

Introduction

The Goddard Earth Sciences Data and Information Services Center (GES-DISC) at NASA plays a crucial role in archiving and disseminating vital Earth science data. In this project, we leverage immersive visualization technologies to reshape engagement with and comprehension of the intricate datasets of our planet. Through the adoption of immersive technologies, we are enhancing established methods, offering novel, intuitive experiences in visualizing and interacting with Earth science data. Our goal is to contribute to the ongoing evolution of data interaction, pushing the boundaries of what's possible in data interpretation and education.

Benefits of VR/AR/XR

1. VR/AR/XR are **designed for 3D**. We experience the world in 3D, so it's natural for us to view geospatial data in 3D.
2. VR/AR/XR give us a better **sense of scale** - it's more intuitive to compare how big and small things are.
3. VR/AR/XR allow for more **immersion and interaction**. We feel like we're really able to walk through and understand our world.
4. VR/AR/XR make data more **accessible**. When we make data easier and more intuitive to understand, we make it more accessible to the people who need it.

Datasets

1. GPM IMERG Final Precipitation L3 1 day 0.1 degree x 0.1 degree V06 (GPM_3IMERGDF)

Variable: *precipitationCal* (daily precipitation total in mm)
 Location: Florida/Southeast U.S.
 Dates: September 8, 2017 – September 12, 2017

2. Aqua/AIRS L3 Daily Standard Physical Retrieval 1 degree x 1 degree V7.0 (AIRS3STD)

Variable: *CO_VMR_Cal*
 Location: Canada
 Date: June 6, 2023

Procedure

Setup

1. Identifying and downloading of required data.
2. Outlining project: a variable-to-height 3D visualization.

ArcGIS Pro

3. Creating new local scene project in ArcGIS Pro.
4. Transforming each NetCDF file into a raster layer.
5. Exporting each raster layer into a TIFF format.
6. Creating elevation layer out of raster data values.
7. Using raster calculator to vertically exaggerate elevation.
8. Repeating above steps to create a scene for each date.

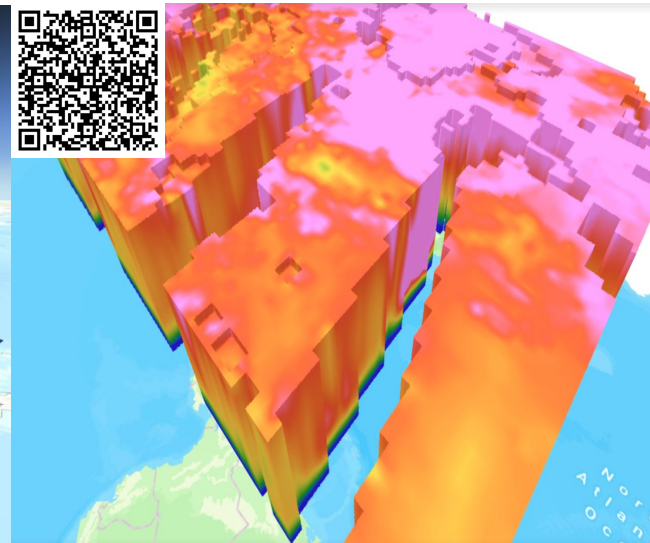
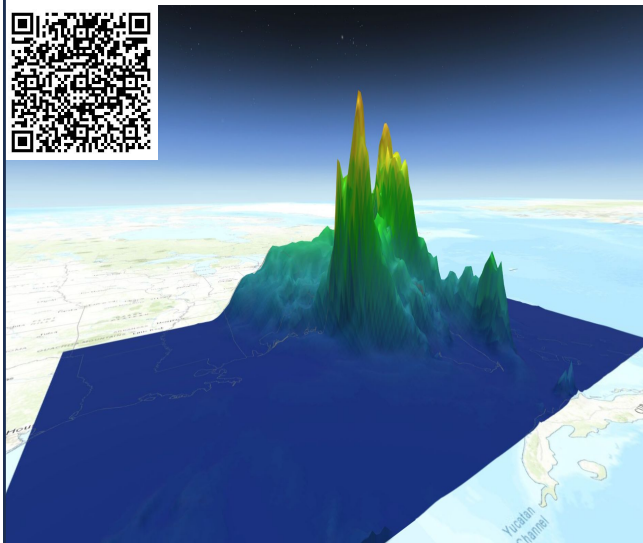
ArcGIS Online

9. Exporting each scene and its layers to ArcGIS Online.
10. Creating a new web scene in ArcGIS Online.
11. Importing all of the exported layers into web scene.
12. Creating a slide for each date, showing its visualization.

360 VR

13. Exporting web scene to 360 VR.
14. Publishing 360 VR for public use.

Visualization



Future Work

- Visualize voxels and iso-surfaces in 360 VR.
- Automate the process of creating a 360 VR experience.
- Animate the data visualization through time.
- Combine ArcGIS with game engines for more interaction.
- Use open-source or free-to-use tools like Unity & QGIS.
- Create immersive simulations of phenomena with data.

Contact Us

Interested in learning more about our project or collaborating with us? We'd love to hear from you! Please reach out to us to explore opportunities and share insights.

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