



Measuring the Value of Earth Observations

Global Flood Risk Observations for a Better Prepared Humanity

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Overview

What is flooding?

A **flood** is an **overflow** of water that submerges a dry land temporarily.

Usually, in non-coastal areas, floods can occur because the soil can't absorb rainwater fast enough, or storm drains can't handle the force and growing amount of incoming water. Generally, floods are categorized in 3 basic forms based on their occurrence, impacts, and protection requirements:

1. **Fluvial flood** (River Flood)
2. **Pluvial flood**
 - a. Surface water floods
 - b. Flash floods
3. **Coastal flood** (Storm Surge)



Risks

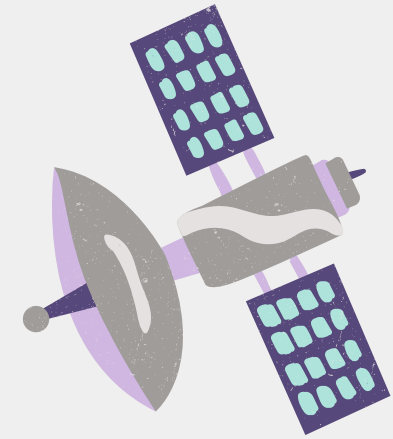
Flooding and rising waters cause massive amounts of **damage to the land**, massive **losses of life**, irreversible **damage to our ecosystem**, substantial loss to **agriculture**, as well as **global economic damage** with possible **species extinction**.

Apart from initial damage by floods, **standing floodwater** can spread **infectious diseases**, **chemical hazards**, **cause injuries**, and **disrupt services** like supplies of drinking water, gas, electricity, and food due to the shortage of transportation.



How do satellites help during floods?

Weather satellites, like those in NOAA's Geostationary Operational Environmental Satellite-R (GOES-R) series, **detect** and **monitor atmospheric events** that can lead to flooding.



Satellite data is useful for quickly **assessing** the extent of the damage. It can also help to monitor and detect any **changes** or help to understand **emerging problems** that may be critical in the mid-term. That is why first responders and disaster relief programs turn to satellite-based tools to help evaluate ground conditions.



Project Summary

- Our team focused on **flooding** as a way to study and **mitigate** its most detrimental effects on **earth** and **societies** globally.
- Comparisons of flood data and loss from satellite observations paired with past records, help to show us where **improvements** to our **global infrastructure**, **water management techniques**, and **storage resources** should be made or improved upon.
- Our research shows **documented stats** from historical observations. The benefit of **quantifying** this research and isolating its access in one place gives Emergency Management Resources, First Responders, Government Agencies, The United Nations, and all other aid providers key resources to **mitigate** and **manage** a **flood disaster** more efficiently.
- We will be using **EO satellite data** regarding the increasing water levels, forecasts of hurricanes and monsoon seasons in both hemispheres, the intensity of rainfall in the catchment area of rivers, varying precipitation in the soil, forecasts of windstorms with their strength, size, speed, and direction of them to **develop an application for the society**.



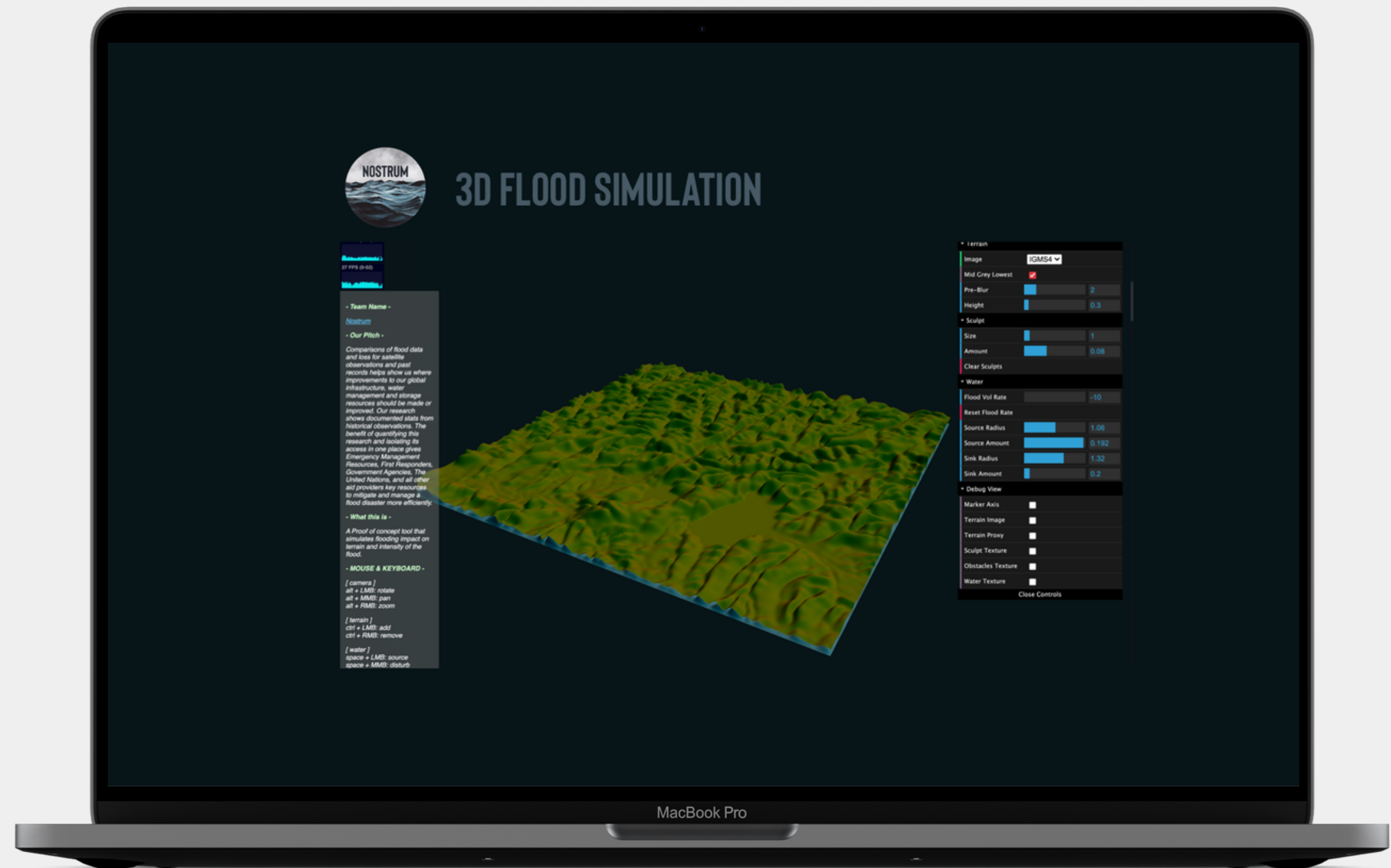
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- WELCOME TO NOSTRUM APP
- 3D FLOOD SIMULATION
- SIGN UP FOR FLOOD ALERT
- LEARN MORE ABOUT FLOODS
- NOSTRUM



Nostrum Application

Visit: <https://www.nostrum.earth/> and try it yourself!

- Once the app loads up, rotate the simulation by pressing down alt or option and mouse click. You don't have to rotate the simulation if you don't want to.
- Choose the image type you want on the right under "Terrain". "City" is the most fun and the underlying terrain is part of a city so it tends to always be an interesting simulation.
- If you want to increase the height of portion of the terrain, simply click ctrl and mouse click. If you want to increase the height of the simulation as a whole, increase "Height" under the terrain.
- Increase "Flood Vol Rate" slowly to witness the effects of flooding on the terrain.



Conclusion

In conclusion, Team Nostrum's goal is to minimize economic losses, minimize the loss of life and ecological disasters, through the use of AR/VR technologies that showcase and project outcomes of flood areas through the use of satellite data and resources, accessed through the development of a user friendly, easily understood and accessible app for all societies to use. Our application will provide flood alerts and educational information to laymen and will present the satellite data in visual form for the disaster management teams to help them in decision-making.

