

National Aeronautics and
Space Administration



Network Analysis of the NASA Earth Science Disasters Program

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Motivation

Summer [Emic Approach: insider-perspective]

- In 2019 the NASA Earth Science Disasters Program awarded 10 projects for NASA 2018 ROSES Disasters Response and Risk Reduction A.37 proposals.
 - How are the newly awarded proposals connected?
 - What connections exist and how can they be utilized?

Fall [Etic Approach: outsider-perspective]

- Wanted to examine external connections to the Disasters Program through specific topics.
 - What connections exist throughout the Group on Earth Observations (GEO) flood community?
 - How are NASA data and products used by stakeholders, key-partners, and the public?
 - Case-study for Hurricane Dorian

End Goal: Create an interactive tool with a geospatial component to visualize the connections.

[Summer] Internal Disasters Program

- Emic (internal) approach: looking at connections of the Disaster Program by looking at A.37 Projects INTERNAL to the agency.
- Manually read through each of the proposals and collected information such as:
 - Project Members
 - Institutions
 - Regions of Interest
 - Project Reach
 - End-user Community
- Confirmed accuracy of information through survey of Project PIs.

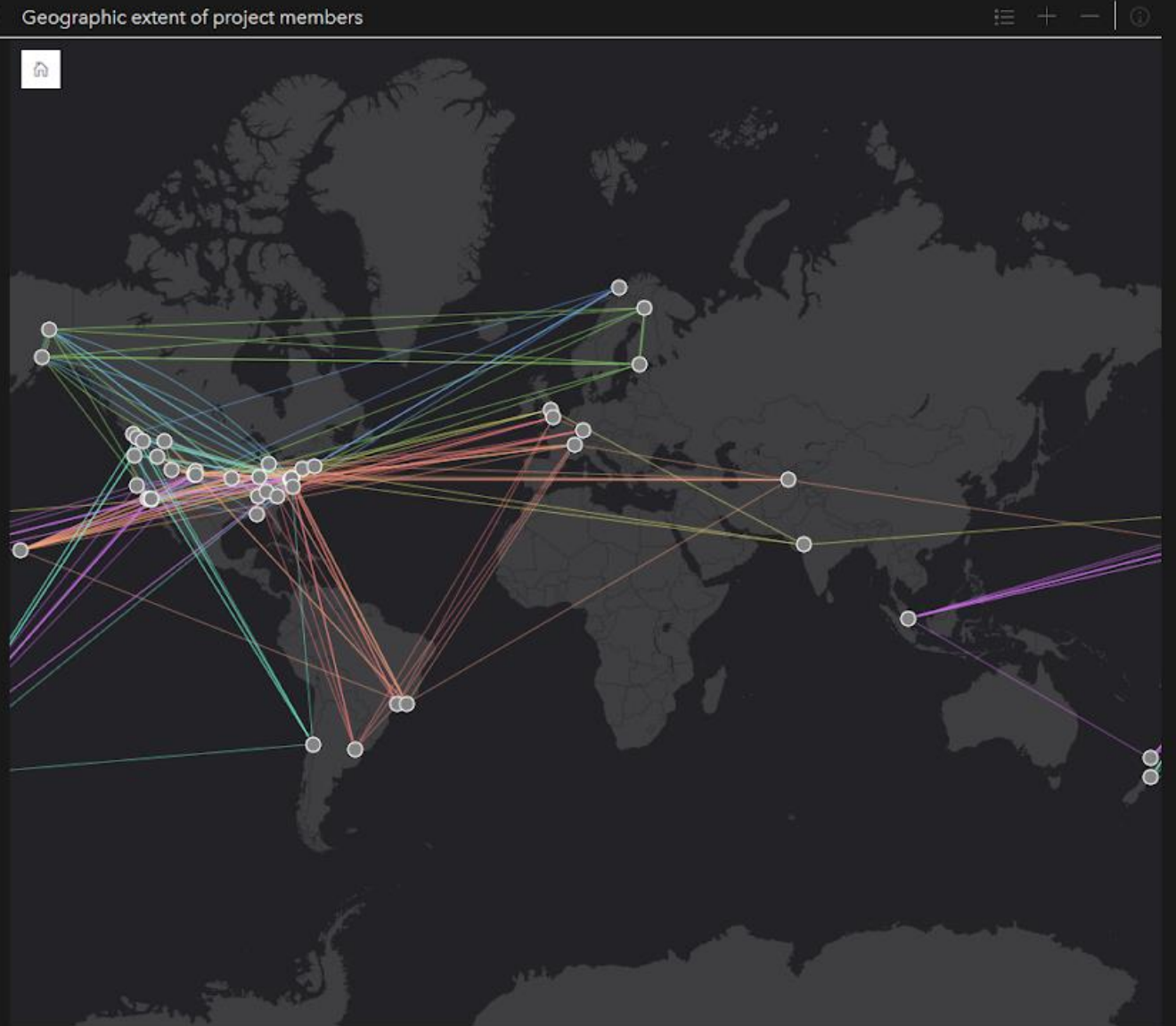
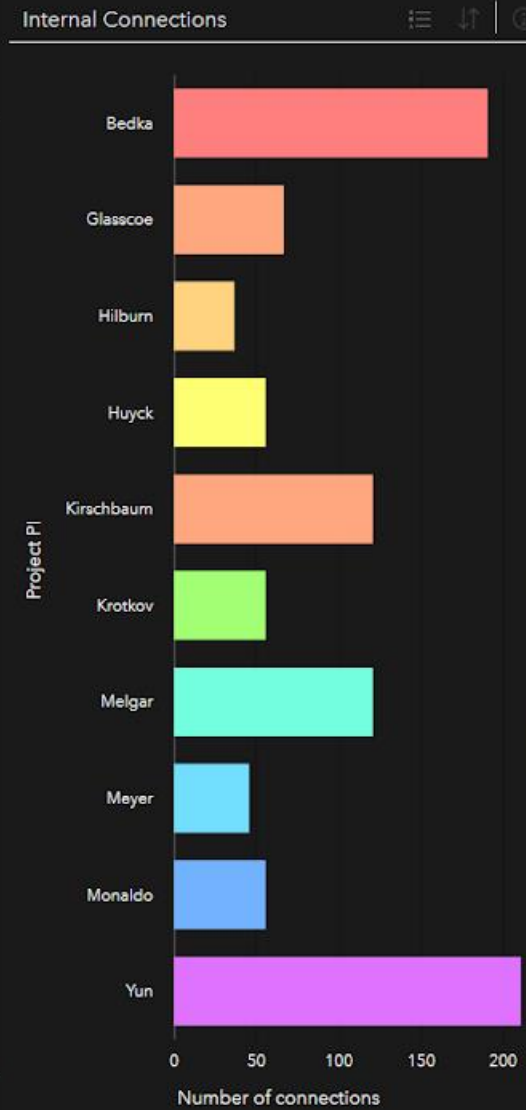
1 Project Members and Institutions

2 Project Member Link-Map

This second page demonstrates the connectivity of the projects by showing the locations of project members and coloring their affiliated links according to their project.

- Use the **Internal Connections** window to (de)select projects to assess the level of overlap based on proximity. Clicking on each project's color-bar in the chart will highlight the links in the map window. Shift-clicking more than one color-bar will highlight multiple project links. Reset the windows by clicking on the selected project's color-bar again or by clicking the empty space in the graph.
- These windows can be used to see what projects have members at similar centers or in close proximity to one another; it might only be a building or even an office away.

3 Geographic Region of Interest, Project Reach, and End-User Community



[Fall] Disasters Program and the GEO Community

- Etic (external) approach: outside view of the disasters program and its connections to the broader disasters community.
- Data came from Group on Earth Observations (GEO) 2020 Work Programmes.
 - Mentions to other organizations and agencies were collected and assigned accordingly.
- Divided into subcategories:



Flood

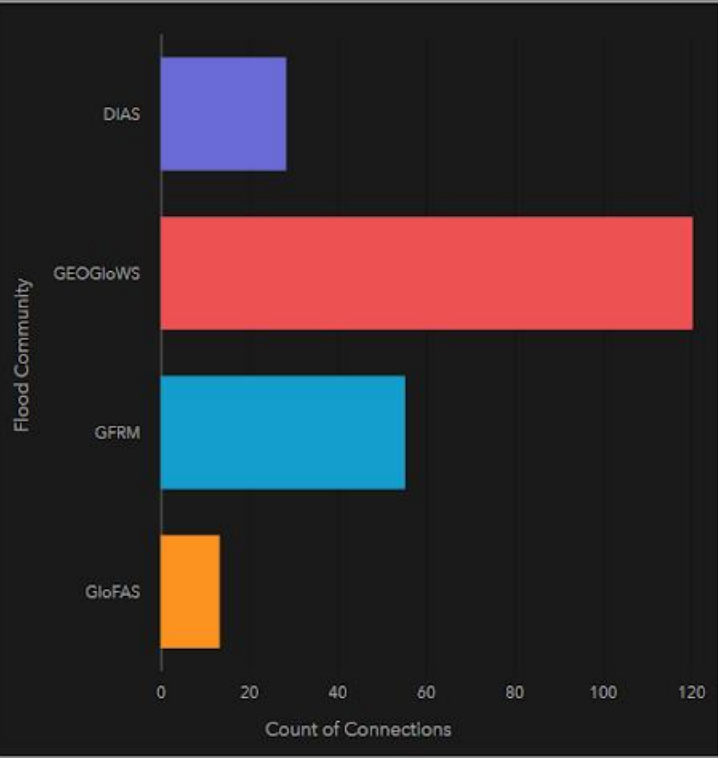
- Data Integration and Analysis System (DIAS)
- GEO Global Water Sustainability (GEOGloWS)
- Global Flood Risk Monitoring (GFRM)
- Global Flood Awareness System (GloFAS)

Regional

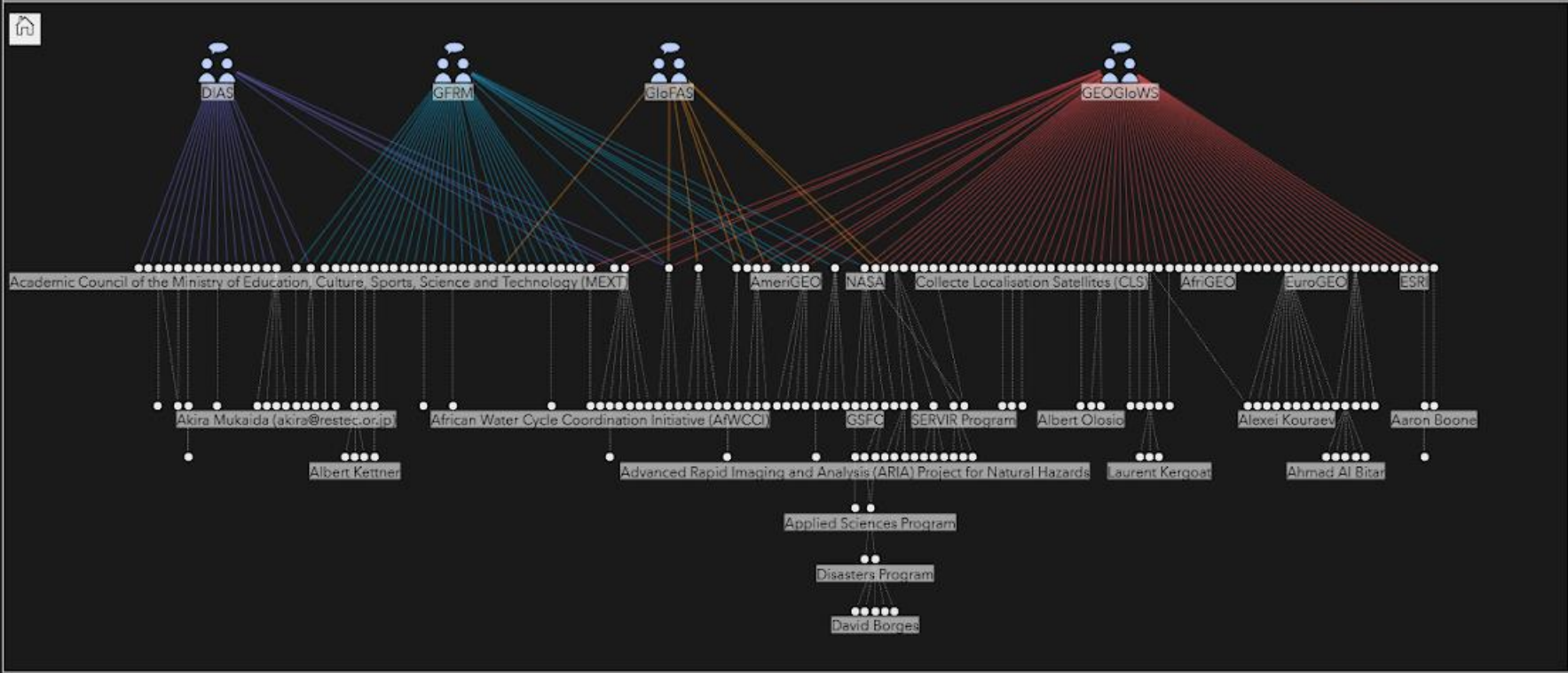
- African Group on Earth Observations (AfriGEO)
- Americas Group on Earth Observations (AmeriGEO)
- Asia-Oceania Group on Earth Observations (AOGEO)
- European Group on Earth Observations (EuroGEO)

GEO Flood Community Networks Regional GEO Networks

Click these color bars to change networks!

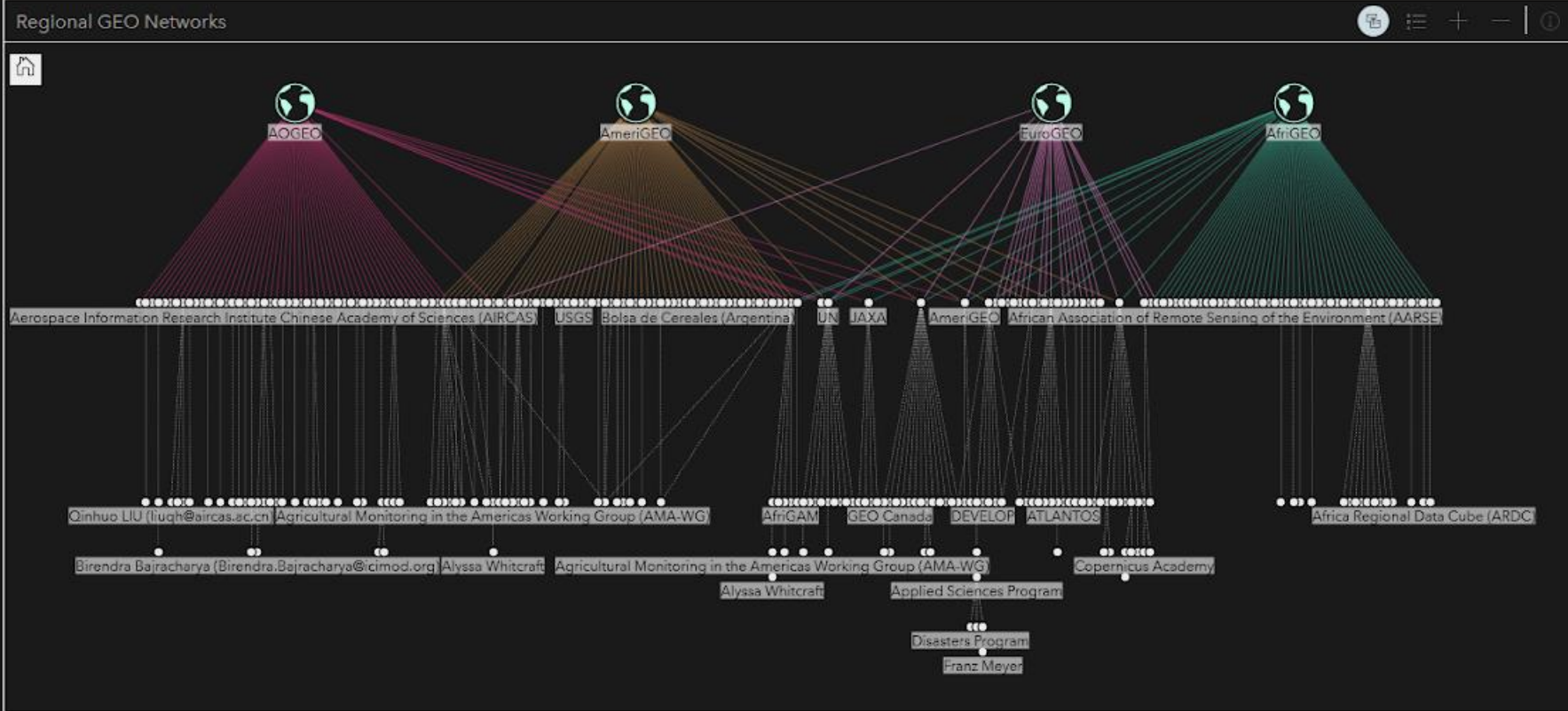
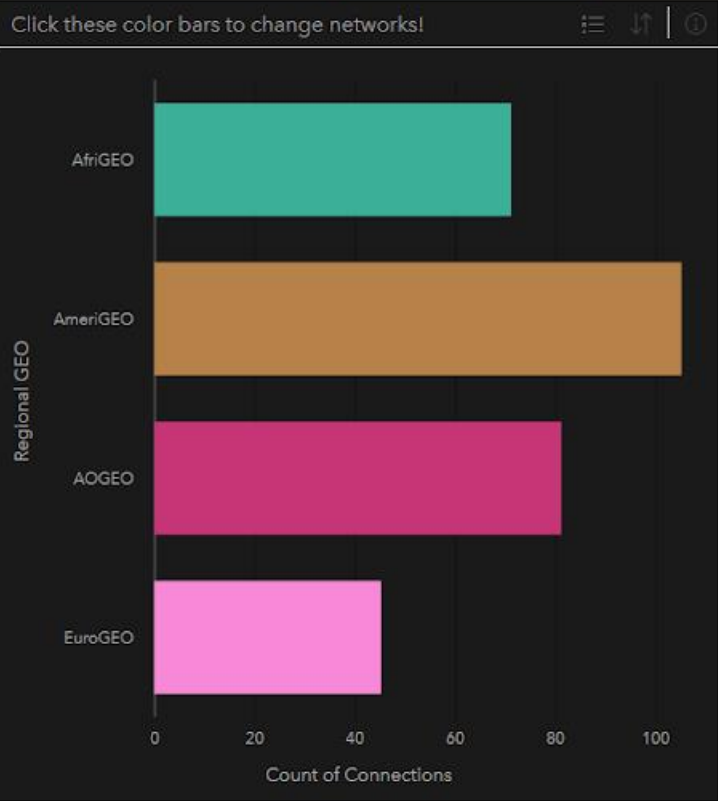


GEO Flood Community Networks



GEO Flood Community Networks

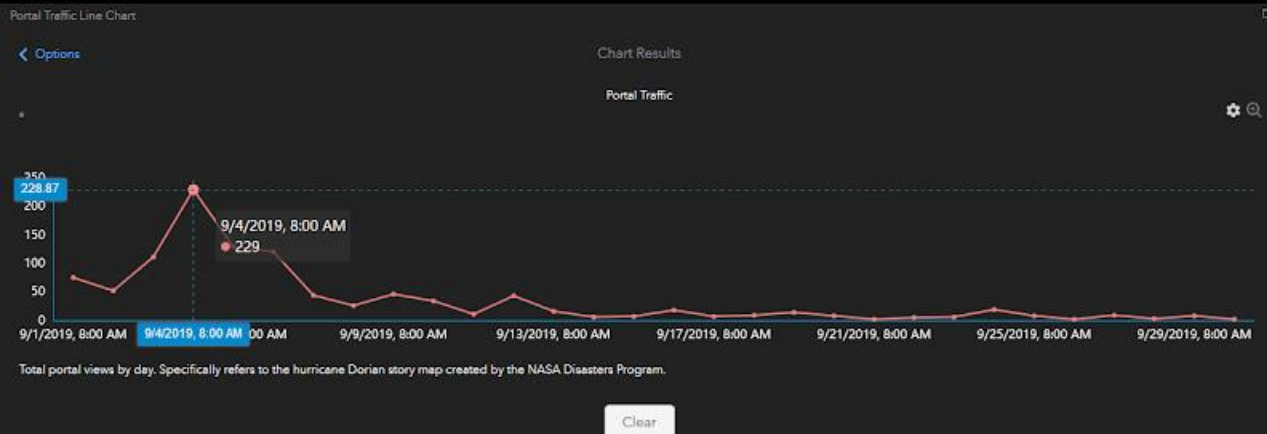
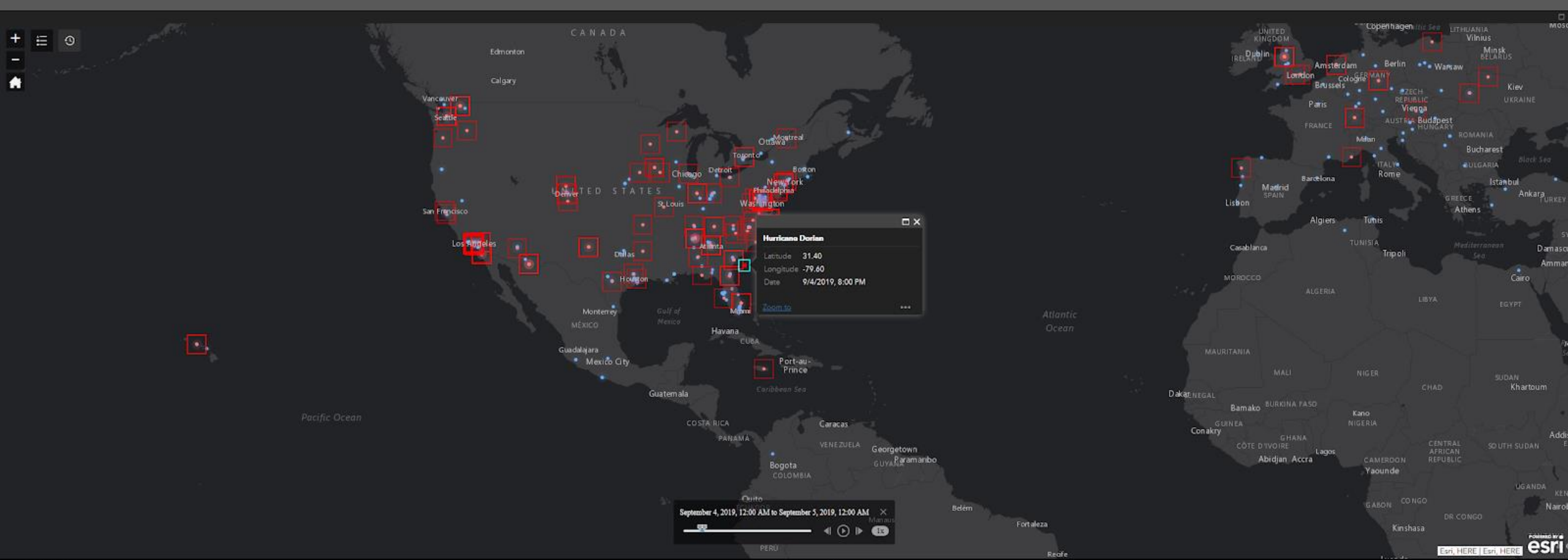
GEO Flood Community Networks **Regional GEO Networks**



Regional GEO Networks

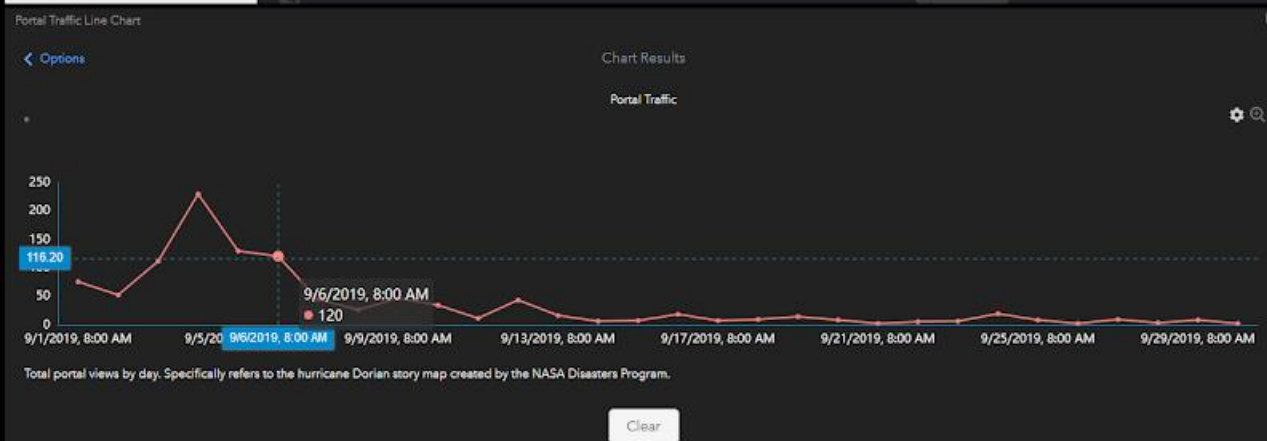
End-User Engagement

- **Final Objective:** discern general website traffic from product/portal traffic.
- Google analytics used for website traffic.
 - Does not track views to embedded products and story maps on the NASA Disasters Portal.
 - Cannot assume that website traffic translates to usage of data and products.
- Case-study of Hurricane Dorian for September 2019.
 - Coordinates for hurricane.
 - *Website traffic*
 - Gathered from Google Analytics
 - disasters.nasa.gov/hurricane-dorian-2019/
 - *Portal traffic*
 - Requested NCCS get-requests as a .log file
 - Mined for IP addresses and dates, then geolocated





September 6, 2019, 12:00 AM to September 7, 2019, 12:00 AM



Conclusions

- Created interactive tools for internal use to visualize and analyze internal and external project connections related to the NASA Disasters Program.
- Created an interactive web application for internal use to discern general website traffic from portal/product traffic for the case of Hurricane Dorian.
- Developed and catalogued methodologies in step-by-step guides for recreating these projects and deliverables.
- Product review/proof of concept for ESRI ArcGIS Insights to provide a use-case for the agency.

Next Steps

- Disasters Program considering procurement of Insights license based on the progress made during this internship, and plans are in development to continue to build out these internal and external networks, based on the success achieved during this internship.
- Potential to influence future GIS architecture of Disasters Program Portal, based on limitations identified and need for detailed product metric tracking.
- GEO Secretariat creating new thematic Working Groups this year (Ex: Disaster Risk Reduction Working Group), and also considering the solutions developed during the internship, which were highlighted at Esri's booth during the 2019 GEO Ministerial Summit in Canberra, Australia.



Acknowledgments

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