



Visualization Exploration & Data Analysis

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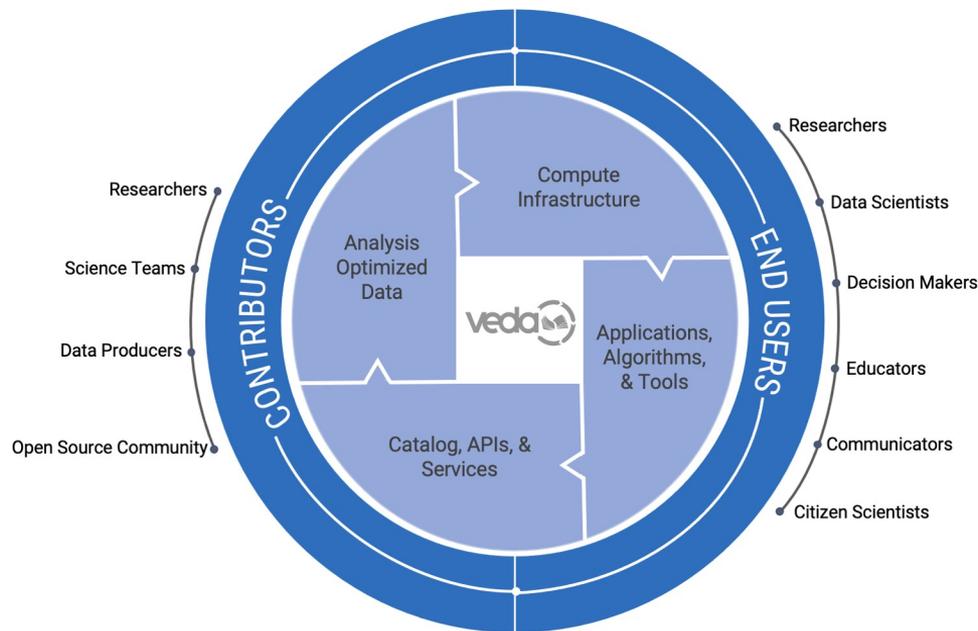
Visualization, Exploration, and Data Analysis

Why?

- Interdisciplinary science depends on large amount of Earth science data and computational resources
- Working with these datasets is non-trivial
- Big data science requires advanced distributed computing knowledge

What?

VEDA is an open platform that brings key Earth science datasets next to open source tools for data processing, analysis, visualization, and exploration in a managed and more accessible computing environment

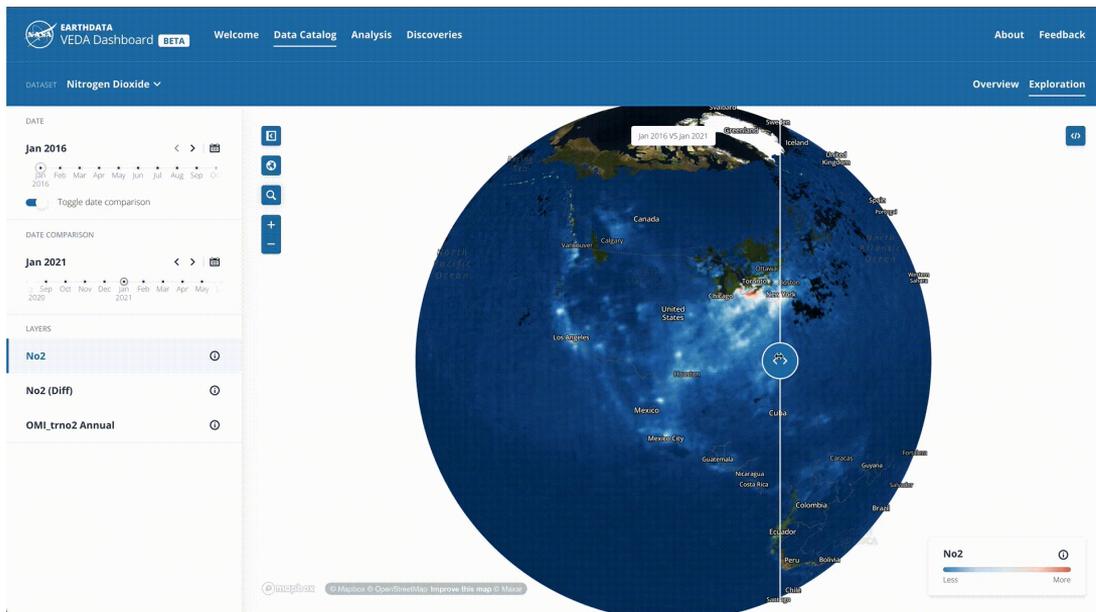


Explore

Analyze

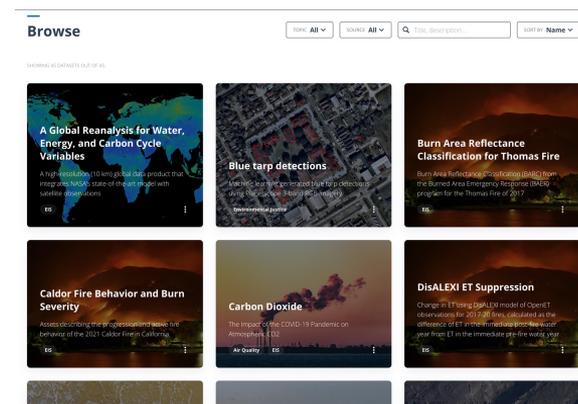
Publish

Communicate



Finding relevant data products

Exploring data to identify interesting features



Explore

Analyze

Publish

Communicate

```
[9]: fig, ax = plt.subplots(1,2,figsize=(11,5))  
  
# visualize burn area values for all fires  
ax[0].hist(gdf['area'].values, bins=300)  
ax[0].set_xlabel(200)  
ax[0].set_ylabel('log')  
ax[0].set_xlabel('Fire Area (km2)')  
ax[0].set_ylabel('Count')  
  
# plot only sample of fires because  
# all of them will take a while to render  
comps.plot(ax=ax[1], edgecolor="black", color="name")  
gdf.sample(10000).plot(ax=ax[1], edgecolor="red", color="red")  
ax[1].set_xlabel('Longitude')  
ax[1].set_ylabel('Latitude')  
fig.show()  
  
[10]: # isolate large fires >= 5km2  
large_fires = gdf[gdf['area'] >= 5]  
print('# of large fires:', len(large_fires))  
# of large fires: 1744  
  
[11]: # optional interactive visualization  
# timestamps must be dropped because they don't play  
# well with the interactive map  
# large_fires.drop(['StartTime', 'EndTime'], axis=1).explore(column='fid', style='muted', fill=False,  
# title='Stamen Terrain', cmap='jet')  
  
[12]: base_path = 's3://veda-data-store-staging'  
fire_ids = set()  
file_paths = []  
  
# str = 'FL'  
# str = 'NF'  
  
for obj in veda.objects.filter(Prefix='EIS/other/fds-output/2022/LargeFire'):  
    file_path = os.path.join(base_path, obj.key)  
  
    if f_str in file_path or nfp_str in file_path:  
        # pass  
        continue  
  
    file_name = file_path.split('/')[-1]  
    fire_id = file_name.split('_')[0]  
  
    fire_ids.add(fire_id)  
    file_paths.append(file_path)  
  
fire_ids = list(fire_ids) # convert to list for indexing
```

Developing advanced data products and analysis

Carrying out calculations "in place" without the need to download data

Dynamically allocating resources for computationally demanding processing

Explore

Analyze

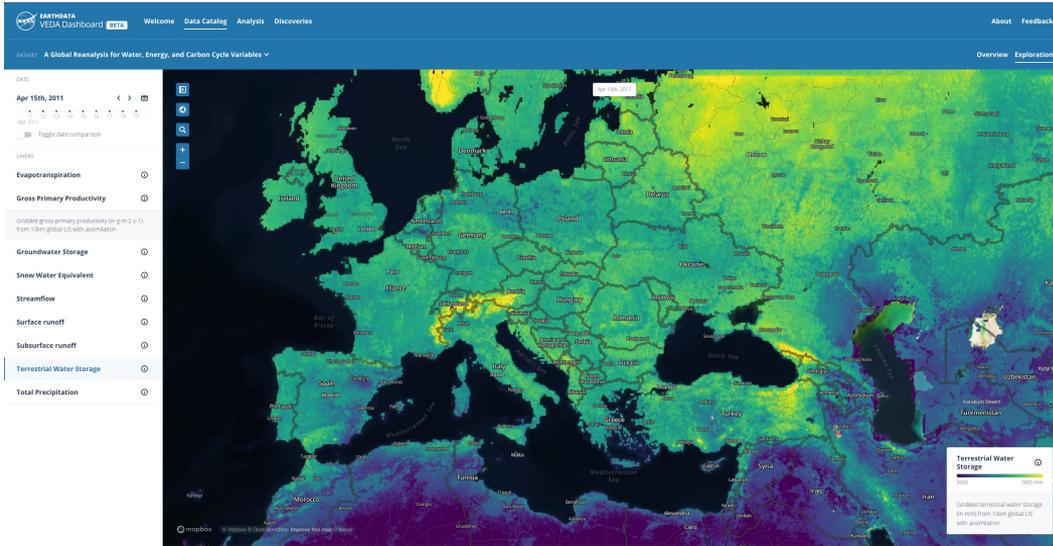
Publish

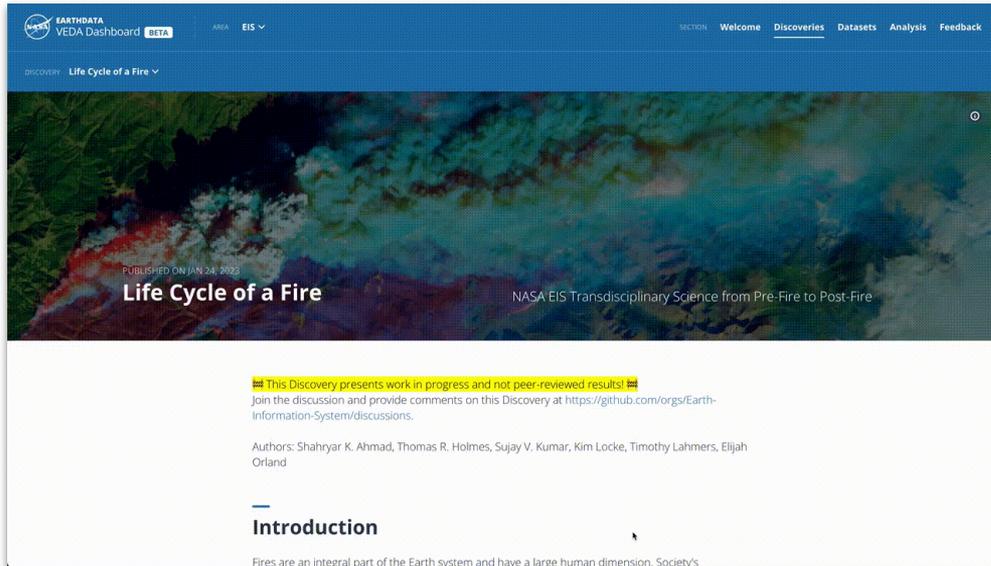
Communicate

Conveniently delivering data through existing interfaces

Providing automatic access to interactive visualization capabilities

Allowing users to analyze your products within the environment





The screenshot shows the NASA EarthData VEDA Dashboard interface. At the top, there is a navigation bar with the NASA logo, 'EARTHDATA VEDA Dashboard BETA', and a dropdown menu for 'AREA EIS'. Below this is a secondary navigation bar with links for 'SECTION', 'Welcome', 'Discoveries', 'Datasets', 'Analysis', and 'Feedback'. The main content area features a large, colorful satellite-style image of a landscape with a fire. Overlaid on the image is the text 'PUBLISHED ON JAN 24, 2023' and the title 'Life Cycle of a Fire'. Below the image, there is a warning message: '⚠️ This Discovery presents work in progress and not peer-reviewed results! ⚠️'. Below the warning, there is a link to join the discussion: 'Join the discussion and provide comments on this Discovery at <https://github.com/orgs/Earth-Information-System/discussions>'. The authors listed are: 'Authors: Shahryar K. Ahmad, Thomas R. Holmes, Sujay V. Kumar, Kim Locke, Timothy Lahmers, Elijah Orland'. The section 'Introduction' is visible at the bottom, with the first sentence: 'Fires are an integral part of the Earth system and have a large human dimension. Society's'.

User friendly data-driven storytelling

Enrich science and applications narratives with interactive exploration

How to use it?

1

VEDA Dashboard

Public-facing User Site

<https://www.earthdata.nasa.gov/dashboard/>

2

VEDA Data Services

Data Catalog and APIs

<https://radiantearth.github.io/stac-browser/#/external/staging-stac.delta-backend.com/>

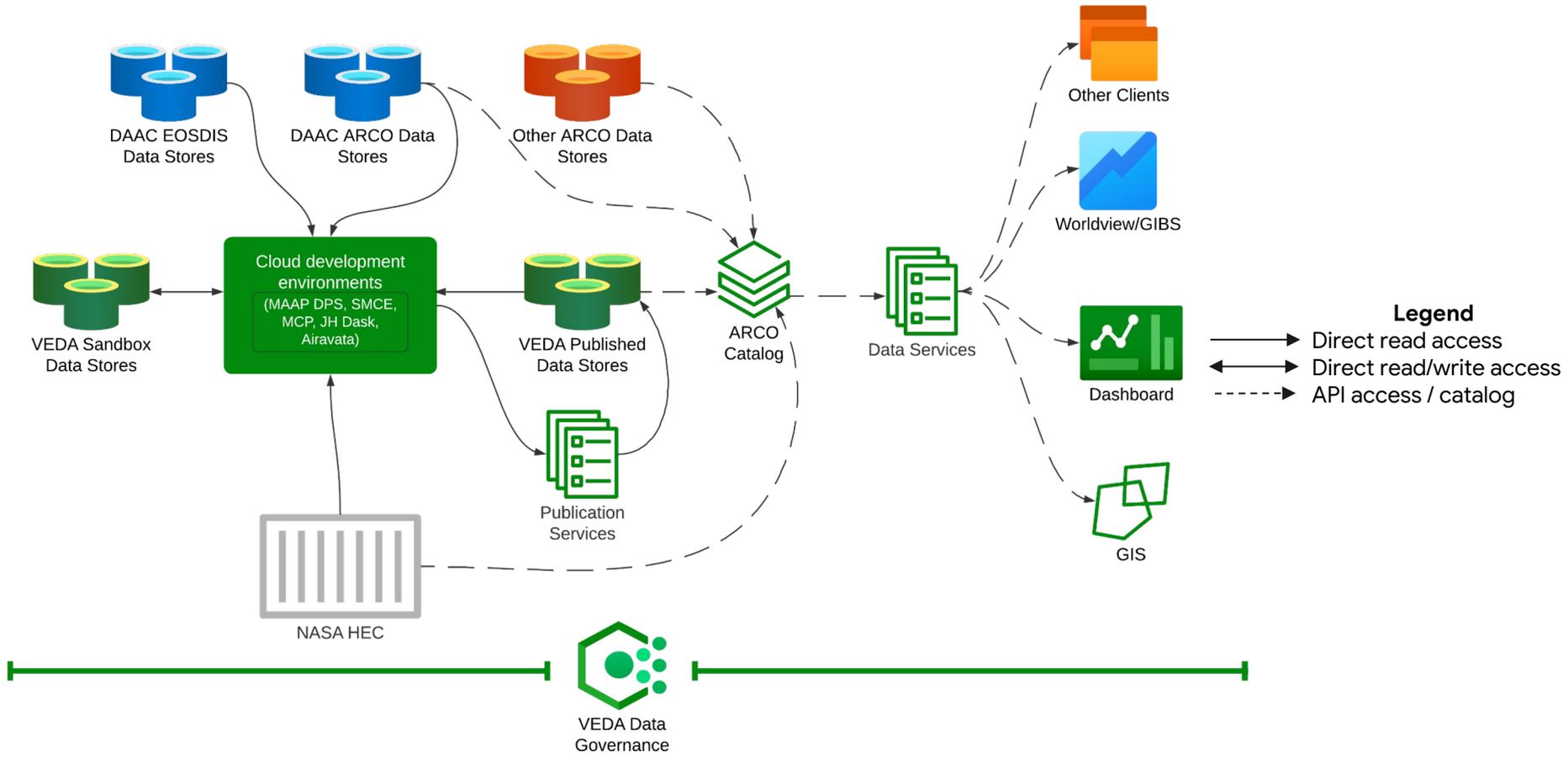
3

VEDA Analytics Platform (AP)

Interactive Compute Resources

<https://nasa-veda.2i2c.cloud>

Data Architecture



VEDA supports

Current Collaborations

Earth Information System (EIS)

Environmental Justice Initiative

US Greenhouse Gas Monitoring and Information Center

Earth Information Center

Earthdata GIS Team (EGIST)

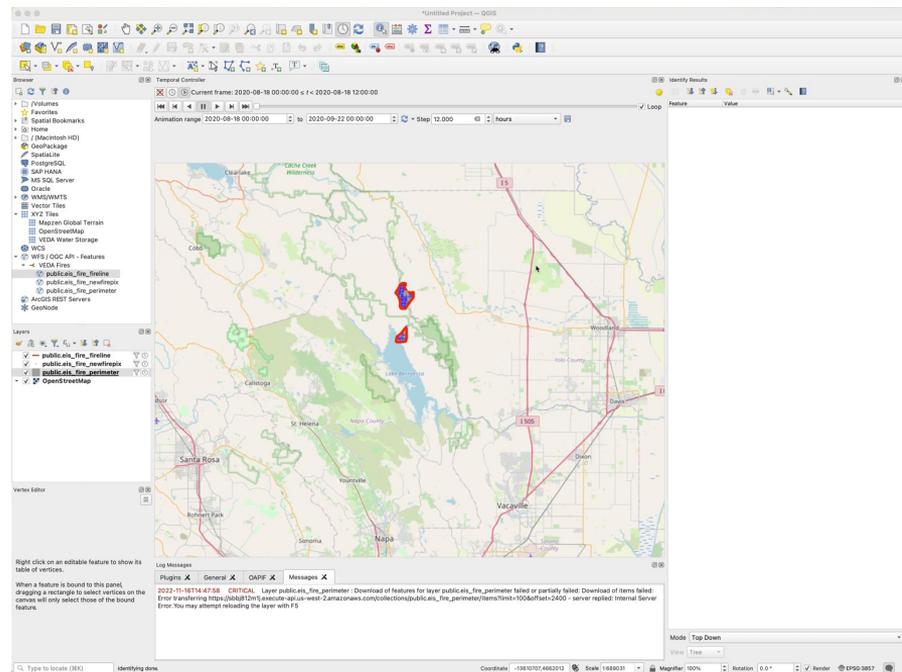
NASA/ESA/JAXA trilateral dashboard

ESA/NASA Earth Scientists involved with MAAP et al.

Potential Collaborations

SciAct

FireSense



Demonstration of EIS Fire data served from VEDA backend into ArcGIS

VEDA Resources

- [VEDA GitHub Repos with Documentation](#)
- [VEDA Data Catalog](#)
- [Community Documents](#)
- [VEDA Dashboard](#)

Live Demo

Thank you

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