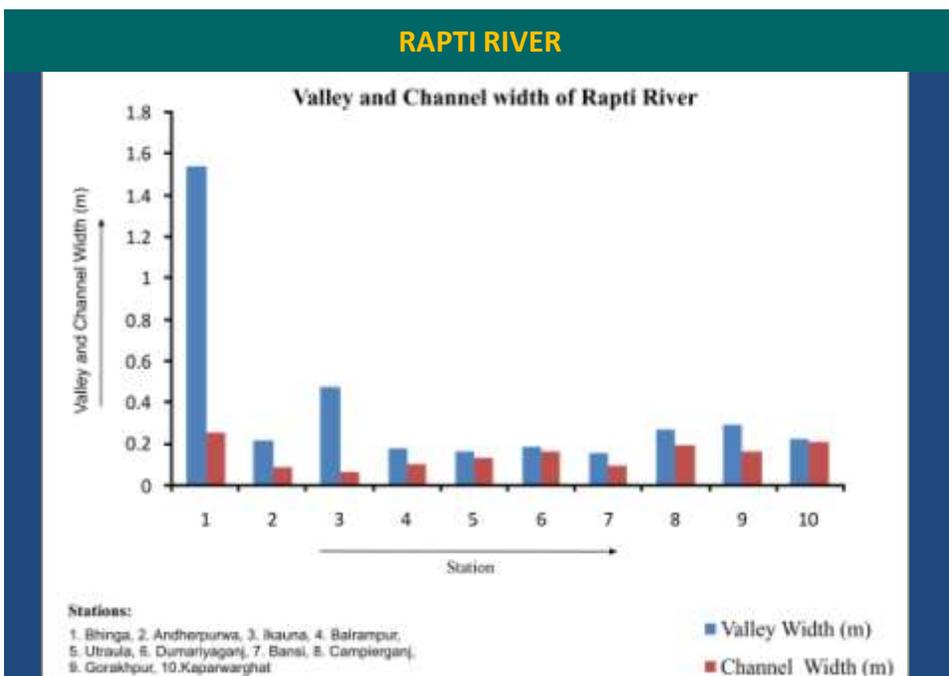
GREAT GANDAK RIVER



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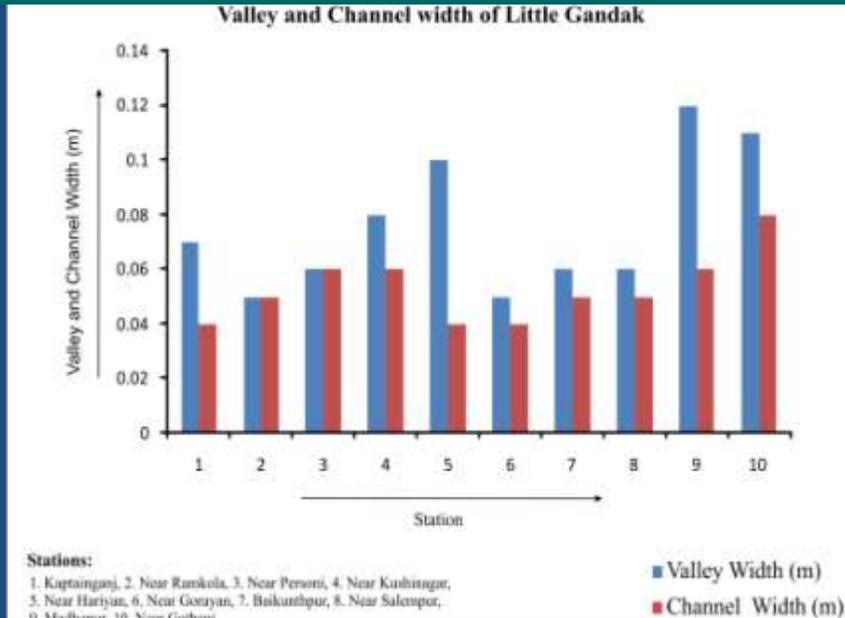


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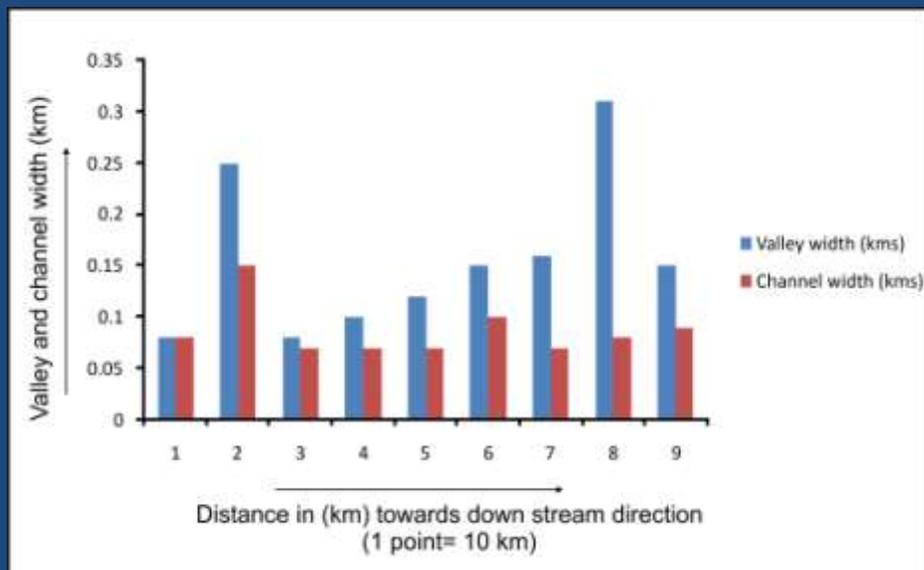
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CHHOTI GANDAK RIVER



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GOMATI RIVER



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GHAGHARA RIVER



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GHAGHARA RIVER

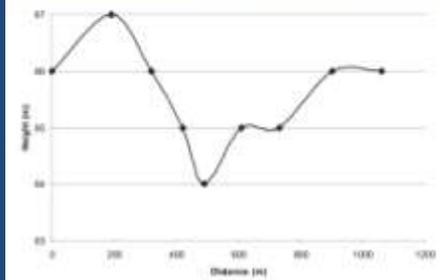


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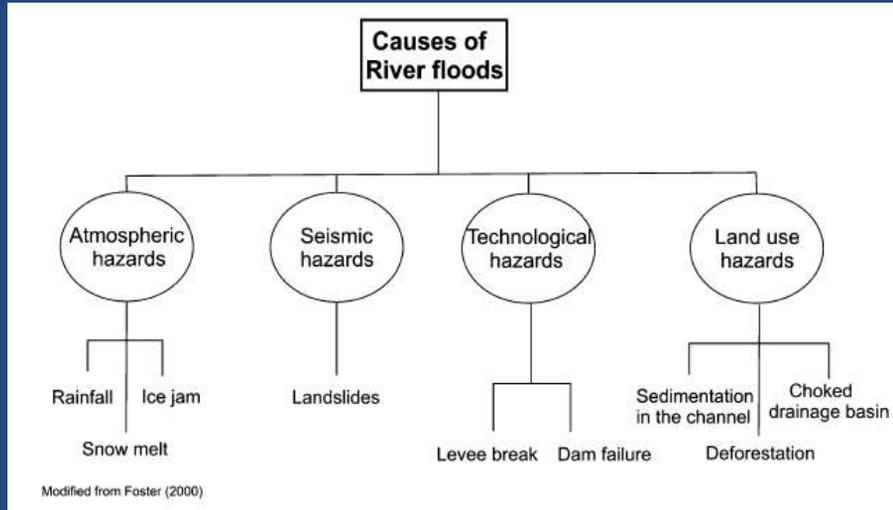
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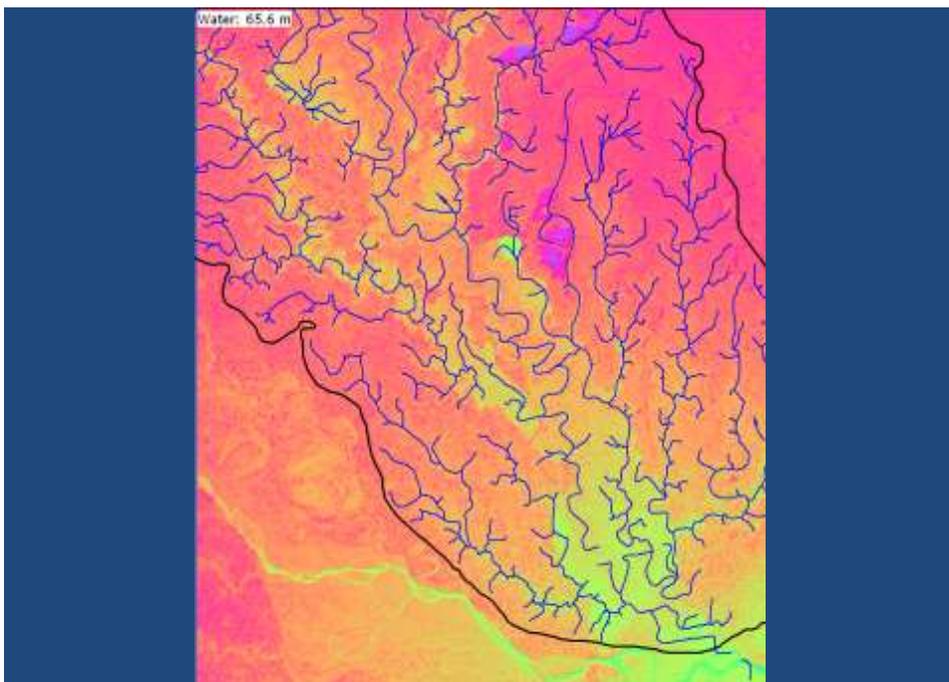
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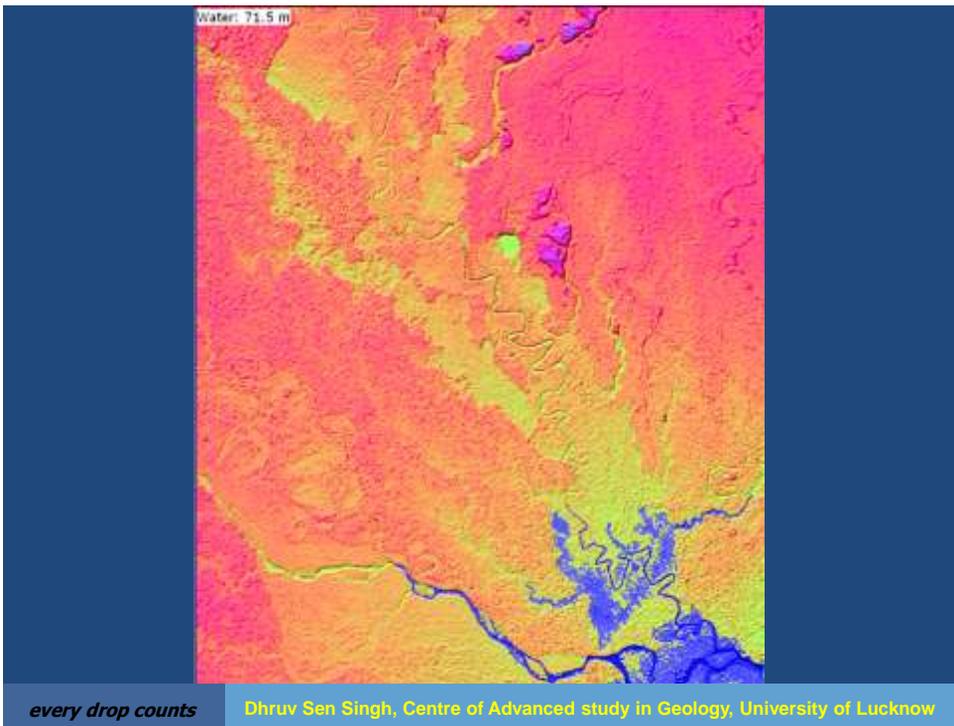
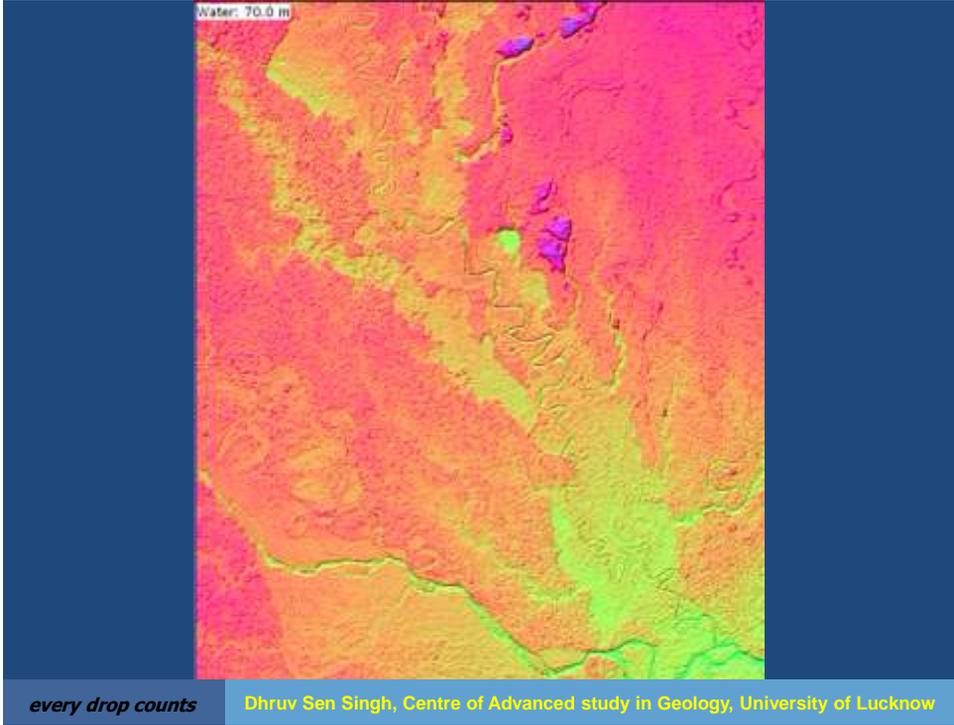
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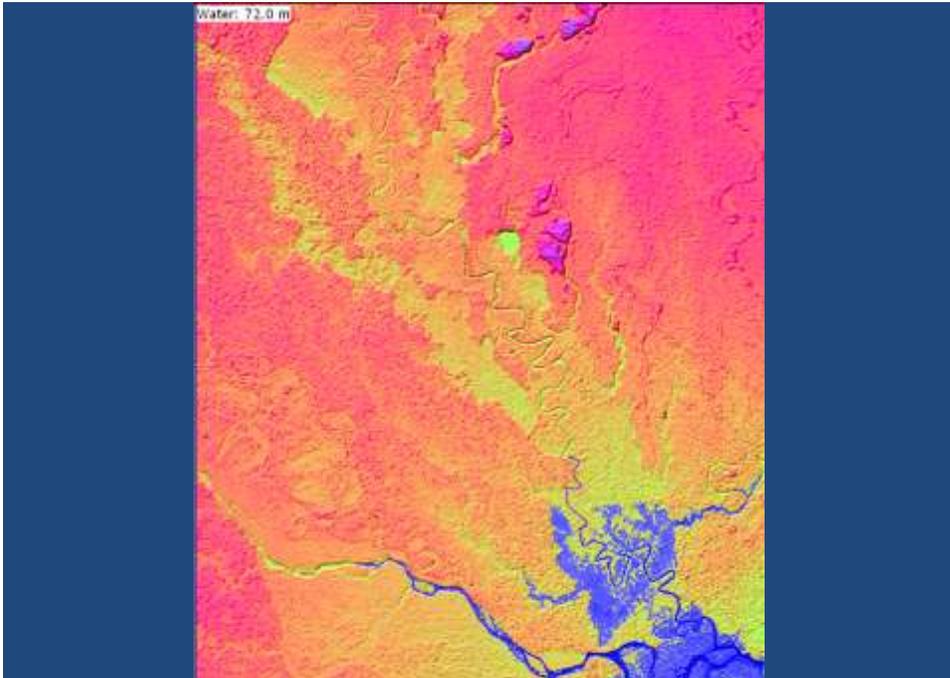
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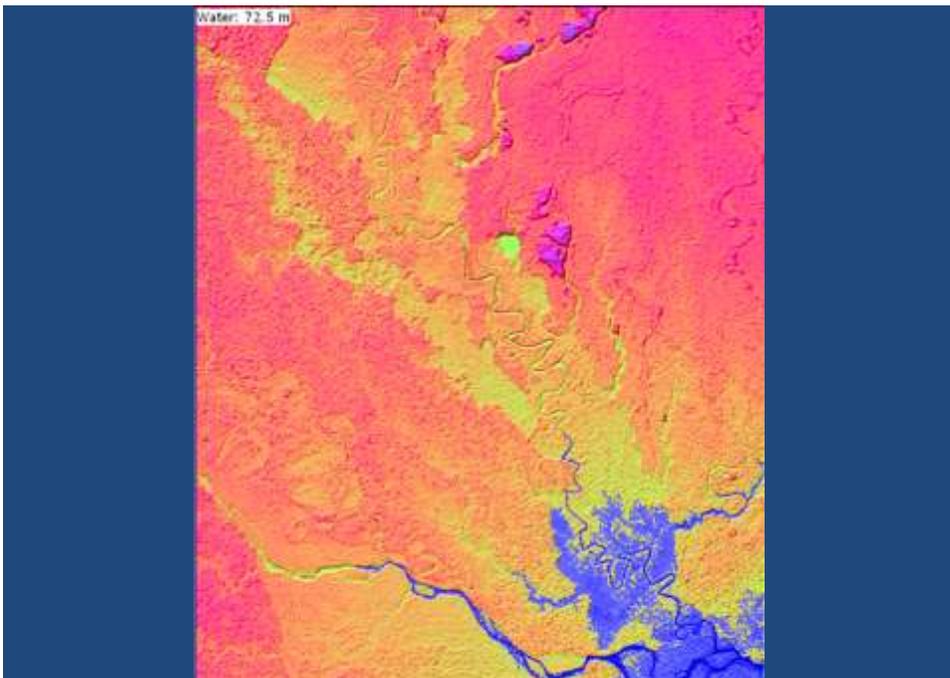
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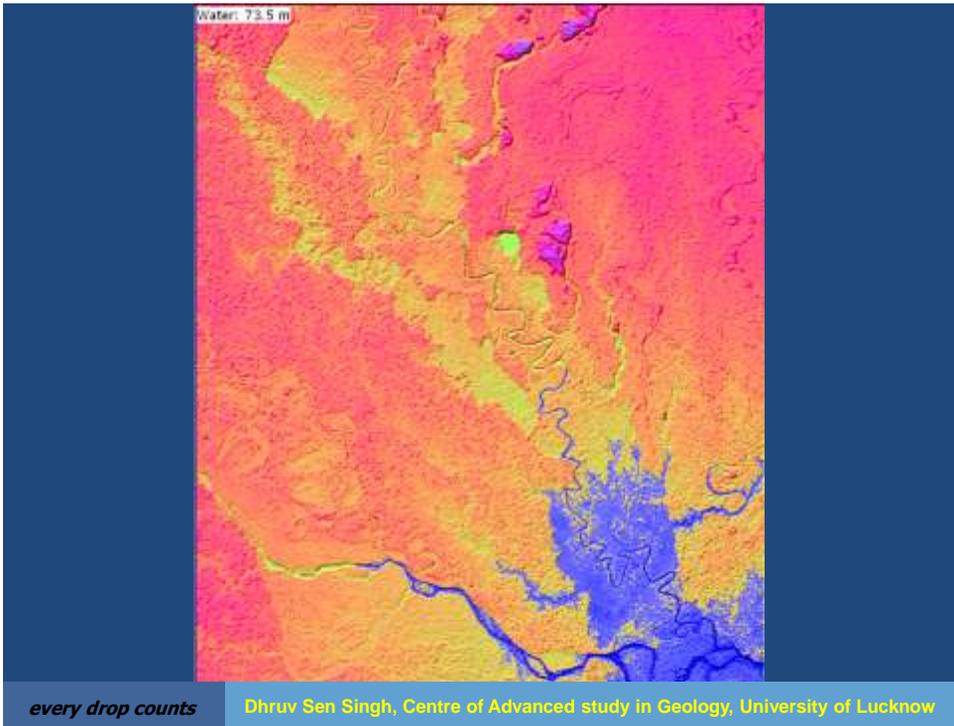
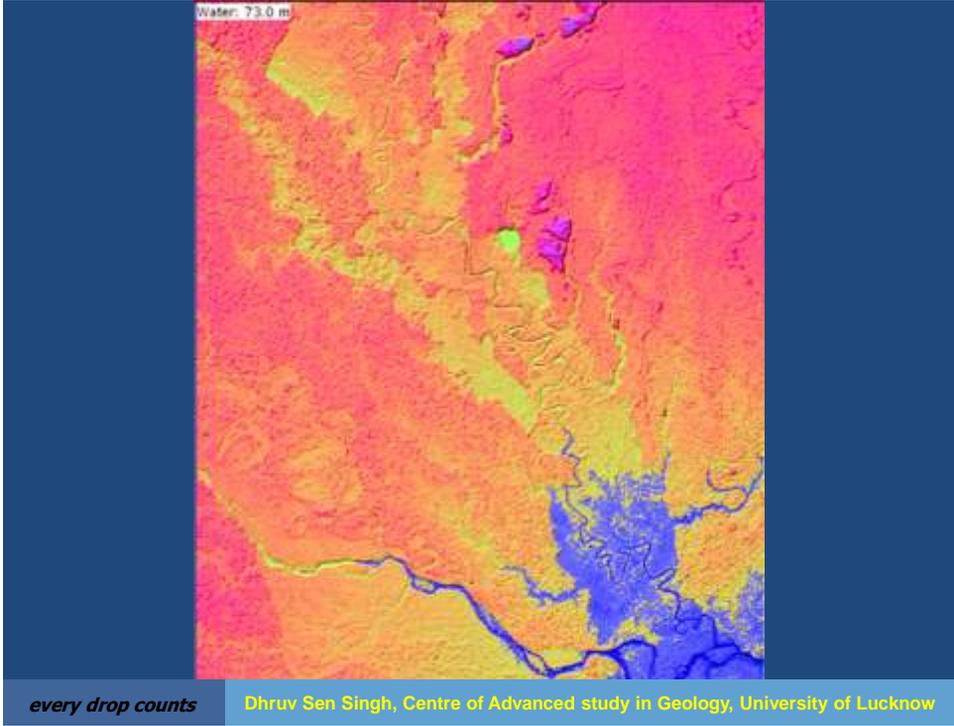
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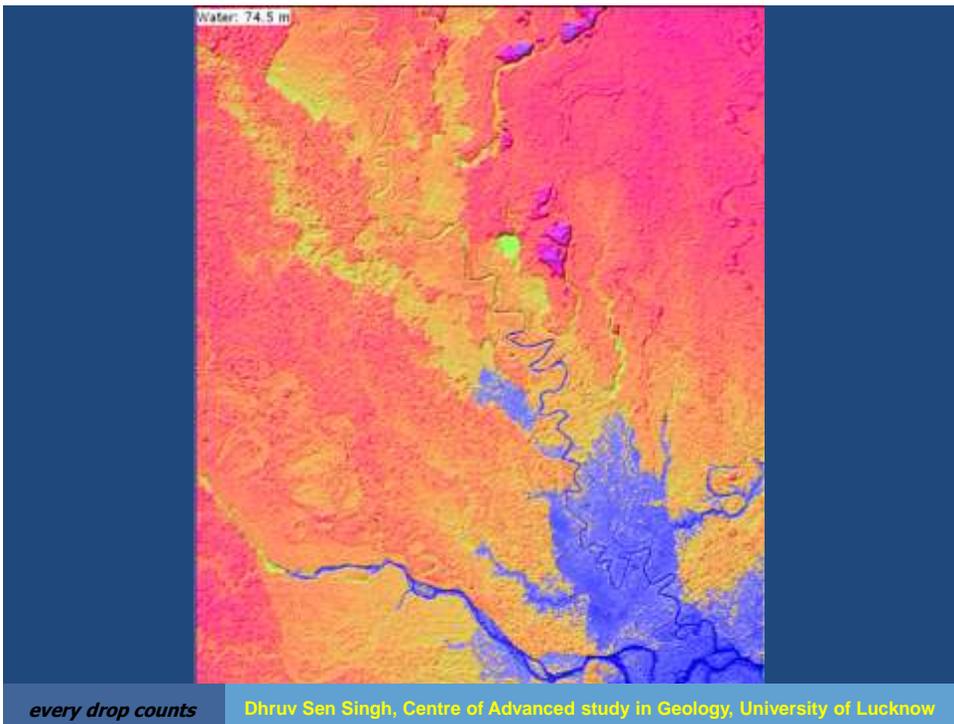
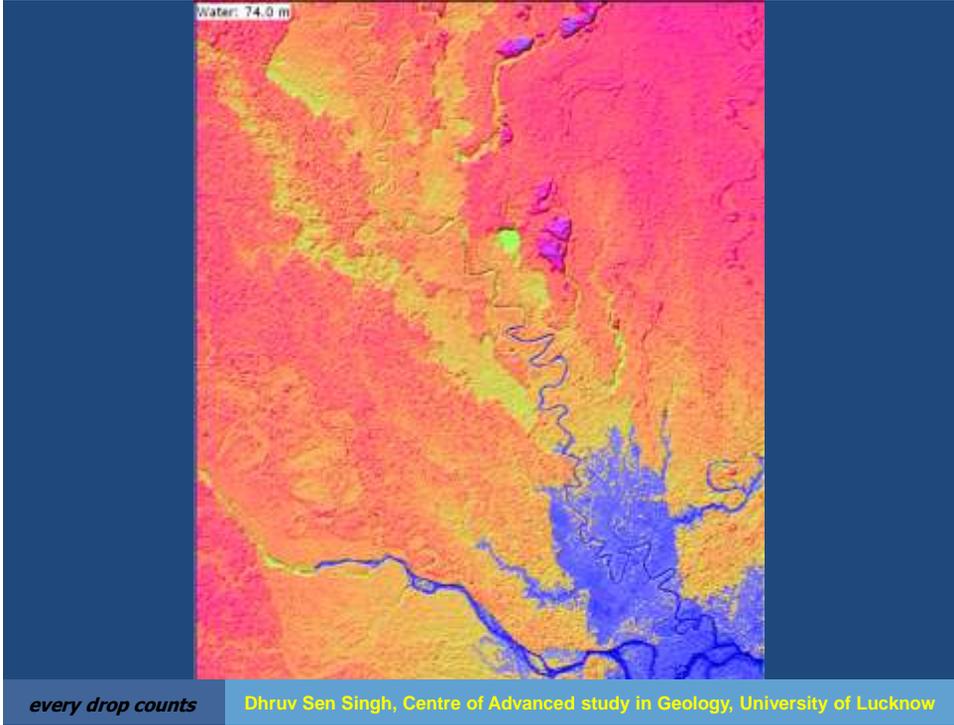
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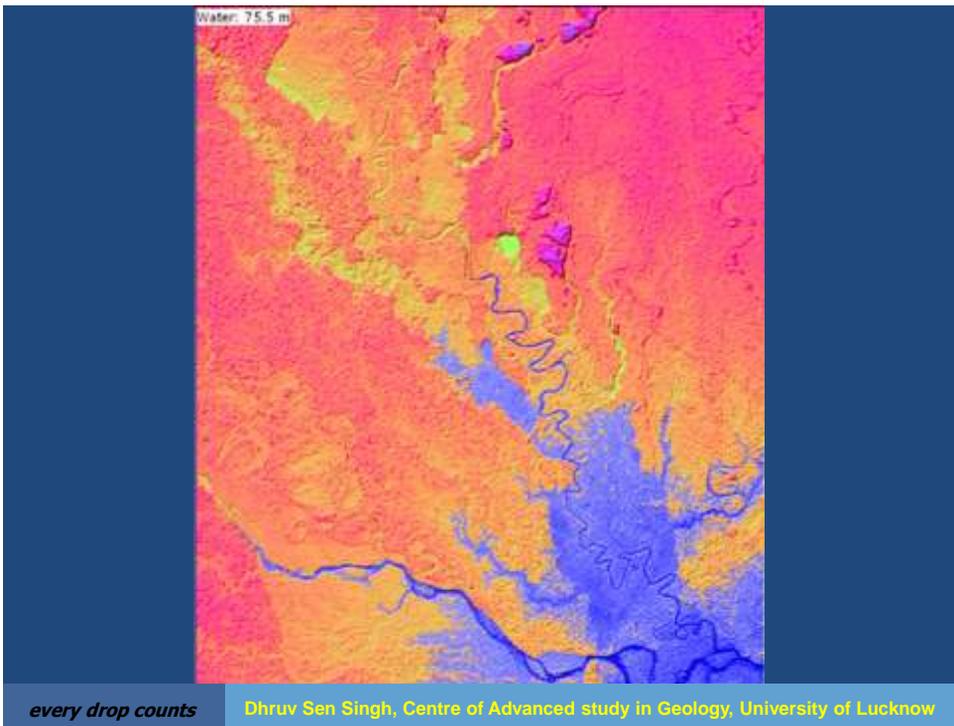
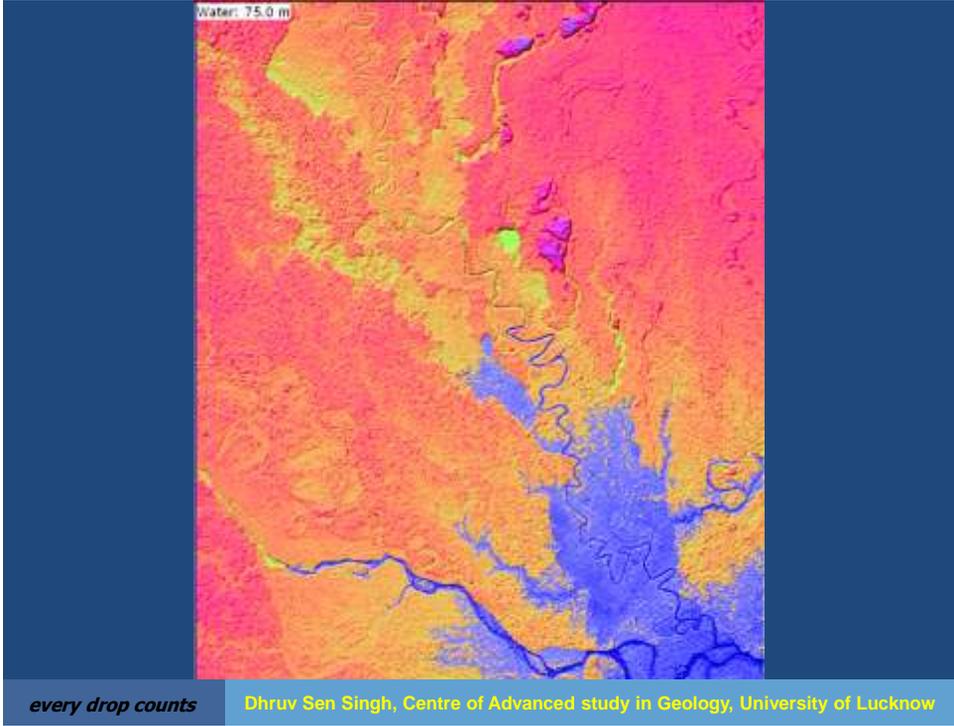


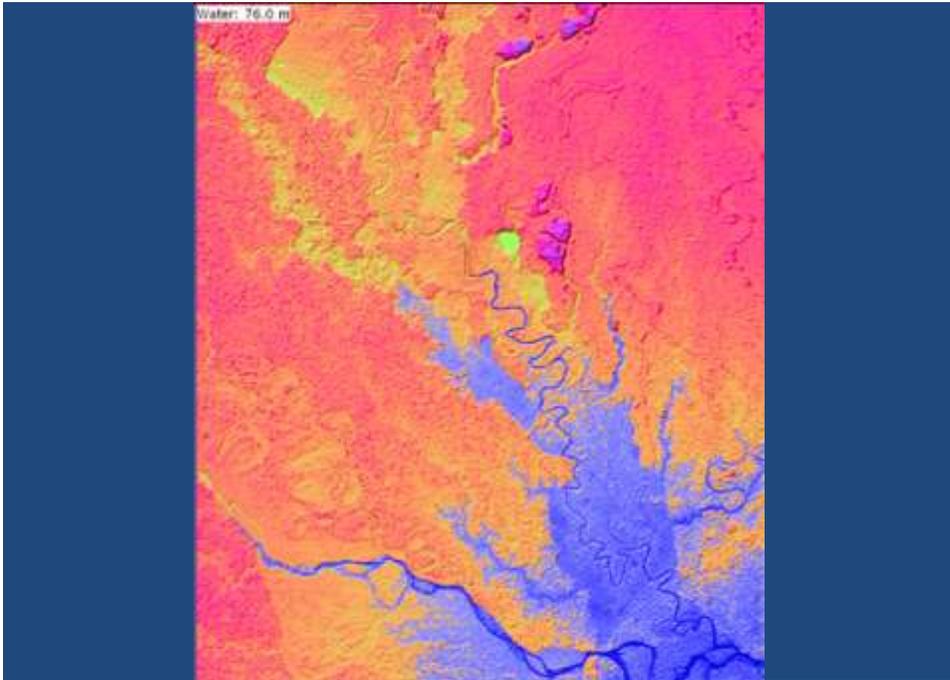
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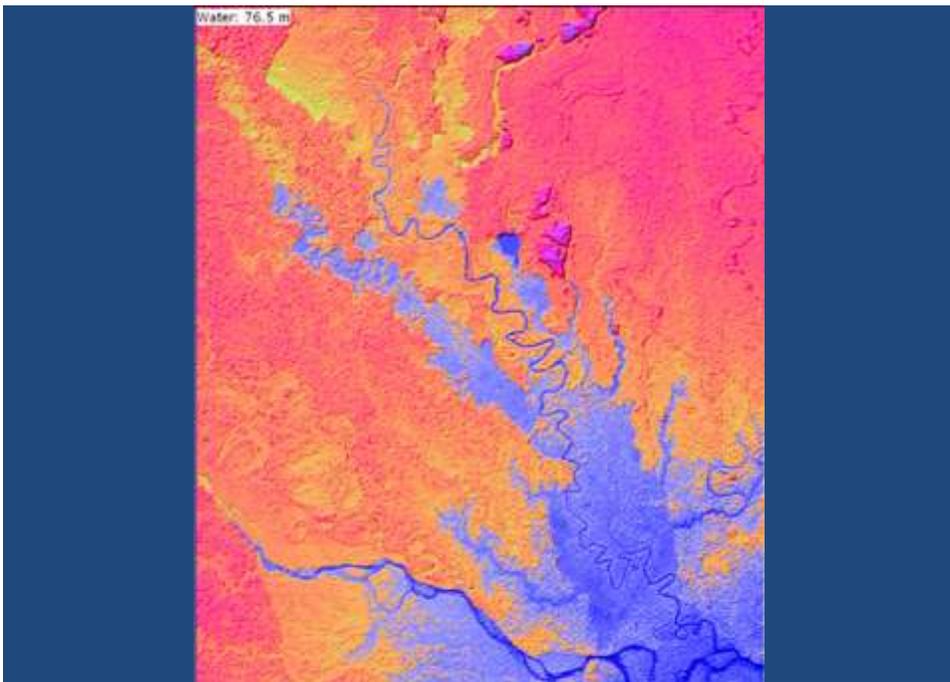






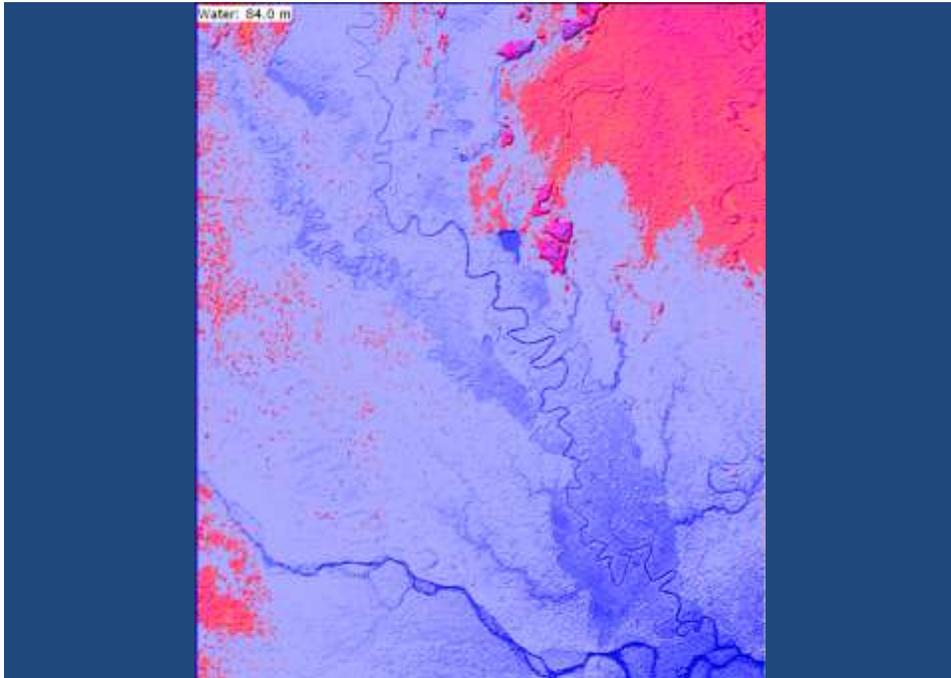
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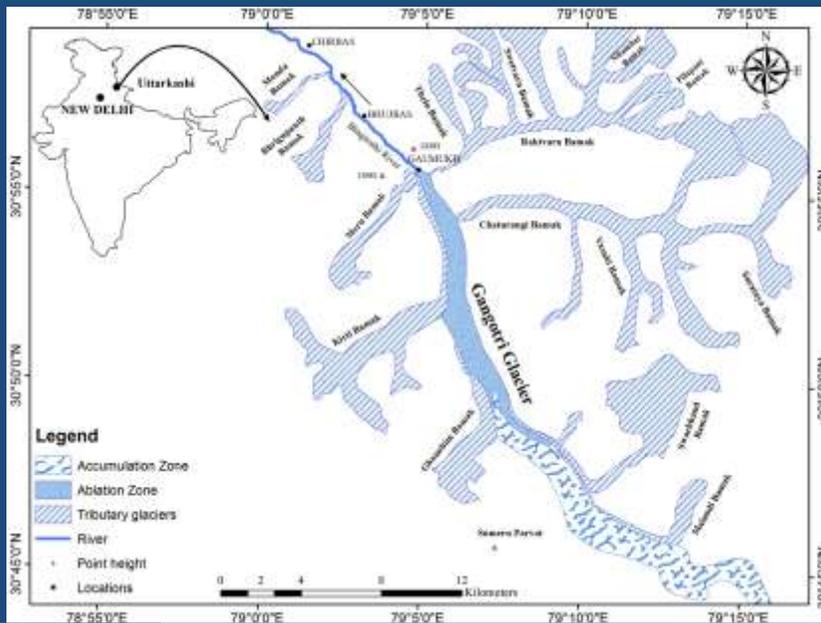
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LOCATION MAP OF GANGOTRI GLACIER



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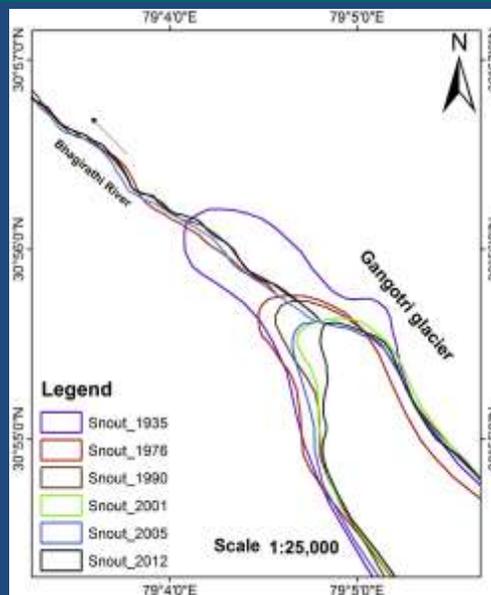
POSITION OF THE GANGOTRI GLACIER SNOUT IN 2001 (a) AND 2015 (b)



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POSITION OF THE SNOUT OF THE GANGOTRI GLACIER



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YEAR WISE DEPLETION RATE OF THE ABLATION AREA

The overall year-wise depletion of the ablation area of the Gangotri Glacier.

S. No.	Satellite/Sensor	Date of pass	Total area of ablation zone (sq km)
1	IRS-1A, L2	25.09.1990	21.49
2	IRS-1A, L2	15.10.1991	19.19
3	IRS-1A, L2	12.10.1992	Not possible
4	IRS-1A, L2	10.10.1993	17.34
5	IRS-1A, L2	27.09.1994	20.62
6	IRS-1A, L2	14.09.1995	22.77
7	IRS-1C-L3	19.10.1996	18.03
8	IRS-1C-L3	14.10.1997	Not possible
9	IRS-1C-L3	09.10.1998	21.07
10	IRS-1D-L3	16.10.1999	21.25
11	IRS-1C-L3	15.11.2000	19.97
12	IRS-1D-L3	23.09.2001	19.89
13	IRS-1D-L3	2012	17.04

CHARACTERSTIC OF GEOMORPHIC ZONES

Characteristics of morphological zones.

S. No.	Morphological zones	Sediments	Percentage of sediment (size in cm)				Roundness and sorting	
			Boulders					Matrix
			>150 LSB	60-150 LMSB	30-60 SMSB	2.5-30 SSB		
1	Glacial	Primary	2-5	5-10	5-10	40-60	20-40	Angular, poorly sorted
2	Glacio-Fluvial	Secondary	2-5	5-10	10-20	20-40	50-60	Sub rounded, poorly sorted

LSB = Large Size Boulders, LMSB = Large Medium Size Boulders, SMSB = Small Medium Sized Boulders, SSB = Small Size Boulders, Matrix = Sand, Silt, Clay.

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CLOUD BURSTS IN GANGOTRI GLACIER ON 6 JUNE, 2000



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CHORABARI GLACIER AND MANDAKINI RIVER



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SUSTAINABLE SOLUTIONS AROUND



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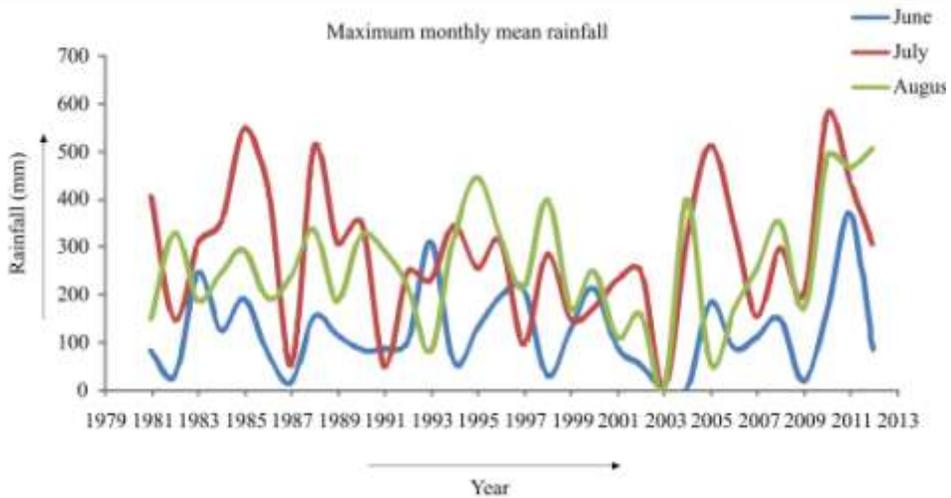
KEDARNATH DEVASTATION, 16, 17—June, 2013



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PRECIPITATION VARIATIONS FROM 1980-2013



IMD and India Water Portal

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CAUSES OF KEDARNATH TRAGEDY



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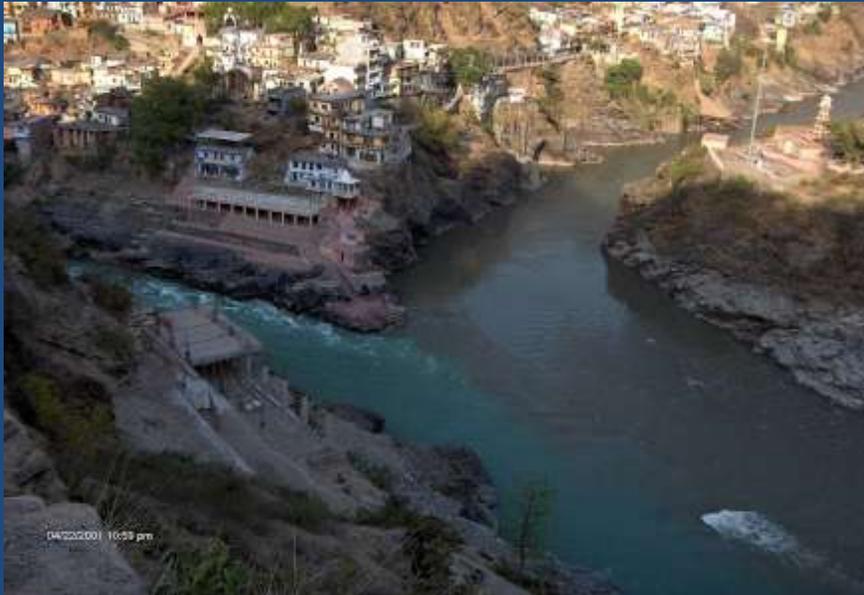
DISTRUBUTION OF DEBRIS AFTER DISASTER



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BHAGIRATHI AND ALAKNANDA AT DEVPRAYAG



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BHAGIRATHI AND ALAKNANDA AT DEVPRAYAG



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Kedranath

RESEARCH COMMUNICATIONS

Soilless processes during flash floods in the glacial moraine of Kedarnath, Garhwal Himalaya and their role in the modification of bedforms

Dhruv Sen Singh*

Department of Geology, University of Lucknow, Lucknow-226007, India

Abstract—Soilless processes during flash floods in the glacial moraine of Kedarnath, Garhwal Himalaya and their role in the modification of bedforms.

Keywords—Kedarnath, Garhwal, flash floods, moraine, soilless processes, bedforms, glacial moraine.

Introduction—Soilless processes during flash floods in the glacial moraine of Kedarnath, Garhwal Himalaya and their role in the modification of bedforms.

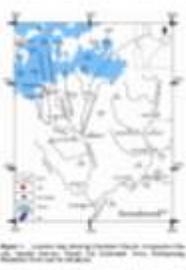
1. Introduction—Soilless processes during flash floods in the glacial moraine of Kedarnath, Garhwal Himalaya and their role in the modification of bedforms.

2. Geological Setting—The study area is located in the glacial moraine of Kedarnath, Garhwal Himalaya, India.

3. Methodology—The study was conducted using field observations and laboratory experiments.

4. Results and Discussion—The results show that soilless processes play a significant role in the modification of bedforms during flash floods.

5. Conclusion—Soilless processes are an important factor in the modification of bedforms during flash floods in the glacial moraine of Kedarnath, Garhwal Himalaya.



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Kedarnath

Causes of Kedarnath Tragedy and Disaster Preparedness—Dhruv Sen Singh, Centre of Advanced Study in Geology, University of Lucknow, Lucknow-226007 (Email: dhruvsen@geology.lko.ac.in)

Abstract—The Kedarnath tragedy of 2013 is the first major disaster in the Garhwal Himalaya. The study area is located in the glacial moraine of Kedarnath, Garhwal Himalaya, India.

1. Introduction—The Kedarnath tragedy of 2013 is the first major disaster in the Garhwal Himalaya.

2. Geological Setting—The study area is located in the glacial moraine of Kedarnath, Garhwal Himalaya, India.

3. Methodology—The study was conducted using field observations and laboratory experiments.

4. Results and Discussion—The results show that the Kedarnath tragedy was caused by a combination of factors, including the failure of the dam and the impact of the flash flood.

5. Conclusion—The Kedarnath tragedy highlights the need for improved disaster preparedness and risk reduction measures in the Garhwal Himalaya.



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February, 2021

Climate change has led to rise in natural disasters... ...Encroachment Of Rivers Adds To Havoc

- Dhruv Sen Singh

The floods that inundated the low-lying plains of Assam, India, in 2019, were a stark reminder of the havoc that climate change is wreaking on the planet. The 14th largest of 144 floods that hit the state in 2019, the 11th largest since 1950, was caused by a combination of factors, including heavy rainfall, a high water table, and the encroachment of rivers. The floods, which were the most severe in the state since 1950, caused the death of 100 people and the displacement of 1.5 million people. The floods also caused the loss of 100,000 hectares of agricultural land and 10,000 hectares of forest. The floods also caused the loss of 100,000 hectares of agricultural land and 10,000 hectares of forest.



ENCROACHMENT

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EARTH

There's no place like home...



...and there may never be again. Do your part.

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THANKS



Thanks

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