HELMHOLTZ

SPITZENFORSCHUNG FÜR
GROSSE HERAUSFORDERUNGEN

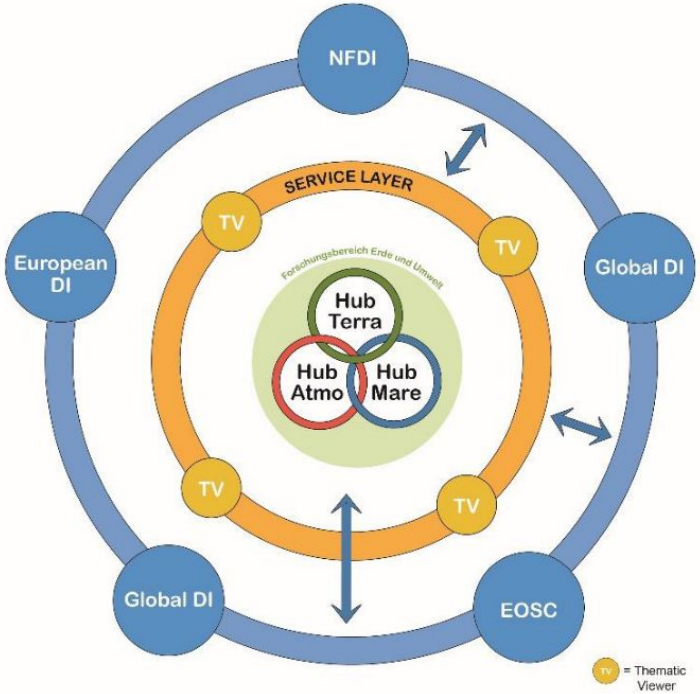
DataHub and Digital Tools

KMT @ GFZ, April 27-29, 2022

Martin Hammitzsch, Tobias Weiß

DataHub - In a Nutshell

- **Integrated approach**
  across the Helmholtz Research Field Earth and Environment
- Aligned handling of data in a **joint environment**
  across the centres
- **Toolbox and platform**
  supporting the scientific work in research program topics
- Bundled, extended and new **research data management services** offered by the centres' IT units and by scientific communities
- **Hub for** opening, providing and accessing **community-specific platforms, services and data**
- **Connection** to **national** and **international**
  data and research infrastructures



Hubs Atmo, Mare and Terra

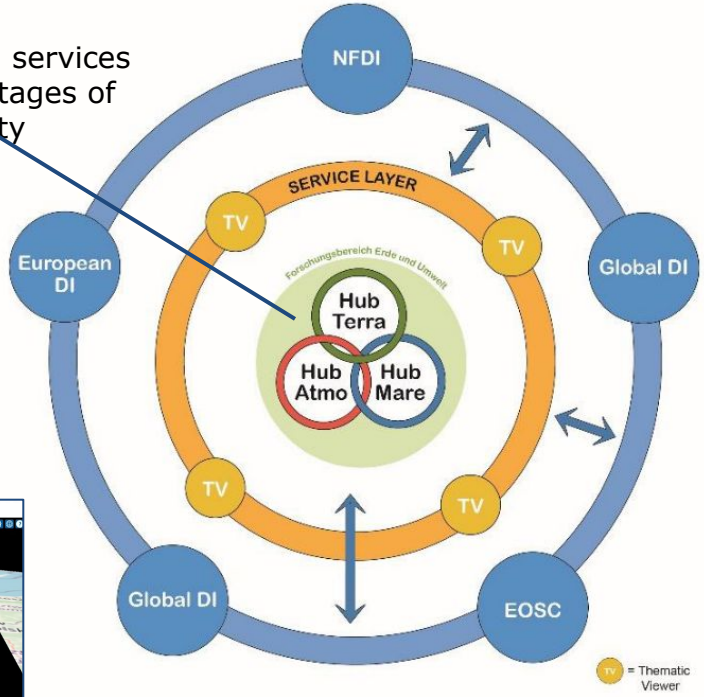
- **Historically separated research data management** in the RF Earth and Environment **shall be integrated in an open, networked infrastructure** and data infrastructures shall be further developed.
- Three integrated hubs (**Atmo, Mare, Terra**) are set up **to connect the centers of the RF** for the development and realisation of project aims and the gauging of requirements.

DataHub Tools

Focus in general at GFZ

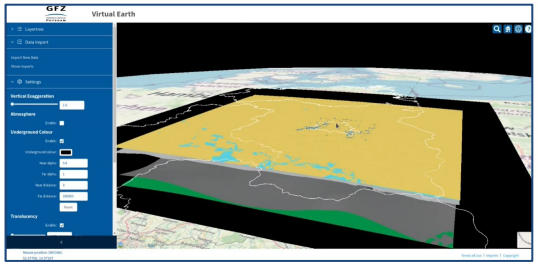
- Observatories, test-sites and campaigns
- Geohazard monitoring, forecasts, estimations, risks and exposure
- Laboratories and sample management
- Underground exploration
- Remote sensing

20+ tools and services in different stages of maturity



Tools with potential for KMT activities

- Timeseries Data
- Underground Data



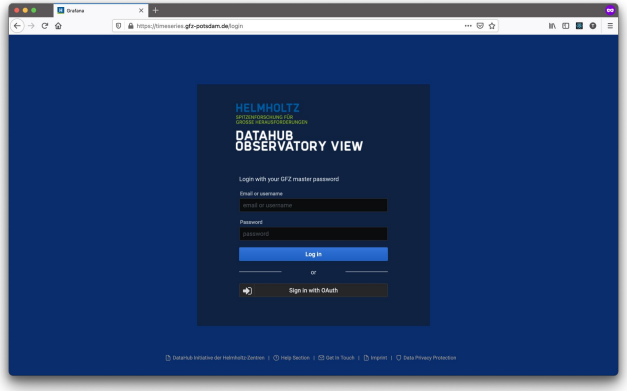
HELMHOLTZ

SPITZENFORSCHUNG FÜR
GROSSE HERAUSFORDERUNGEN

Timeseries Data Integration and Visualisation

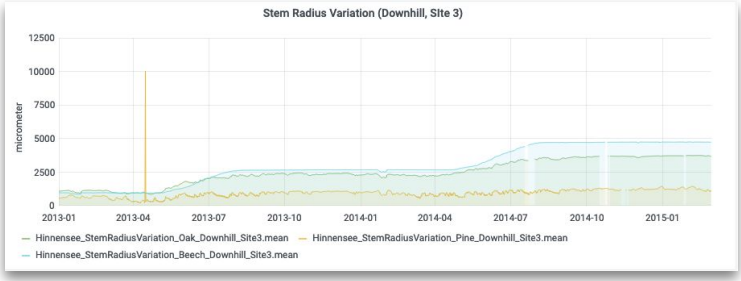
Time Series Management at GFZ

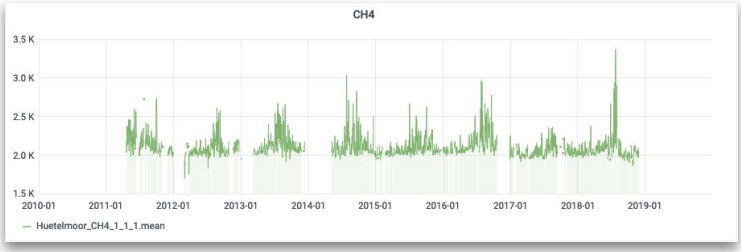
- **Access** (broad) selection of **time series data**
- **Manage and visualize** your time series data
- Use **personalized data dashboards** and panels
- **Share** with project members
- **Combine** data from **multiple sources**
- Options to **navigate** through, **mark** or **annotate** data and to **set alerts** for specific events
- **Embed** interactive data dashboards and panels **into your project websites**
- **Import** data with TSM infrastructure

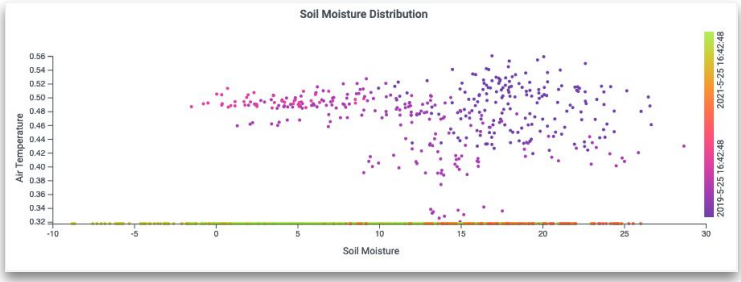


Observatories, test-sites, campaigns …

- Provides access to a (broad) selection of time series data of various projects and sections (in the near future)
- Covers parameters such as Atmospheric pressure, Air temperature, Net radiation, Wind direction, Windspeed, Humidity, Rain accumulation, Soil moisture, Soil temperature, Voltage, Acceleration, Tides, Drift, Polar Motion, CO2, CH4, FCH4, CaC03, LN (Ca/Ti), Varve thickness, Stem radius, Neutron counting …

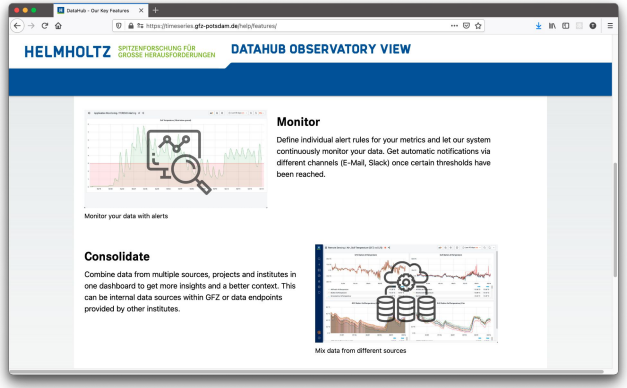


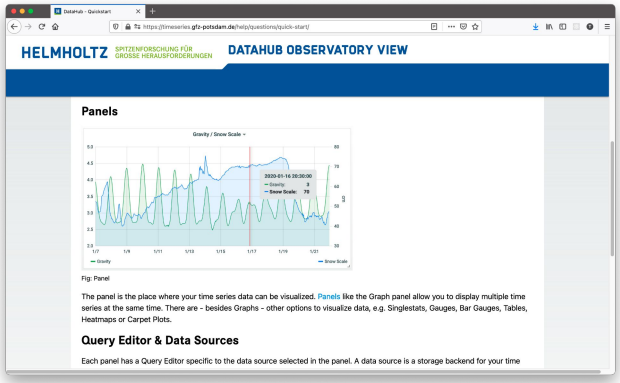




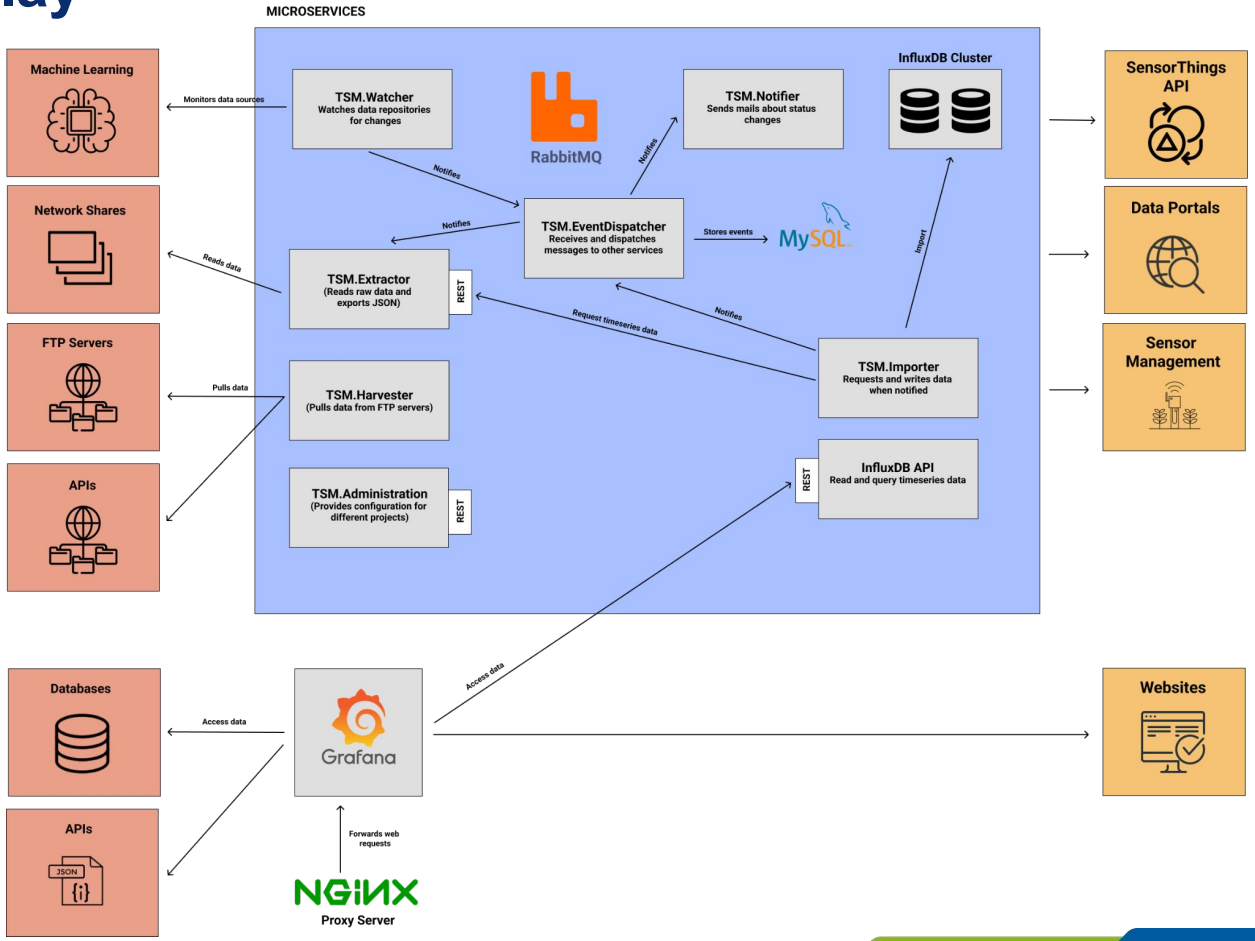
Get in touch

- GFZ Time Series Portal: https://timeseries.gfz-potsdam.de
- Key Features: https://timeseries.gfz-potsdam.de/help/features/
- Help: https://timeseries.gfz-potsdam.de/help/



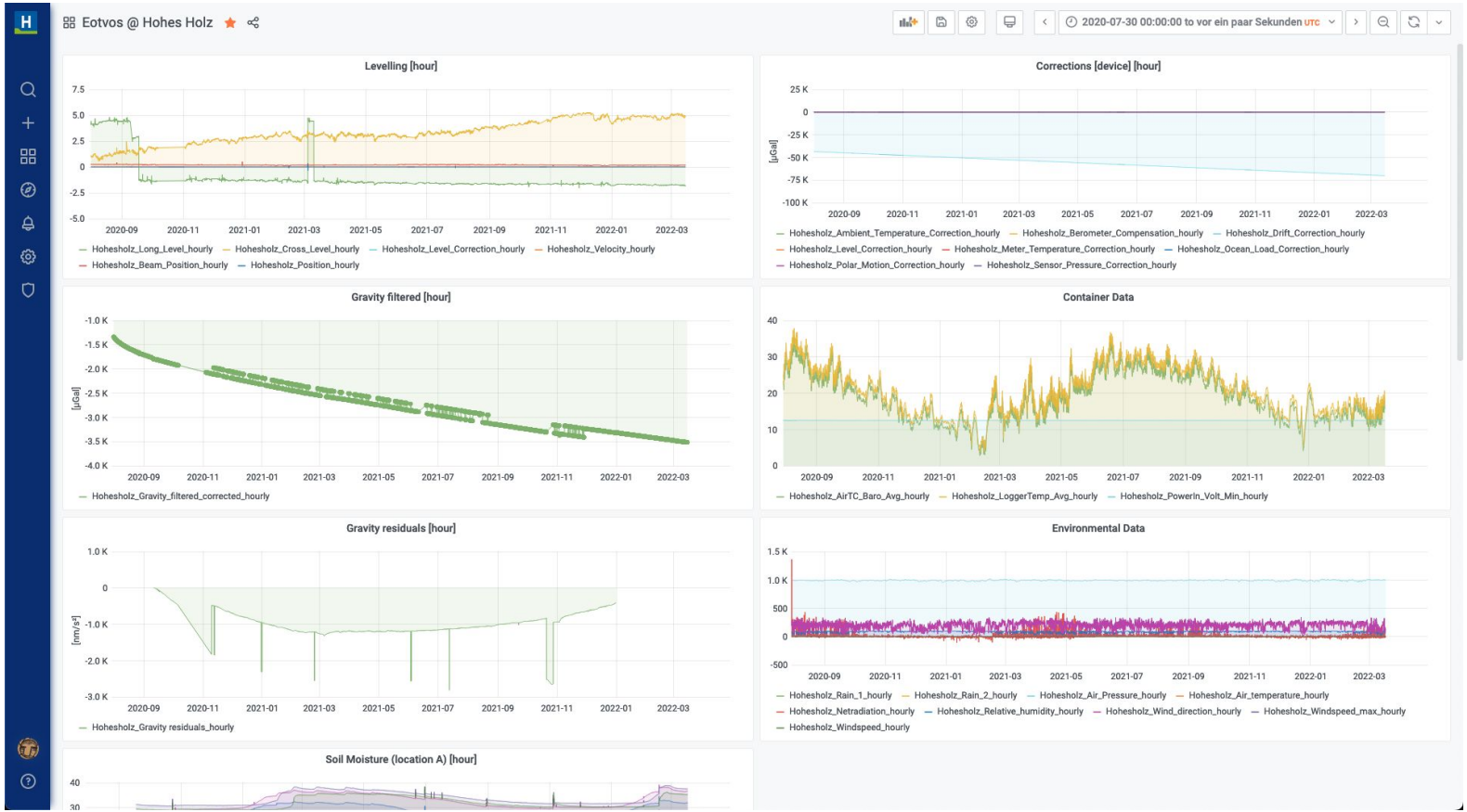


Plug’n’Play

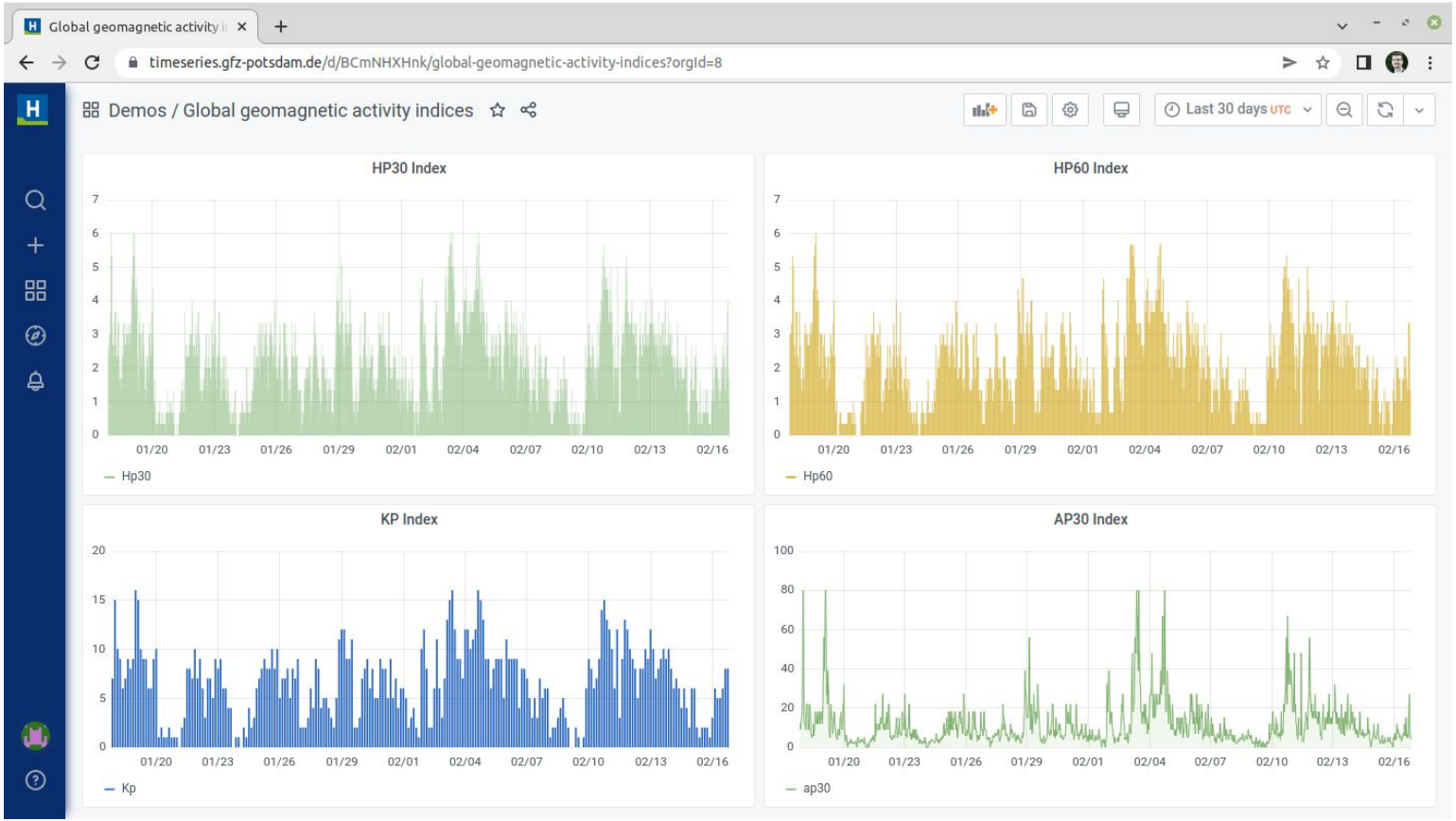

MICROSERVICES
Machine Learning
Monitors data sources
TSM.Watcher
Watches data repositories for changes
RabbitMQ
TSM.Notifier
Sends mails about status changes
InfluxDB Cluster
SensorThings API
Notifies
Notifies
Network Shares
Reads data
Notifies
TSM.EventDispatcher
Receives and dispatches messages to other services
Stores events
MySQL
Import
Data Portals
TSM.Extractor
(Reads raw data and exports JSON)
REST
Request timeseries data
Notifies
FTP Servers
Pulls data
TSM.Harvester
(Pulls data from FTP servers)
TSM.Importer
Requests and writes data when notified
Sensor Management
APIs
TSM.Administration
(Provides configuration for different projects)
REST
REST
InfluxDB API
Read and query timeseries data
Databases
Access data
Grafana
Access data
Websites
APIs
JSON
Forwards web requests
NGINX
Proxy Server

Dashboard example: Helgoland Superconducting Gravimeter

Dashboard example: Hohes Holz Forest Climate Measurements

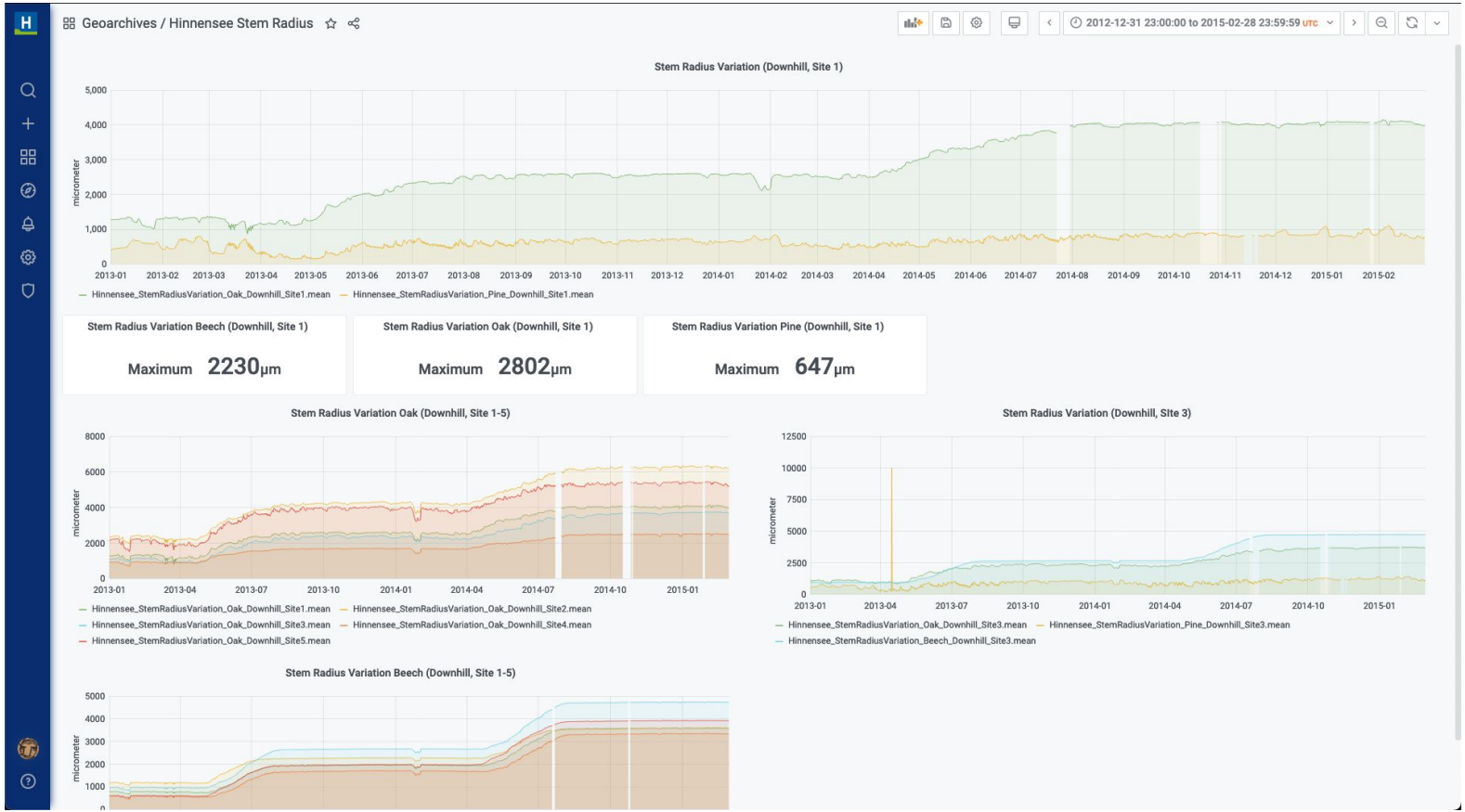


Dashboard example: Kp/Hp-Index (Space Weather)

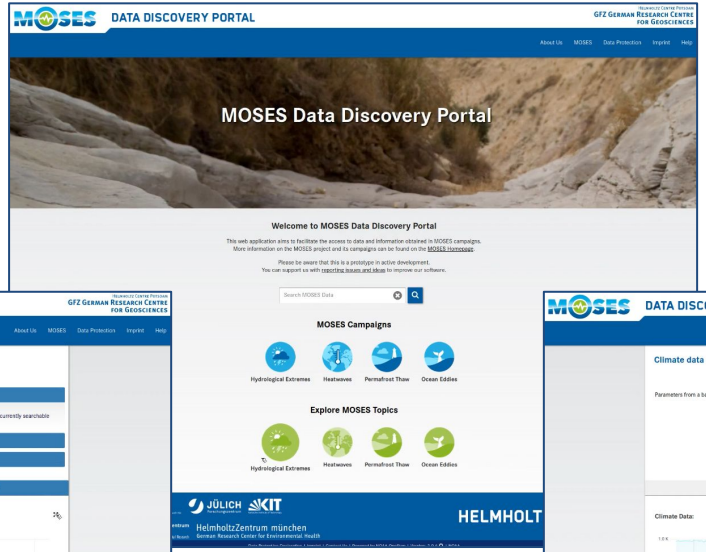


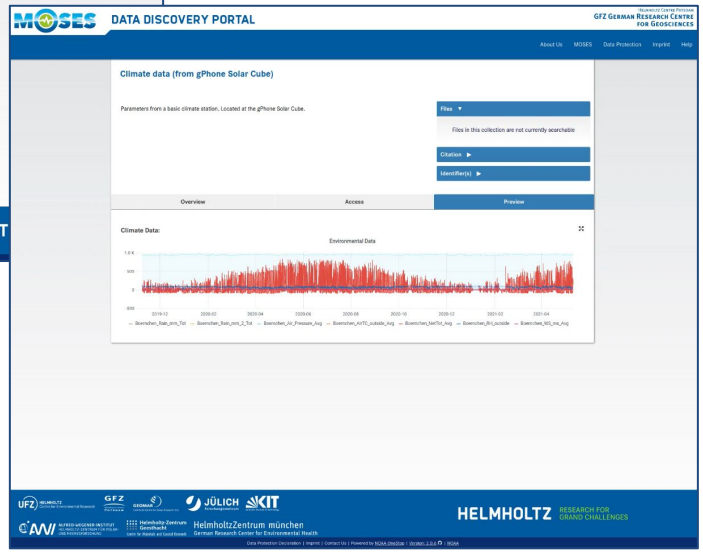
Dashboard example: Scatterplot

Dashboard example: Stem Radius



Embedded panels example: MOSES Data Discovery Portal





Embedded panels example: MOSES Data Discovery Portal