



Surface Elevation at
and around Lake
Eyre, Australia

Aneri Patel
1st March 2022

About Lake Eyre

- Lake Eyre is Australia's largest Salt Lake
- It is the lowest point in Australia (mainland)
- The lake is mostly dry but occasional floods bring wildlife and colour to the lake
- It is 697 km north of the state capital of Adelaide
- Selected ROI: 1,166,098 km²

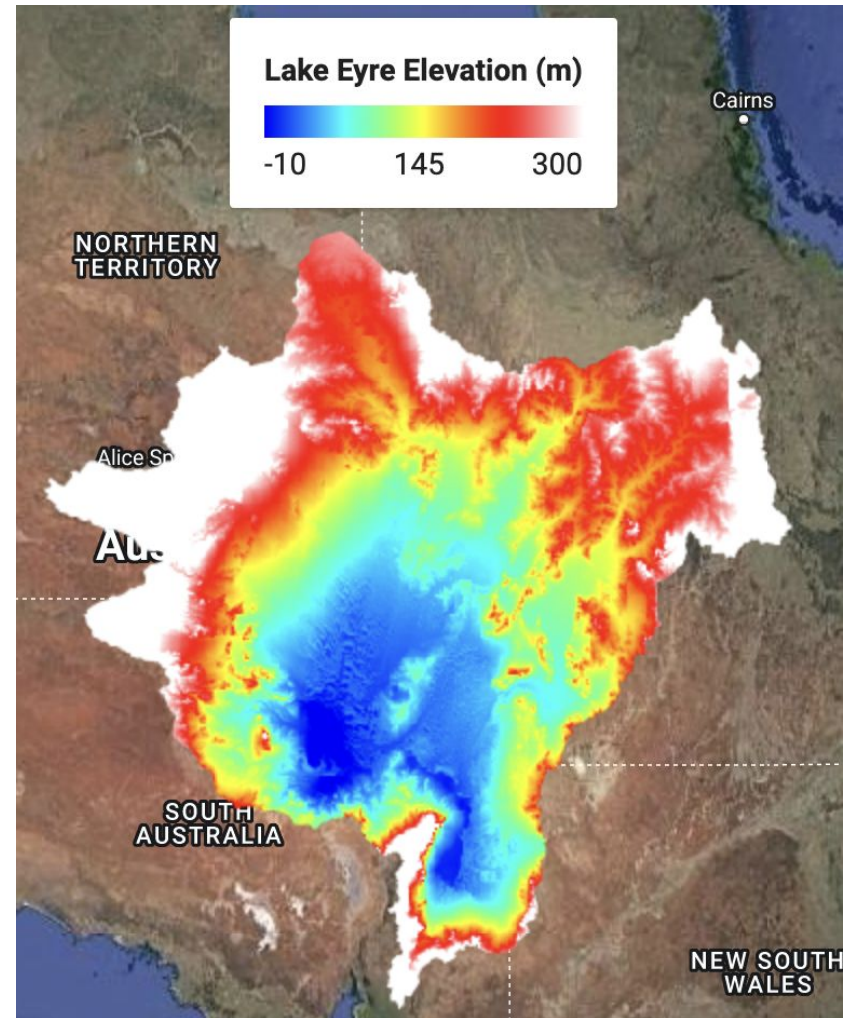


Advanced Land Observing Satellite Digital Surface Model (ALOS-DSM)

- Resolution: 30 m (1 arcsec)
- Duration of Data Collection: 2006 to 2011
- A Digital Terrain Model (DTM) would be more appropriate for this Region of Interest than a Digital Surface Model (DSM) as it does not cover much above ground surface.

J. Takaku, T. Tadono, K. Tsutsui : Generation of High Resolution Global DSM from ALOS PRISM, The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, pp.243-248, Vol. XL-4, ISPRS TC IV Symposium, Suzhou, China, 2014.

T. Tadono, H. Ishida, F. Oda, S. Naito, K. Minakawa, H. Iwamoto : Precise Global DEM Generation By ALOS PRISM, ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences, pp.71-76, Vol.II-4, 2014.

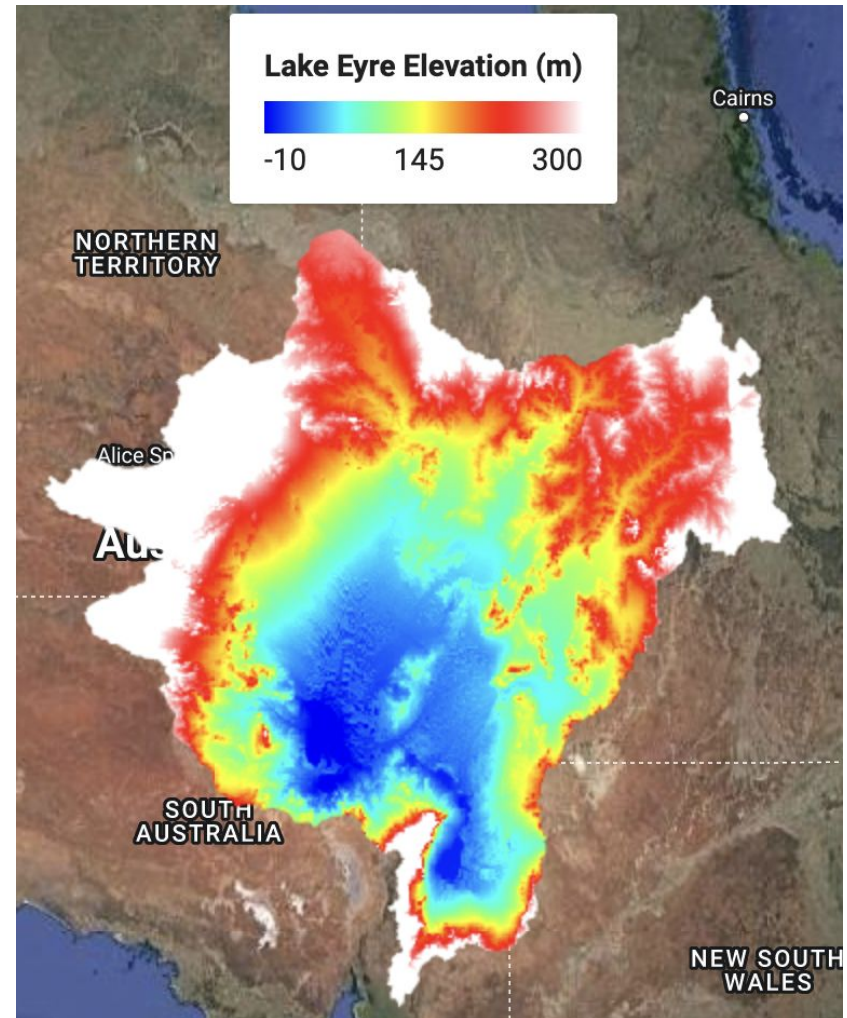


Shuttle Radar Topography Mission Digital Elevation Model (SRTM-DEM)

- Duration of data collection: 11 days in 1994
- Resolution: 90 m (3 arcsec)
- Provides a Digital Terrain Model which is more appropriate for the surface covered by this ROI.

Van Zyl, Jakob J. "The Shuttle Radar Topography Mission (SRTM): a breakthrough in remote sensing of topography." *Acta Astronautica* 48.5-12 (2001): 559-565.

<https://www.usgs.gov/centers/eros/science/usgs-eros-archive-digital-elevation-shuttle-radar-topography-mission-srtm-non>

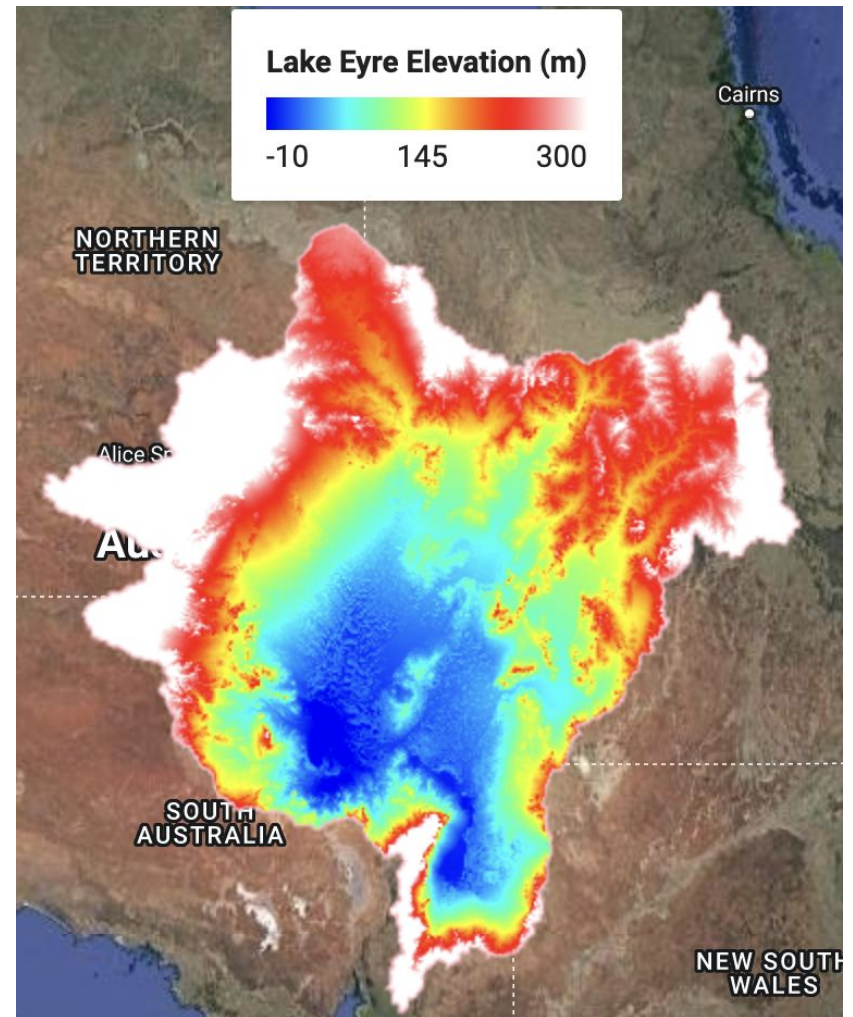


Copernicus Digital Elevation Model (GLO-30 DEM)

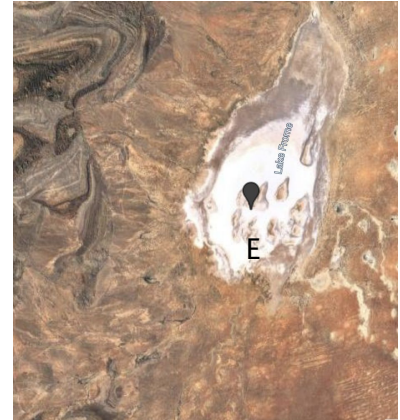
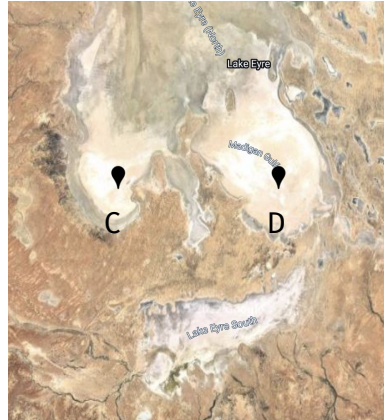
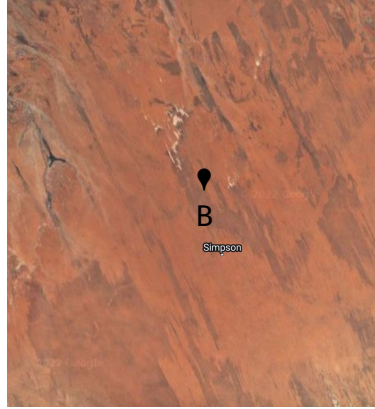
- Duration of data collection: 2010-2015
- Resolution:
 - Limited worldwide coverage at 30 m (1 arcsec)
 - No values for ocean area
- WorldDEM™ infilled on a local basis with the following DEMs: ASTER, SRTM90, SRTM30, SRTM30plus, GMTED2010, TerraSAR-X Radargrammetric DEM, ALOS World 3D-30m.

<https://samapriya.github.io/awesome-gee-community-datasets/projects/glo30/>

<https://spacedata.copernicus.eu/web/cscda/dataset-details?articleId=394198>



Points of Interest



A - Alice Springs - a town

B - Simpson Desert - sandy dunes

C - Madigan gulf

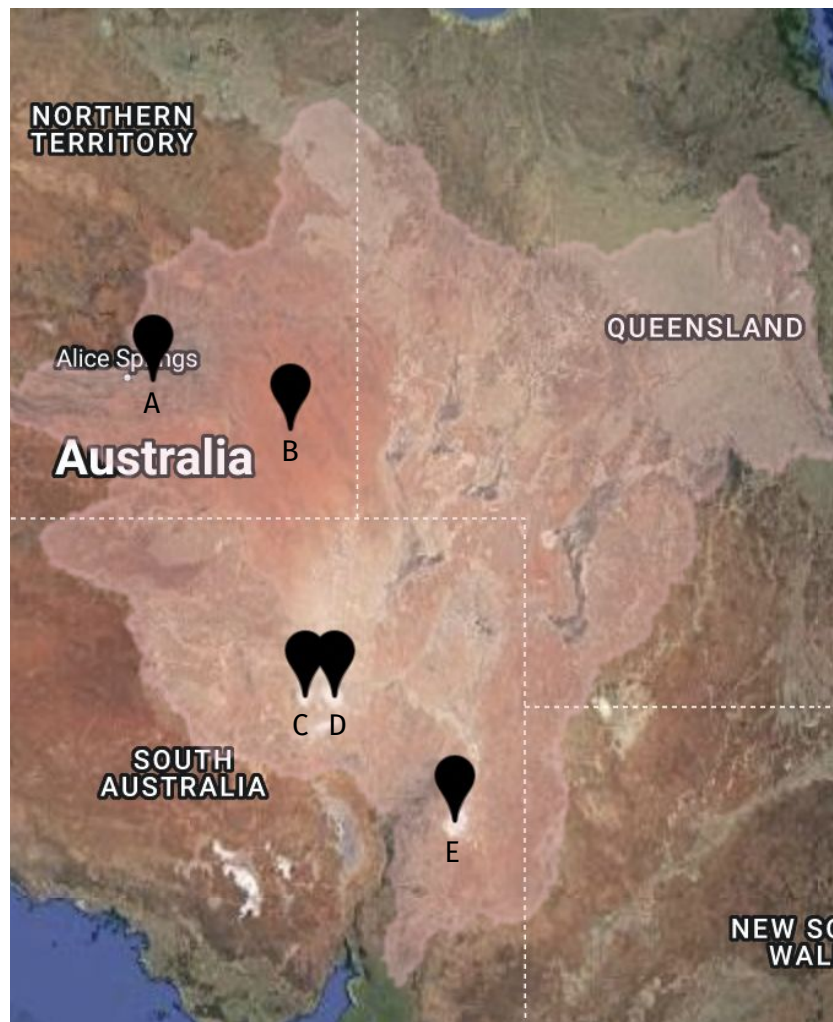
D - Madigan gulf

E - Lake Frome. It rarely fills with brackish water flowing down usually dry creeks flows or exceptional flows.

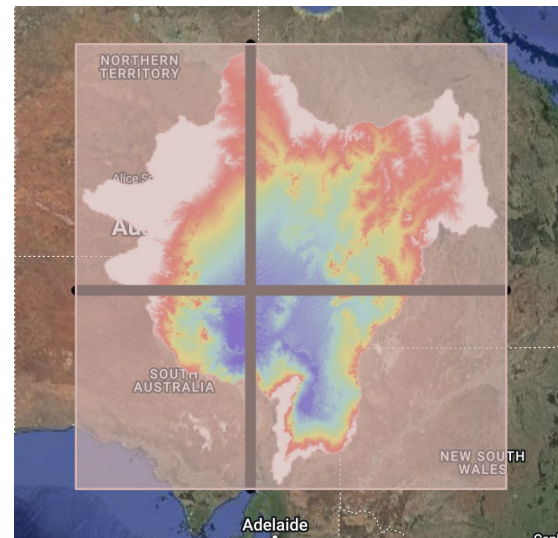
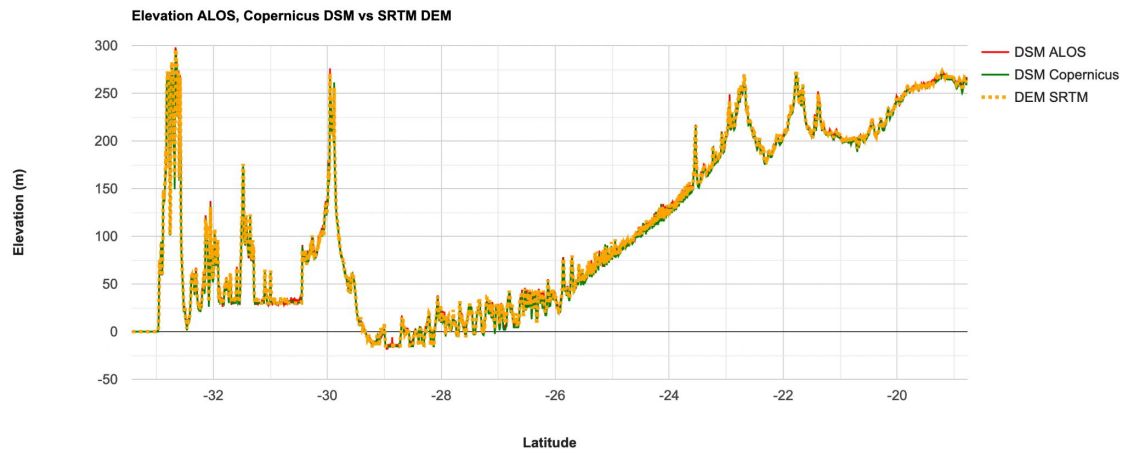
Comparative Analysis

Point	ALOS (m)	SRTM (m)	GLO-30 (m)
A	466	464	455.72
B	151	148	147.66
C	-13	-15	-15.5
D	-15	-15	-15.5
E	1	2	-1.48

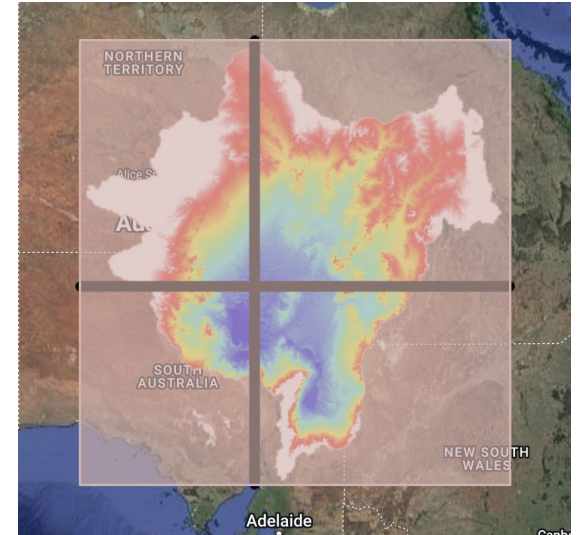
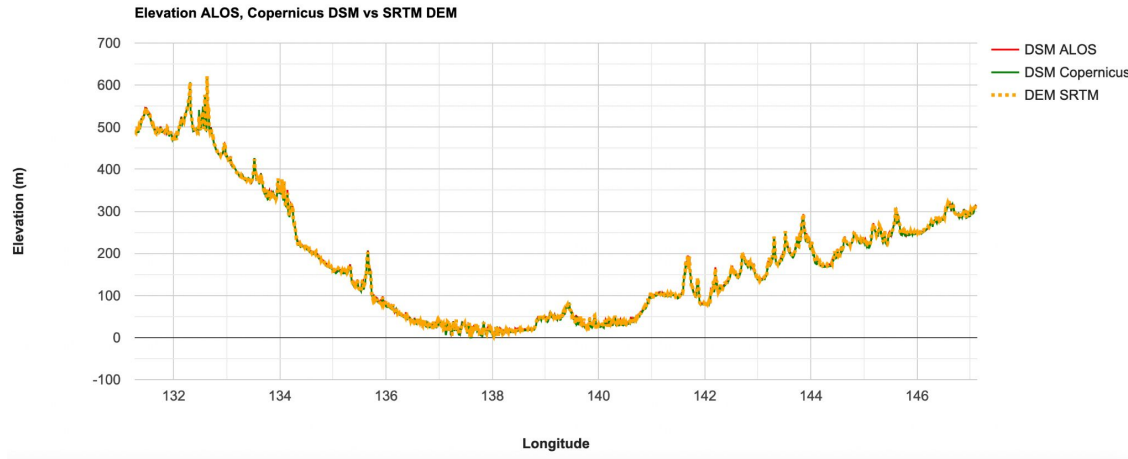
GLO-30 has consistently lower values than ALOS and SRTM at all points of interest.



Latitude Profile



Longitude Profile





Brahmaputra river
level increase in
Assam

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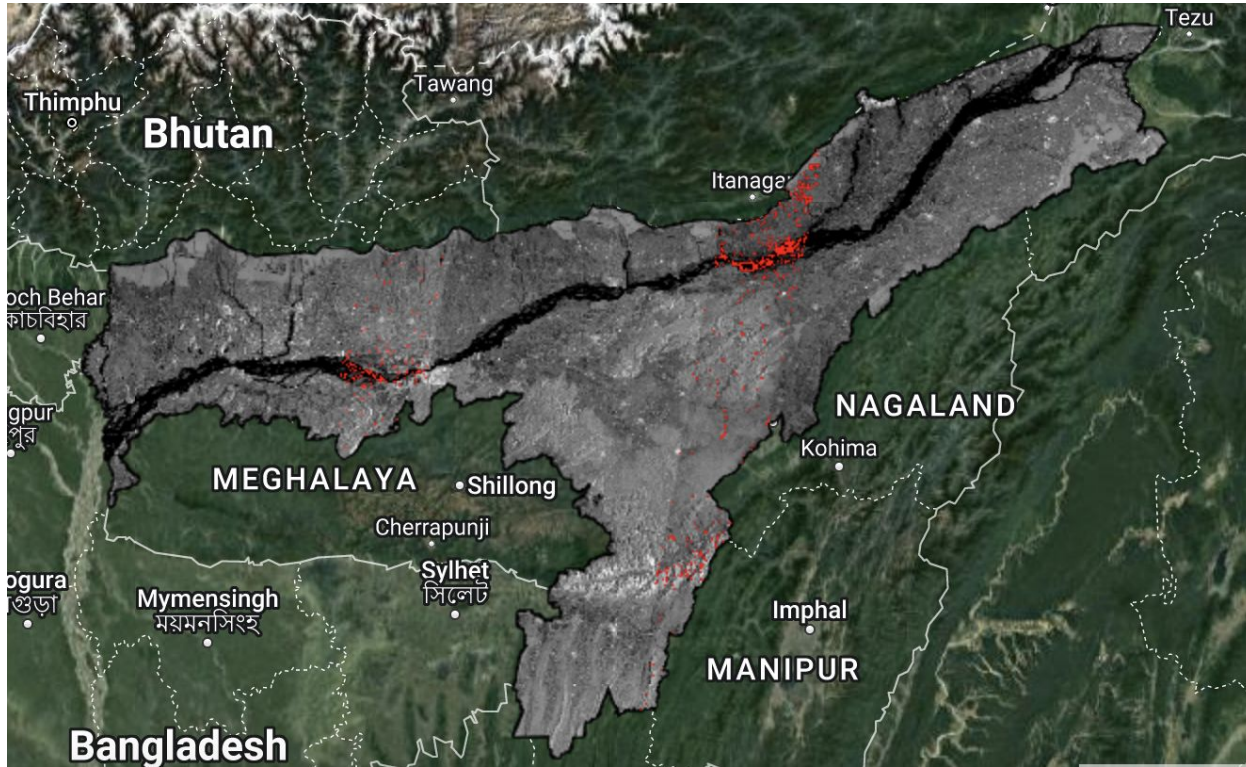
Brahmaputra River

- The Brahmaputra basin is one of the biggest riverine systems in Asia, originating from Tibet flowing through India and Bangladesh and draining into the bay of Bengal.
- As the river flows to a relatively flat plain (Assam), its speed slows and the excess silt gets deposited on its banks.
- Apart from this, more than 50 tributaries feed the river in addition to melting glaciers during summer months which is followed by heavy monsoons. As a result the river naturally overflows during this period.



<https://www.deccanherald.com/national/east-and-northeast/why-does-assam-get-flooded-every-year-866262.html>

Brahmaputra River Floods in Assam (2020 to 2021 - February)

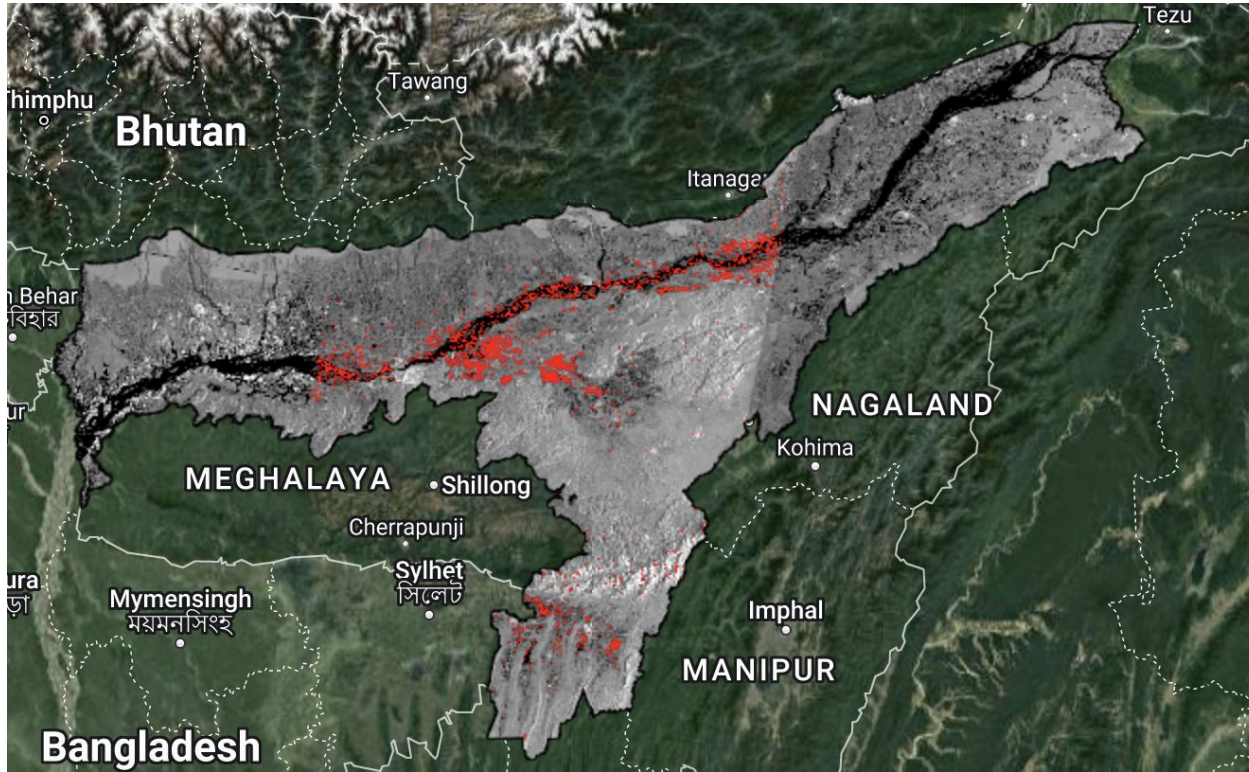


T1: February 2020

T2: February 2021

Data is missing for a
part of the ROI -
Cloud Cover

Brahmaputra River Floods in Assam (2020 to 2021 - July)

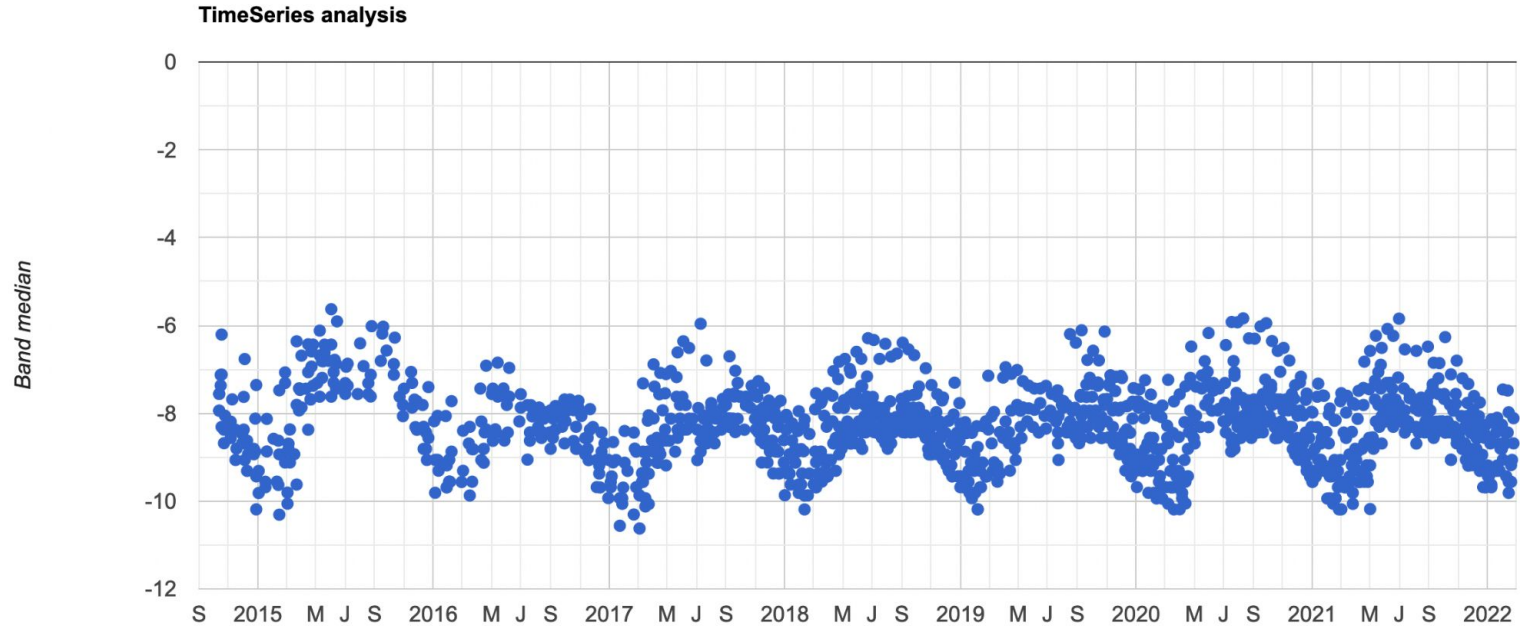


T1: July 2020

T2: July 2021

Data is missing for a
part of the ROI -
Cloud Cover

There is a lot of
missing data for this
area in other months
during which cloud
cover is high.



Median elevation for the ROI - annual fluctuations in the river water level can be observed. The river water level peaks annually ~June, July, August (during monsoons).