An aerial photograph of a winding river flowing through a dense, green forest. The river meanders across the landscape, creating several sharp turns and small islands. The forest is a vibrant green, and the sky is a pale blue. A large, semi-transparent green triangle is overlaid on the left side of the image, containing text.

A Web-based, large scale erosion monitoring system for rivers in Asia

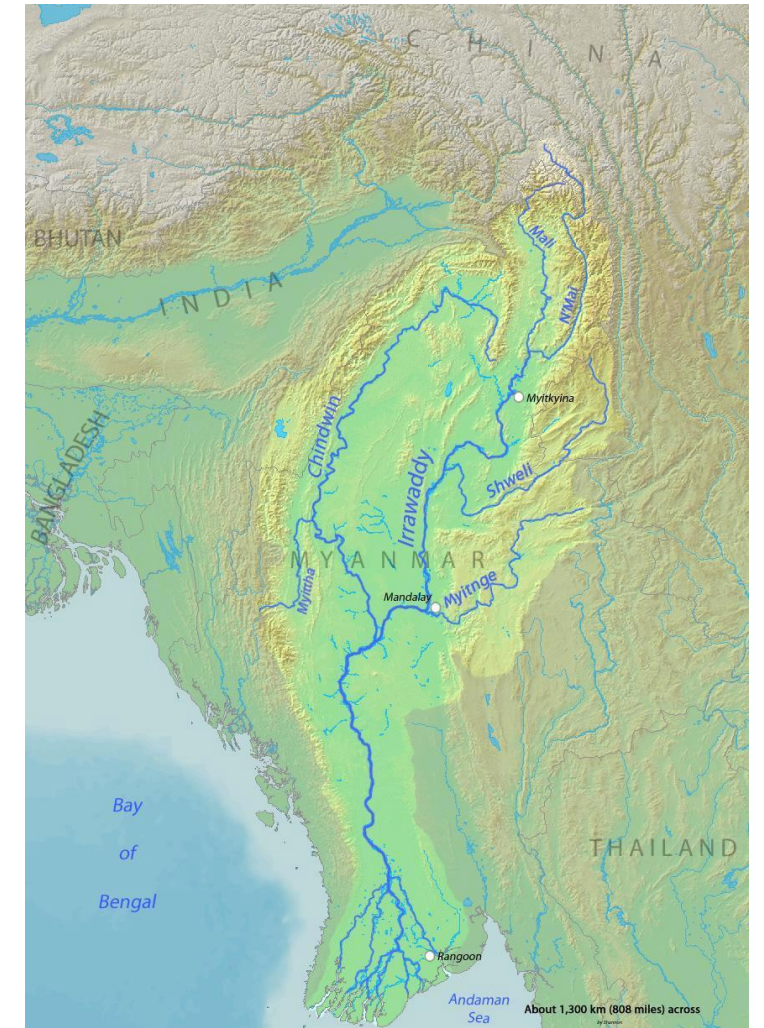
Dhyey Bhatpuria

SEI-Asia, Bangkok

dhyey.bhatpuria@sei.org

The Problem

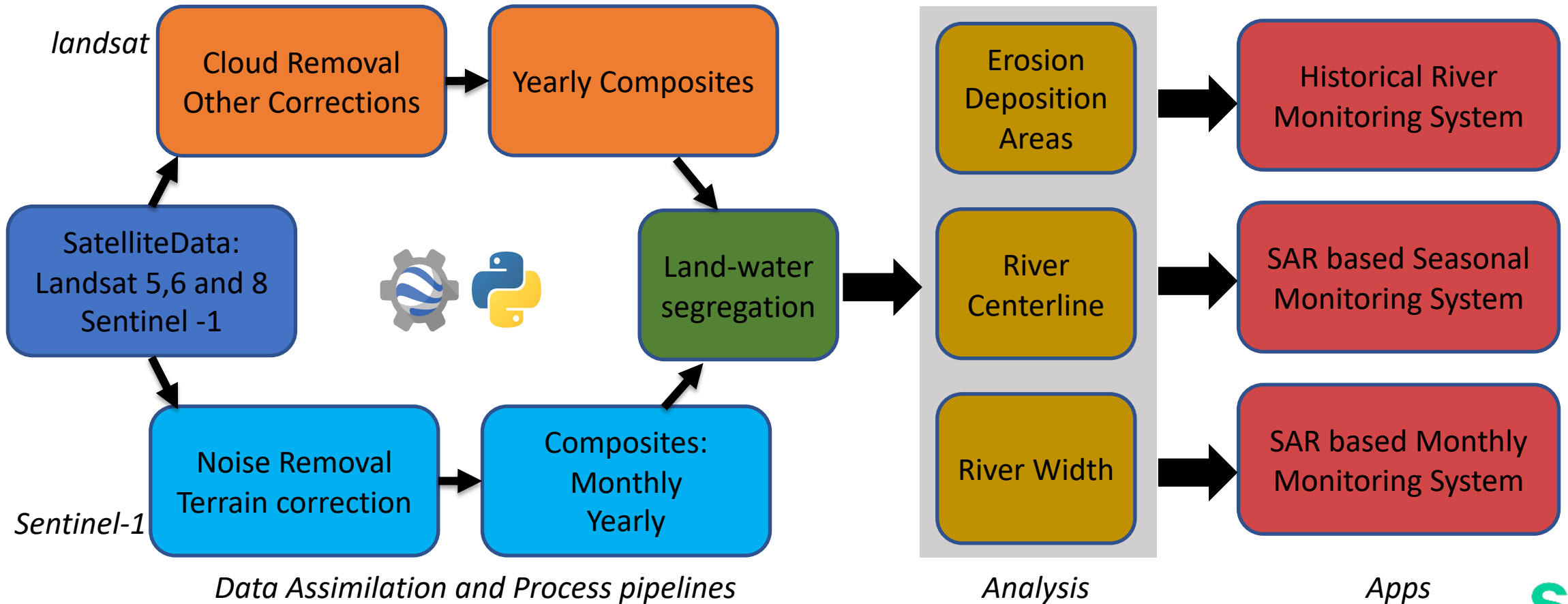
- The Ayeyarwady (Irrawaddy) River in Myanmar is one of the largest free-flowing rivers in the region
- Serves as the fulcrum around which Myanmar society and economy revolves.
- Large sections of Ayeyarwady prone to erosion affecting settlements and livelihoods.
- Field monitoring resources not adequate to cover large area.



Solution

- A freely available web-based monitoring system
- Leverages free remote sensing data
- Cloud based processing chain through Google Earth Engine (GEE)
- Enables seasonal assessment (Pre-monsoon with post monsoon)
- Provides timely information on state of erosion after every monsoon season

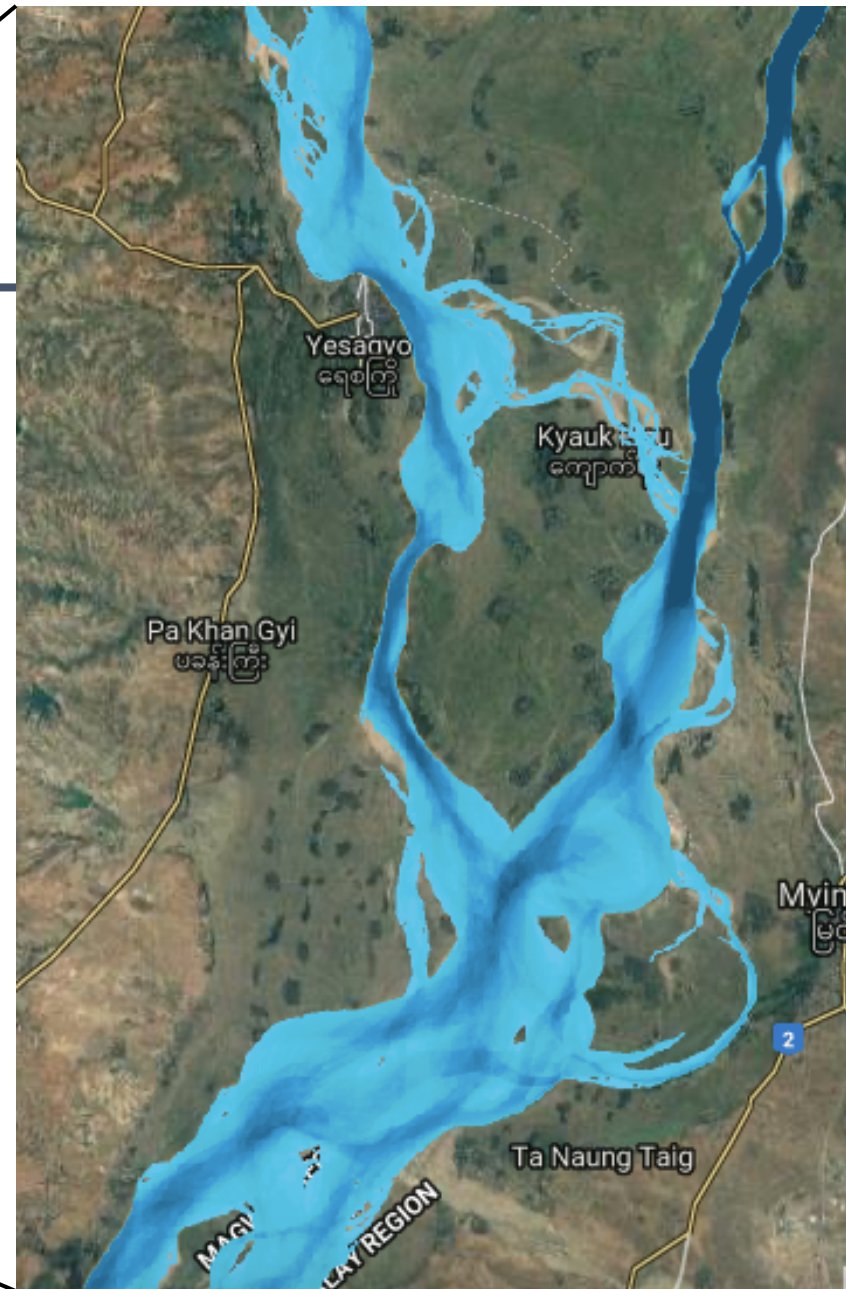
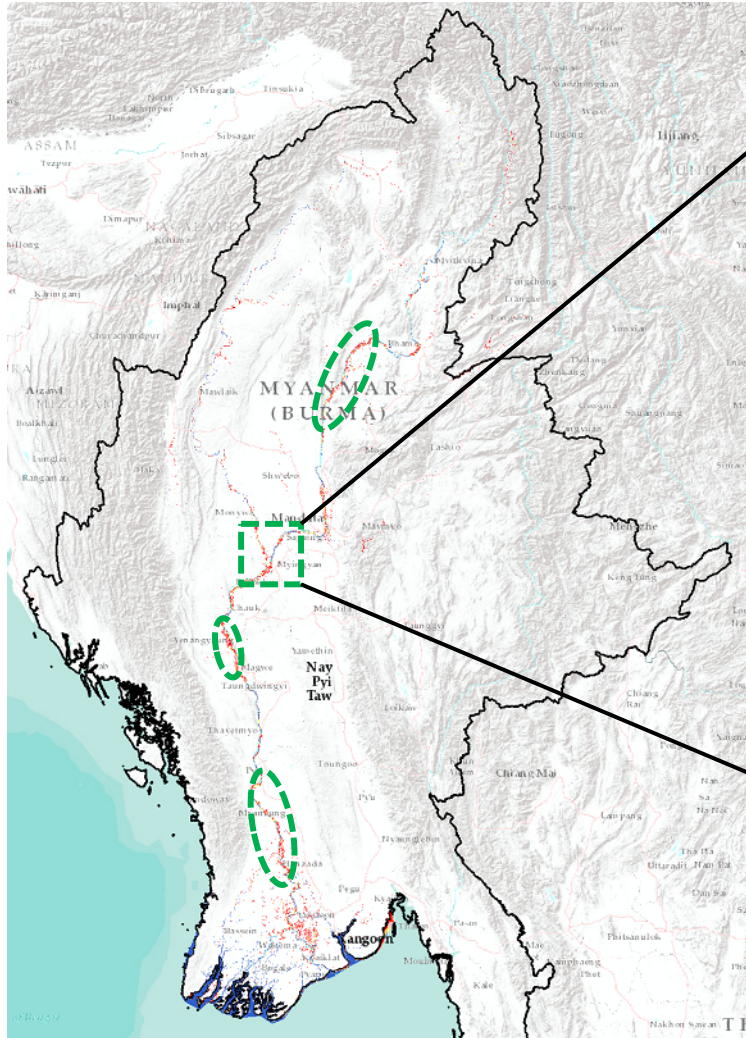
METHODOLOGY



TOOL DEMONSTRATION- Ayeyarwady

- Landsat Historical and Seasonal Monitor: <https://myit-servir.adpc.net/>
- SAR Monthly Monitor (Experimental) :
<https://tinyurl.com/SEIMonthlyMonitor>
- SAR Seasonal Monitor: <https://tinyurl.com/SEISeasonalMonitor>

Hotspots : River Changes

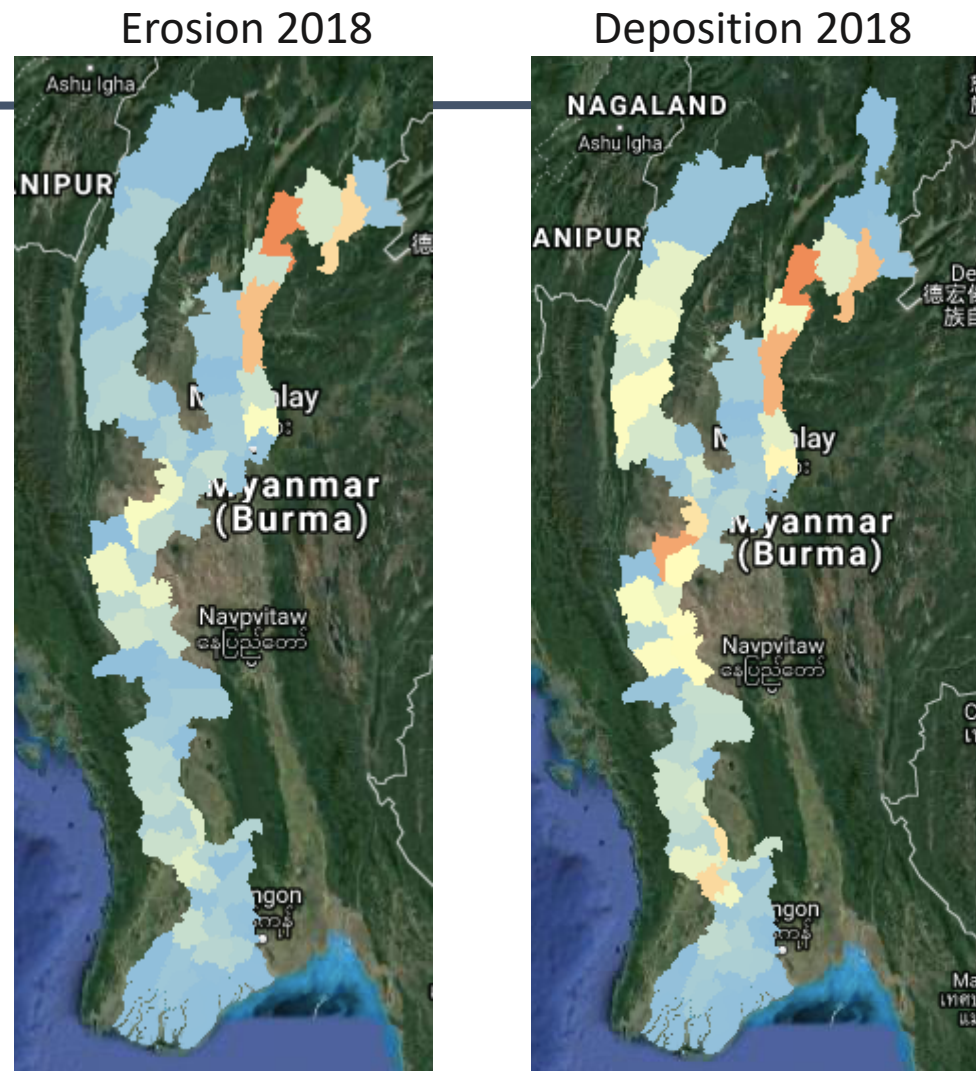


Number of years 1 30



Hazard hotspots (township level)

- Township level aggregates of erosion and deposition.
- River width dynamics is high in upper Ayeyarwady with high erosion and deposition



Rapid Assessment (Brahmaputra – Near Dibrugarh)



Seasonal monitoring for year 2019. Preliminary outputs



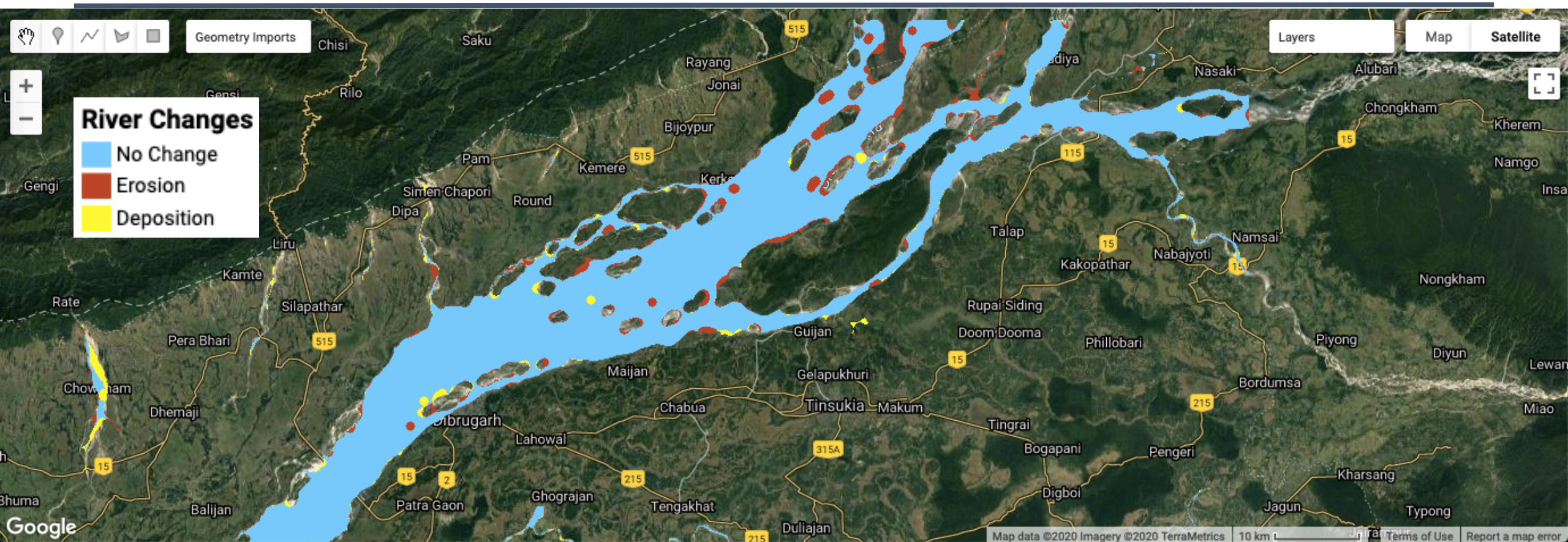
Rapid Assessment (Brahmaputra – Near Dibrugarh)



Seasonal monitoring for year 2019. Preliminary outputs



Rapid Assessment (Brahmaputra – Near Dibrugarh)



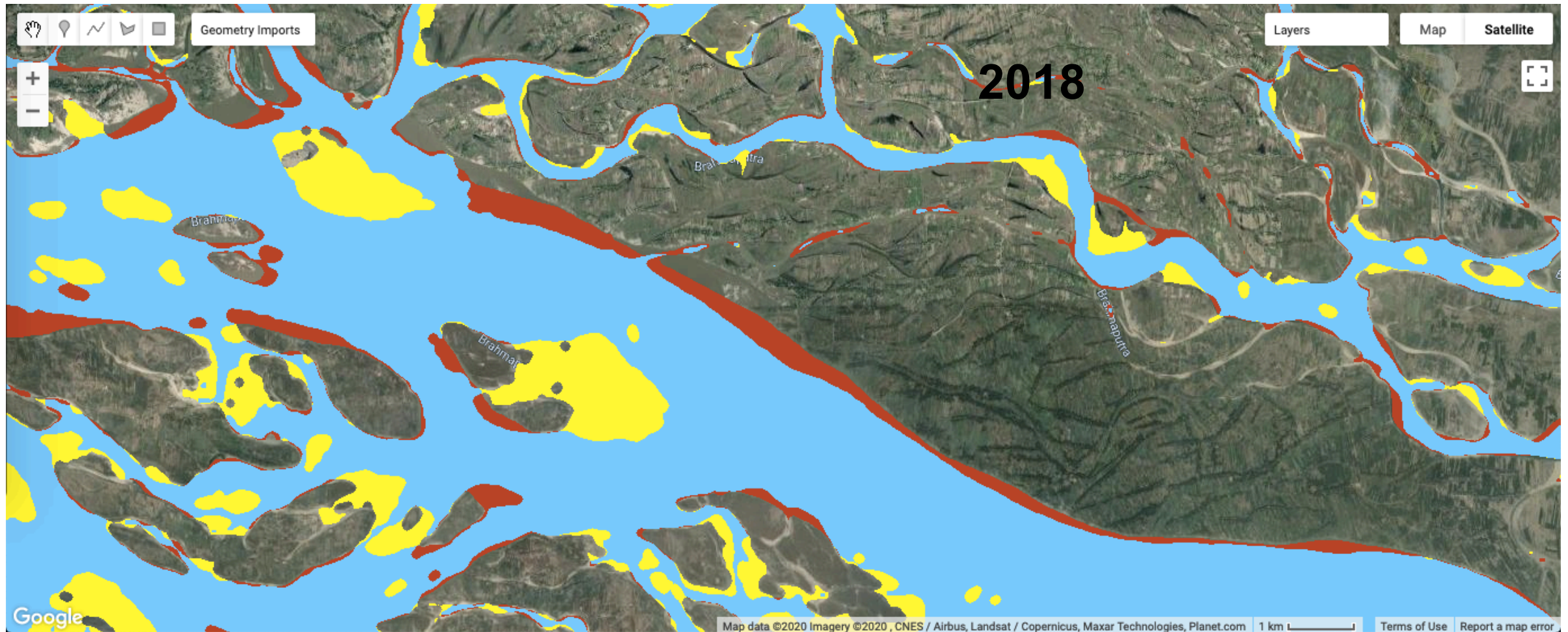
Seasonal monitoring for year 2019. Preliminary outputs



Rapid Assessment (Brahmaputra – near Guwahati)



Rapid Assessment (Brahmaputra – near Guwahati)...



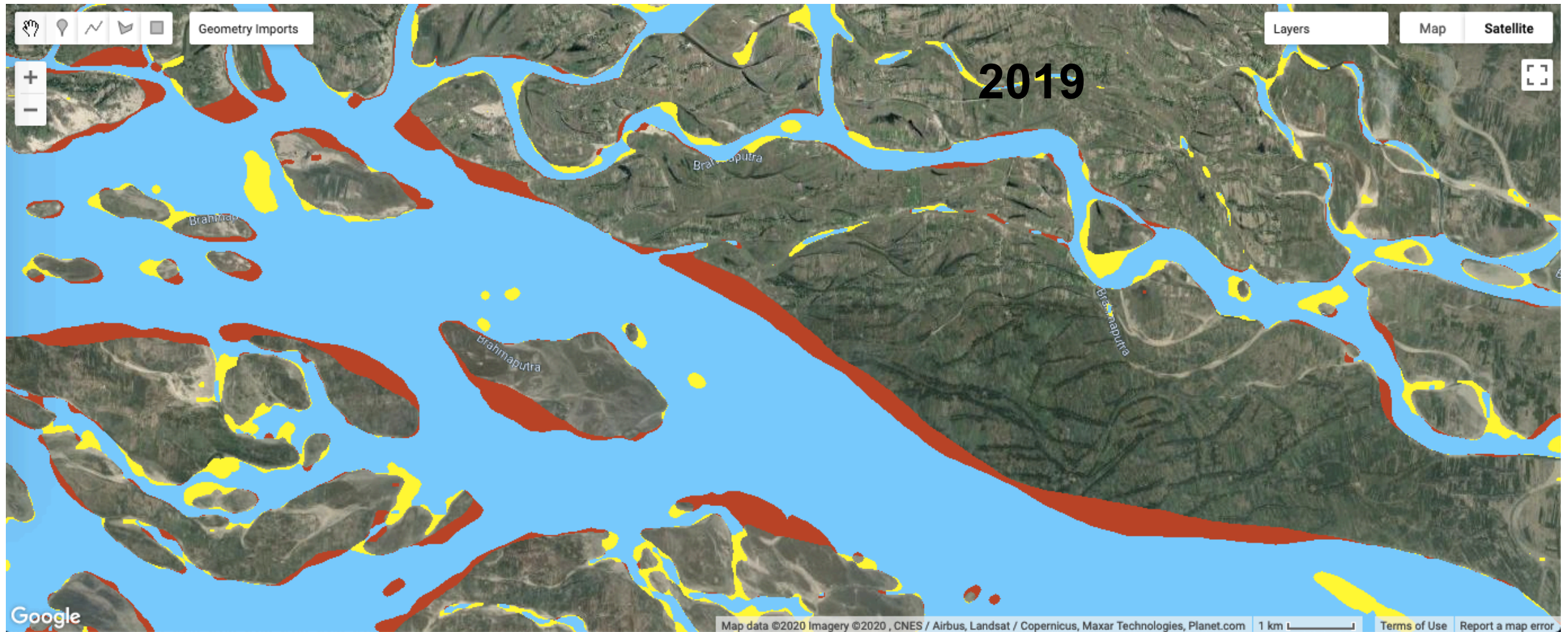
River Changes

- No Change
- Erosion
- Deposition



Preliminary outputs

Rapid Assessment (Brahmaputra – near Guwahati)...



River Changes

- No Change
- Erosion
- Deposition



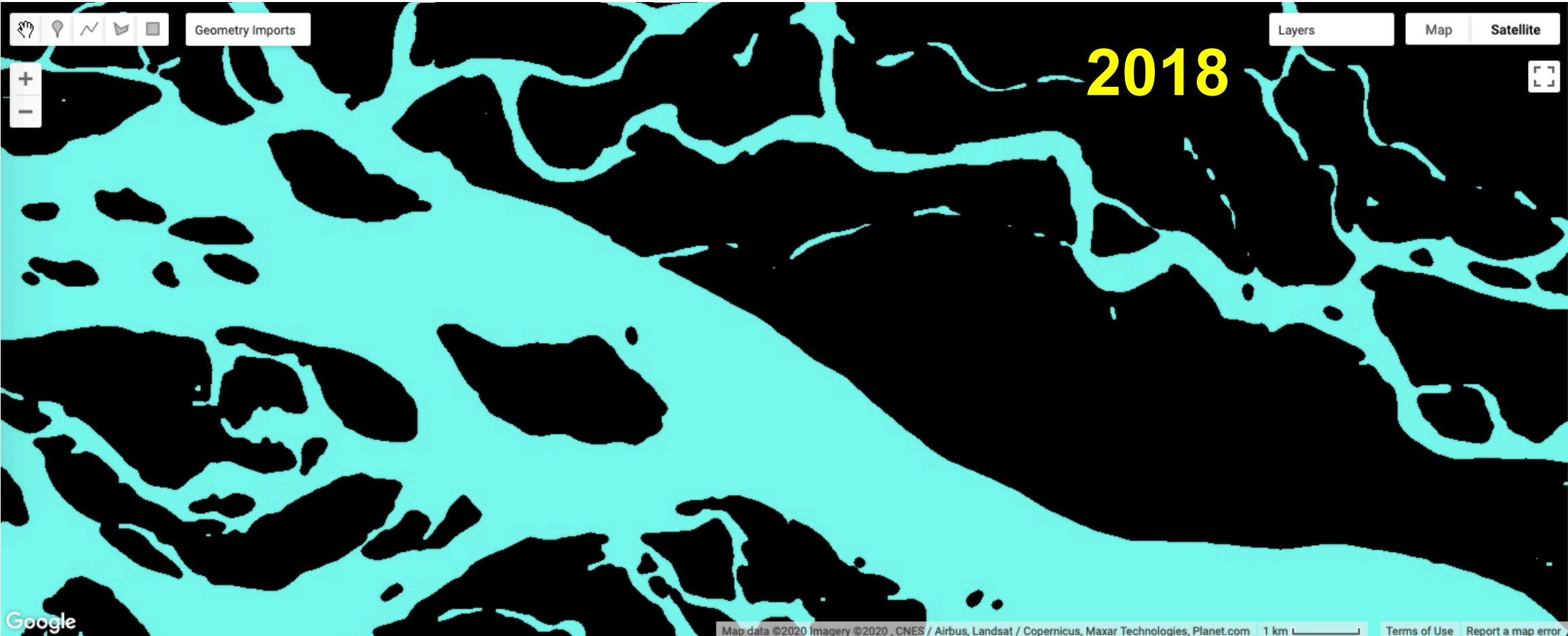
Preliminary outputs

Visualising River Shifts



Preliminary outputs

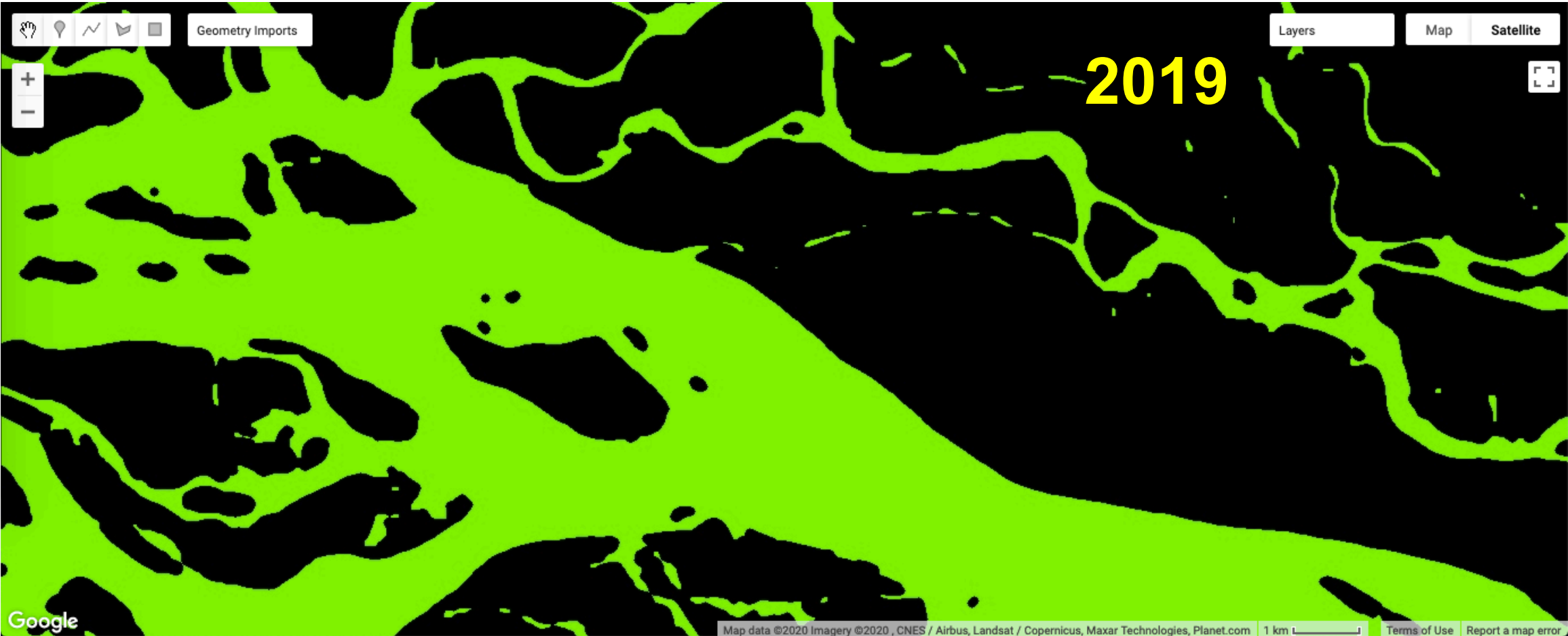
Visualising River Shifts



Preliminary outputs



Visualising River Shifts



Preliminary outputs



Advantages and applications

- The cloud-based backend system allows easy replication to other dynamic rivers (of course with tweaks)
- Front end can be customized to stakeholder needs
- Relevant metrics can be added (like erosion area, river width, historical trends)
- Improved resolution - from Landsat (30m) to Sentinel (10m)
- ***Using the tool, stakeholders can assess erosion after end of every monsoon season over large river length (entire Brahmaputra or Kosi).***
- In-hand holistic estimates of erosion before detailed field work
- Erosion trends can be for future projections too (Probabilistic estimates).

Thank you

