

A Global Database of Historic Flood Events

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Cloud to Street

Google Earth Engine



In Uttarakhand, India, an estimated 6,000 people died in a flood in 2013.



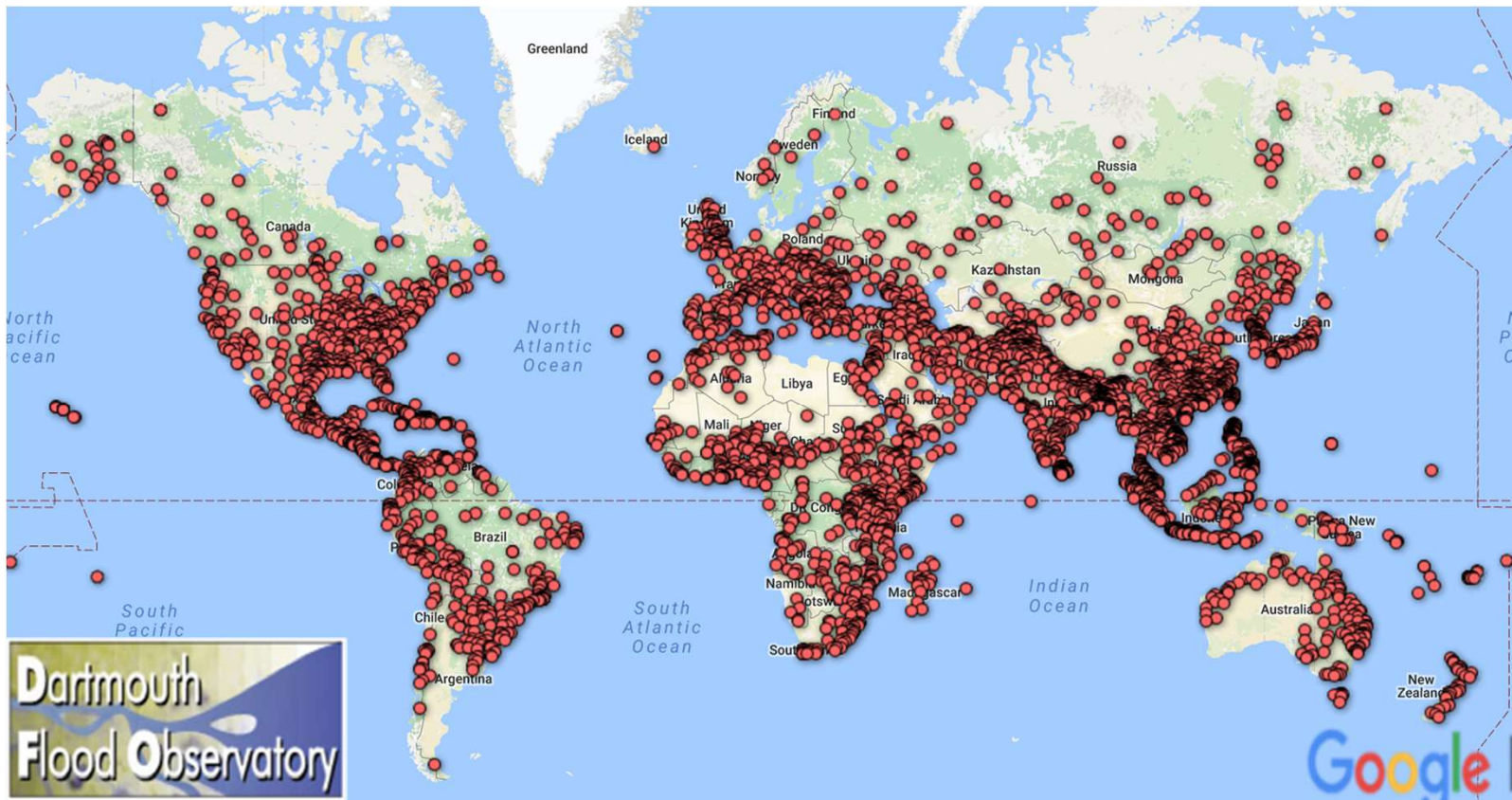
In 2014 the government still had insufficient information on the new shape of the rivers and their flood vulnerability

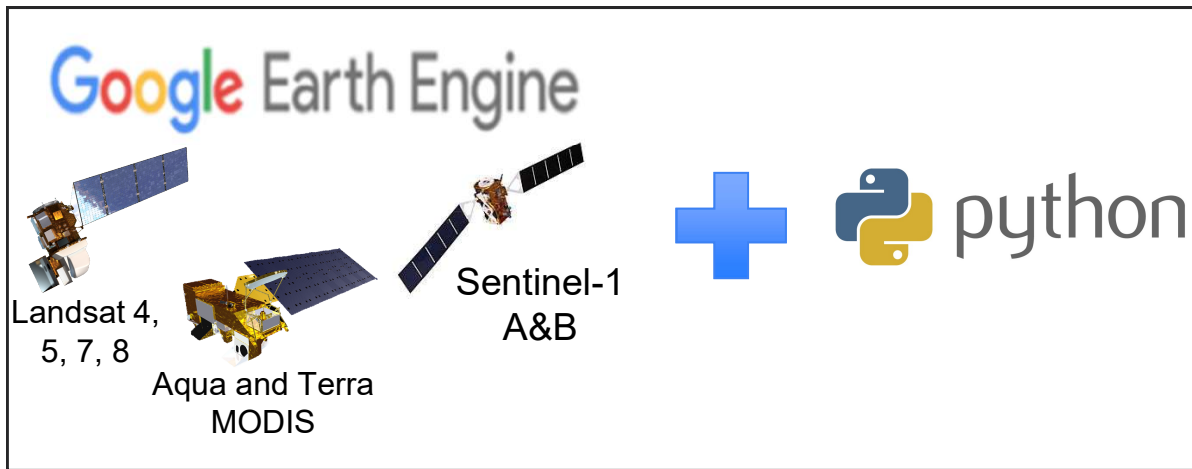


Global Historic Flood Inventory

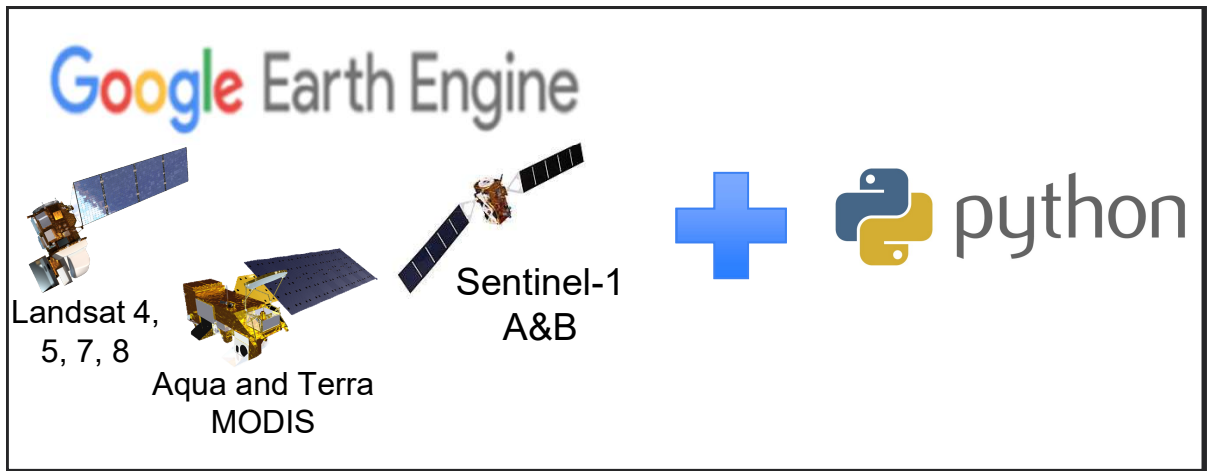
Cloud to Street and Dartmouth Flood Observatory,
funded by Google Earth Outreach

Cloud to Street

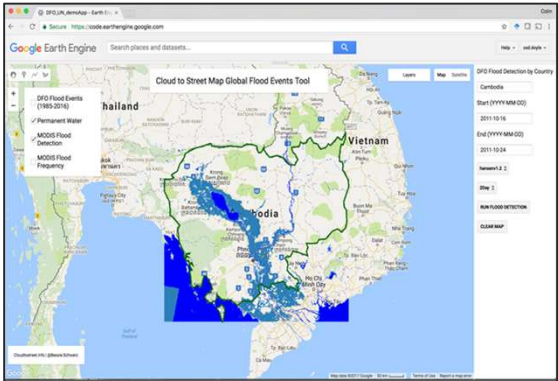




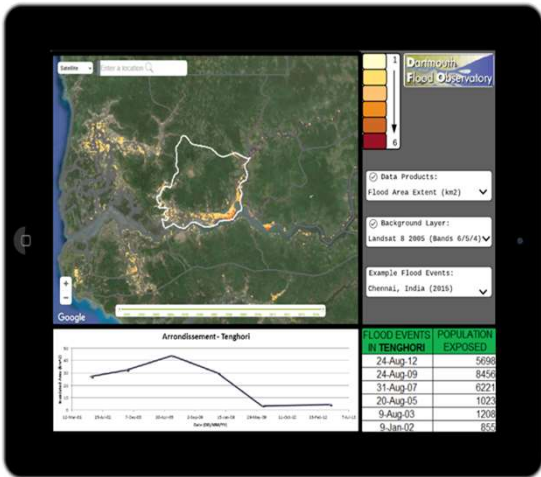
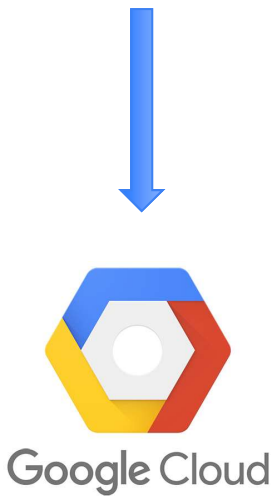
Satellite	Algorithm	Resolution	Reference
MODIS	Dartmouth Flood Observatory (<u>DFO</u>) $NIR/RED < T_1$; $RED < T_2$; $SWIR < T_3$ T = Threshold determined by Otsu (1979) optimization	250-m	Brakenridge and Anderson, 2006, Otsu, 1979
Landsat	Automated Water Extraction Index (<u>AWEI</u>) $AWEI = BLUE + 2.5 \times GREEN - 1.5 \times (NIR + SWIR_1) - 0.25 \times SWIR_2$	30-m	Feyisa et al., 2014
Sentinel-1	Thresholding and Region Growing SAR_{bs} = Radar backscatter $SAR_{bs} < T$; RG T = automated threshold RG = Region growing	10-m	Matgen et al., 2011
VIIRS	DFO	375-m	Brakenridge and Anderson, 2006
Sentinel-2	AWEI DFO	10-m	Feyisa et al., 2014 Brakenridge and Anderson, 2006



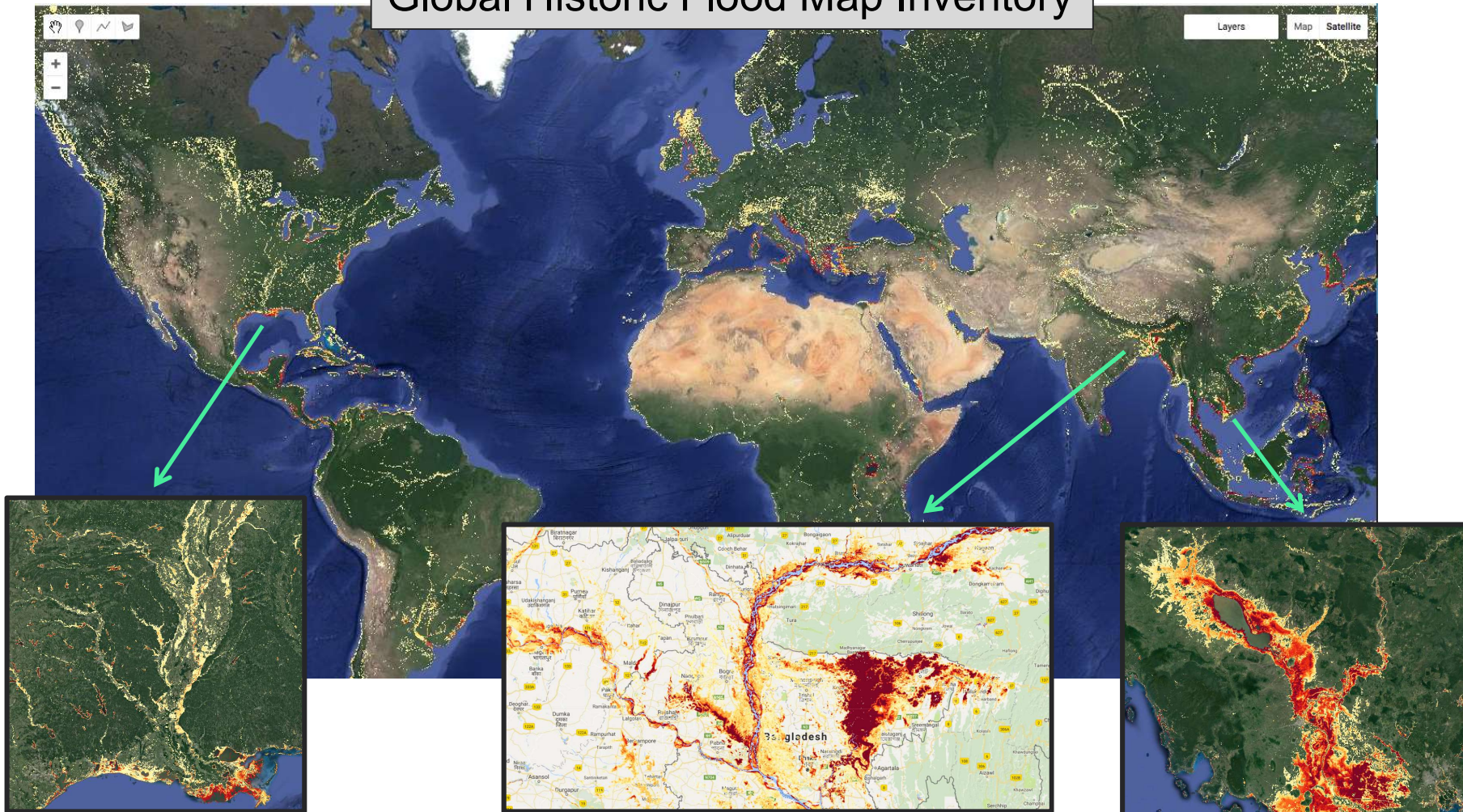
Interactive Flood Assessment Tools



Global Historic Flood Database

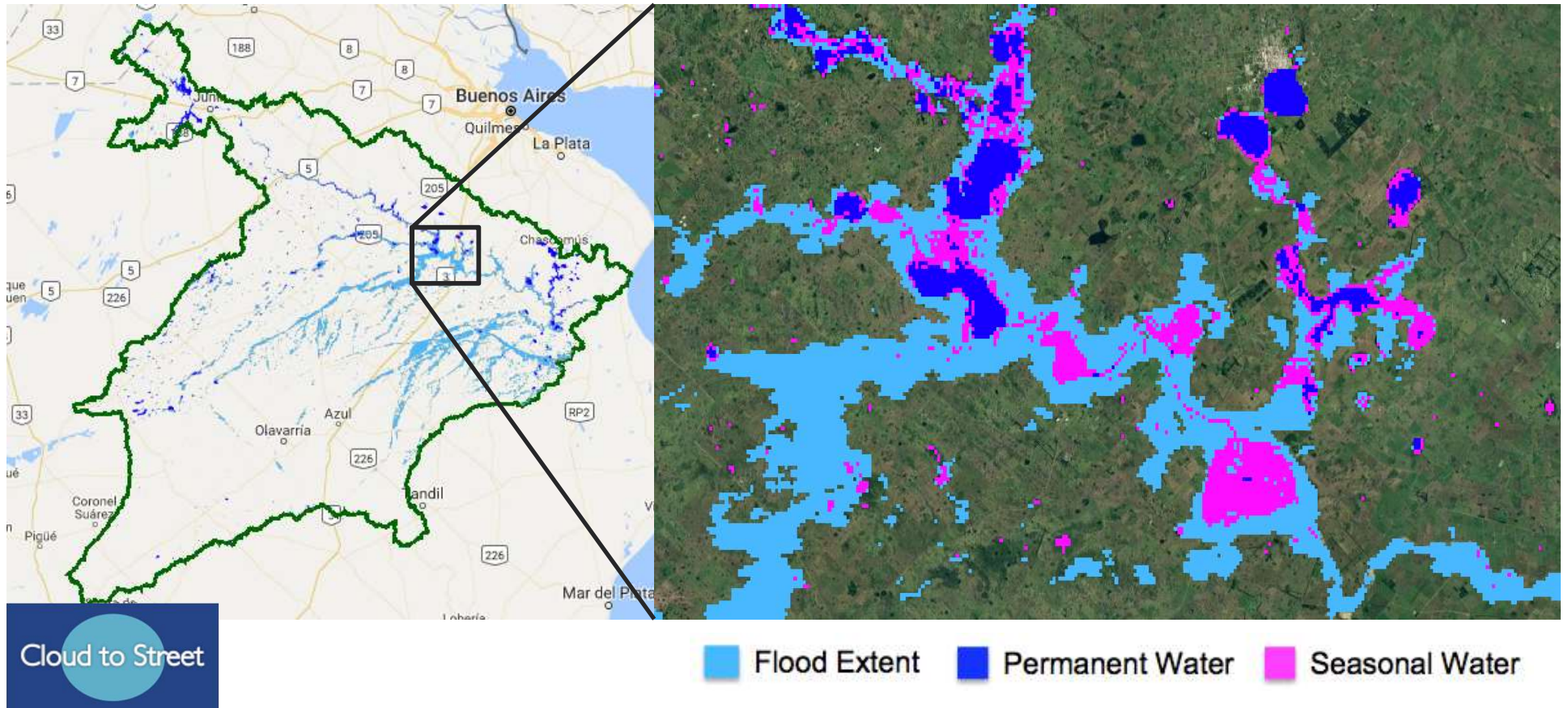


Global Historic Flood Map Inventory

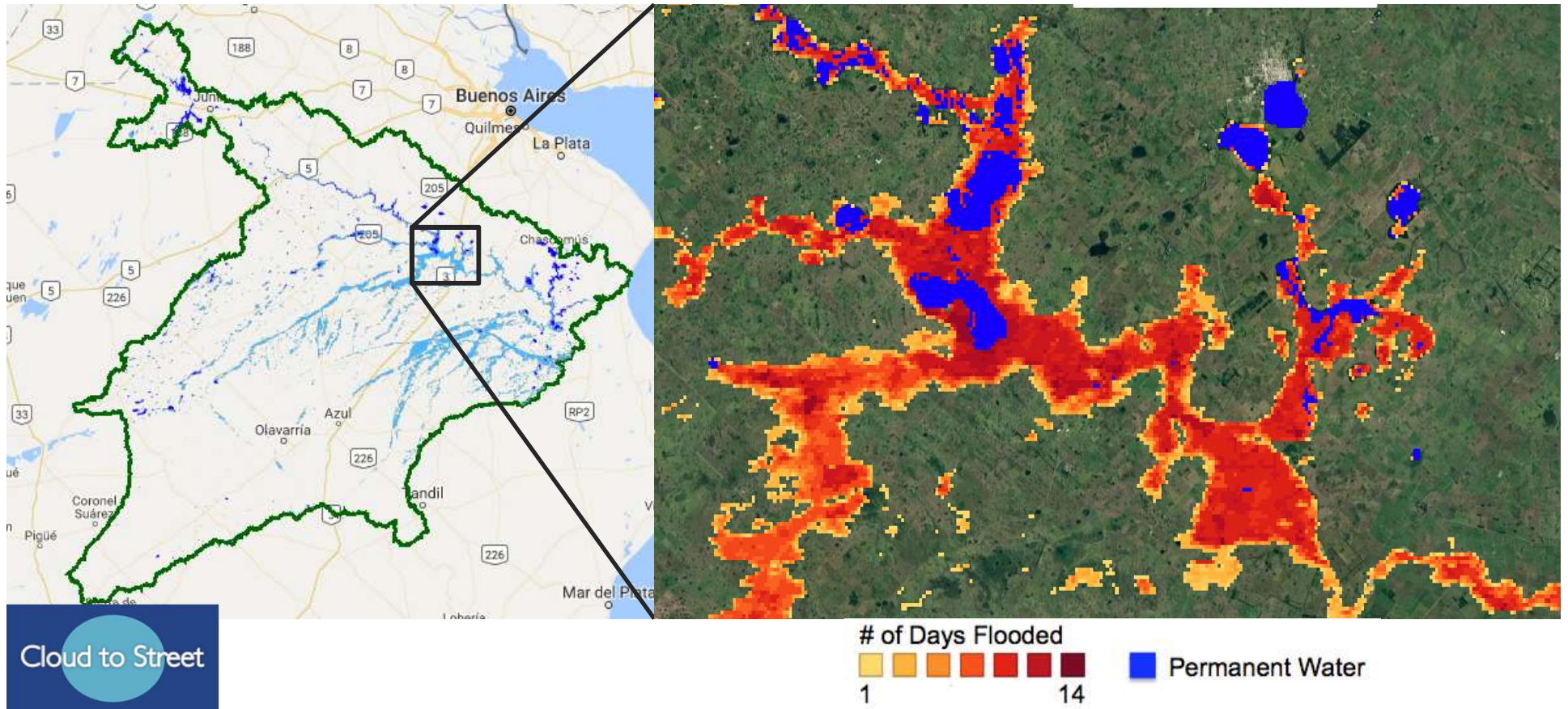


Flood Extent Layer: Rio Salado Basin, Argentina

October, 2002



Flood Duration Layer: Rio Salado Basin, Argentina October, 2002



Automated Flood Detection (demo)

The screenshot displays the Google Earth Engine web interface for the 'Global Flood Mapping Tool'. The browser's address bar shows the URL: `https://code.earthengine.google.com/2a198469362cd9467e1393dd9736b3c9`. The page header includes the Google Earth Engine logo and a search bar. The main map area shows a world map with a white text box in the center that reads 'Global Flood Mapping Tool'. On the right side, there is a control panel with the following elements:

- DFO Flood Detection by Country**: A section header.
-
- Start (YYYY-MM-DD)**:
- End (YYYY-MM-DD)**:
- Select permanent water mask**: A dropdown menu.
- Select composite for daily maps**: A dropdown menu.
- RUN FLOOD DETECTION**: A button.
- CLEAR MAP**: A button.

At the bottom left of the map area, there is a small text box containing the text: `Cloudtostreet.info | @Bessie.Schwarz`. The browser's bookmark bar at the top shows various links including 'Apps', 'News and Politics', 'Google Maps', 'Google Scholar', 'other', 'Google Drive', 'Yale Project on Cli...', 'Echoing Green Portal', and 'Other Bookmarks'.

USES & USERS

Microinsurers & Governments

- Global flood monitoring and up to date inventory of floods for any area of interest and a local social vulnerability index
- Offer affordable catastrophe insurance to the poor
- Prepare communities most exposed to hazards and least likely to absorb the future shock

Development Agencies

- Map of communities that were hit hardest by a flood
- Precisely target recovery programs and rebuilding in the locations where the hazard was the most



Emergency Managers

- Predict the size and damage of a flood as the storm approaches (in development)
- Alert local residents in time
- Target evacuation and position search and rescue where its most needed

Humanitarians

- A near-real time map of floods as they unfold (coming soon)
- Effectively mobilize aid and other support when it is most critical, the 24



Thank you!

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Cloud to Street

The logo for Cloud to Street, consisting of the text "Cloud to Street" in white, with a blue circle behind the word "to".

The logo for Google Earth Engine, featuring the word "Google" in its multi-colored font followed by "Earth Engine" in a grey font.