



<https://hapi-server.org>



Impacting Open Science via Interoperable Data Access with the Heliophysics Application Programmer's Interface (HAPI)

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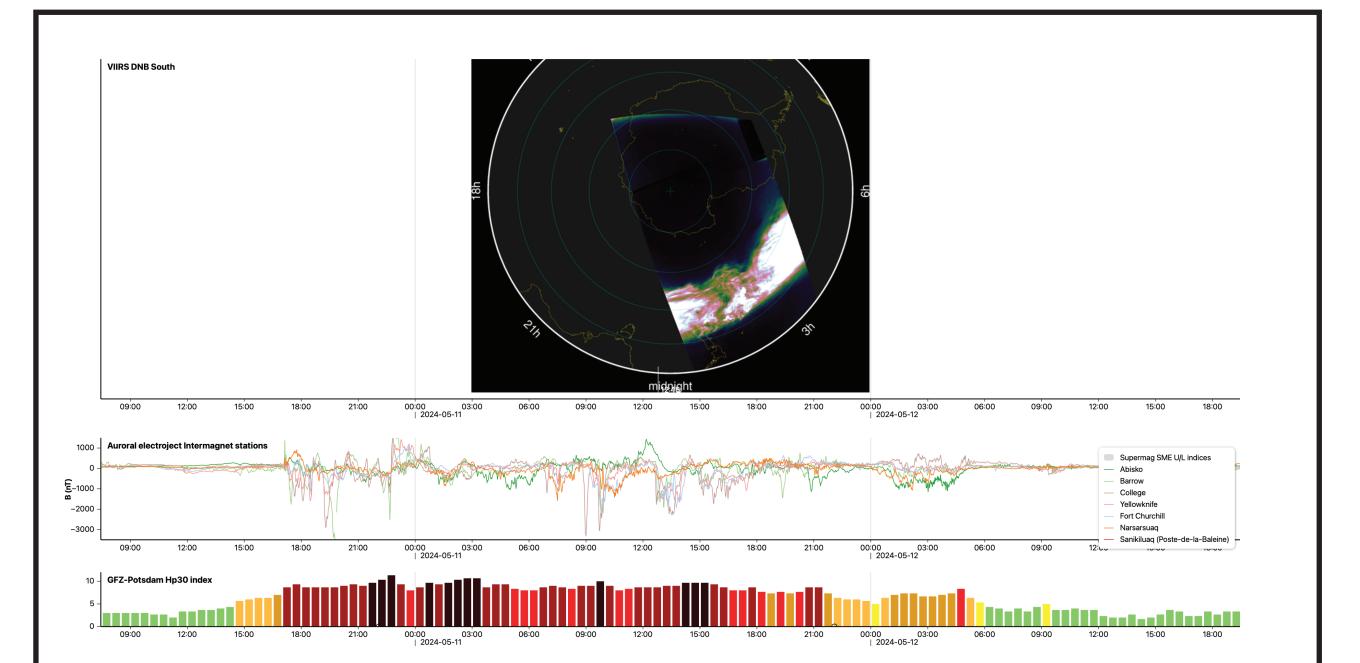
Presented at:
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Available at:
[10.5281/zenodo.14527276](https://zenodo.14527276)

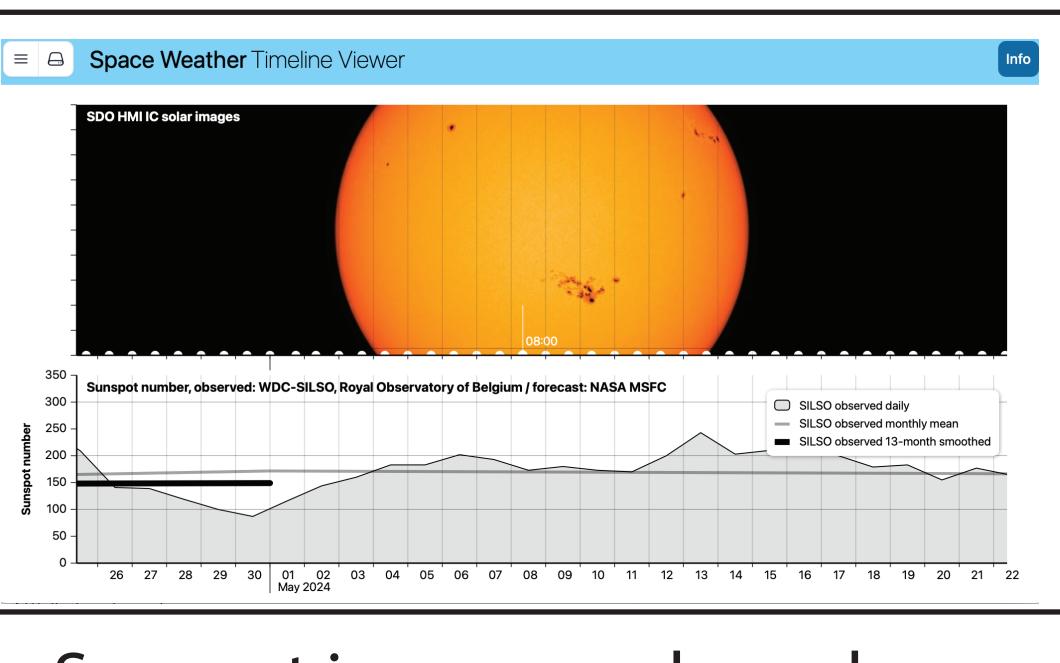
HAPI is a specification for standardizing access to time series data.

It is now widely adopted in Heliophysics and can be easily added to any time series data server.
Implementations of the specification (clients and servers) exist in multiple programming languages.

KNMI HAPI Server and Timeline Viewer

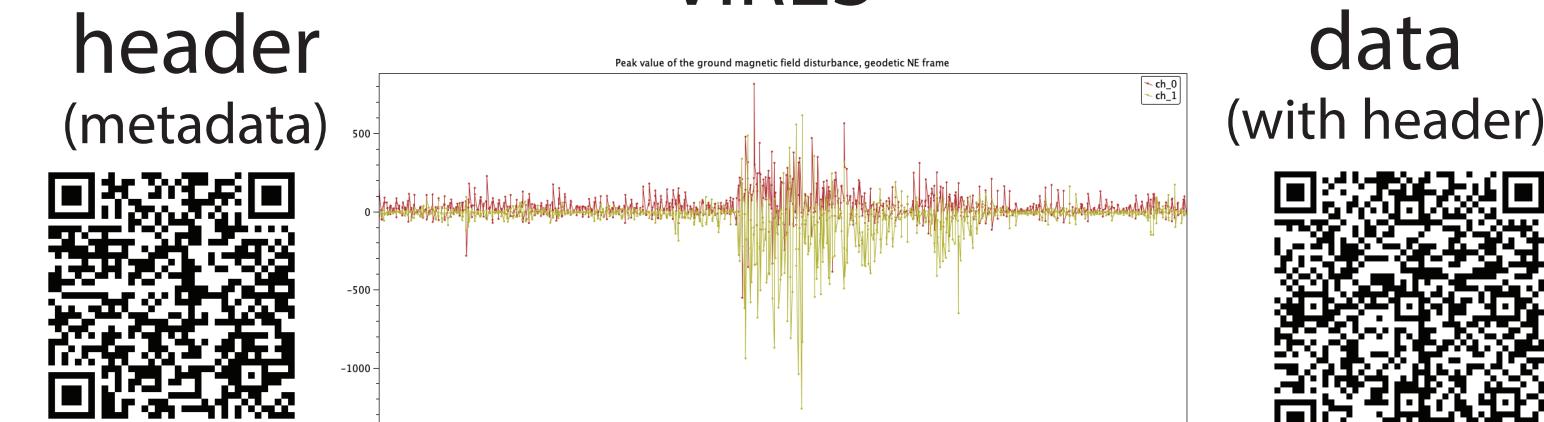


Auroral images, Electrojet B field, Kp Index



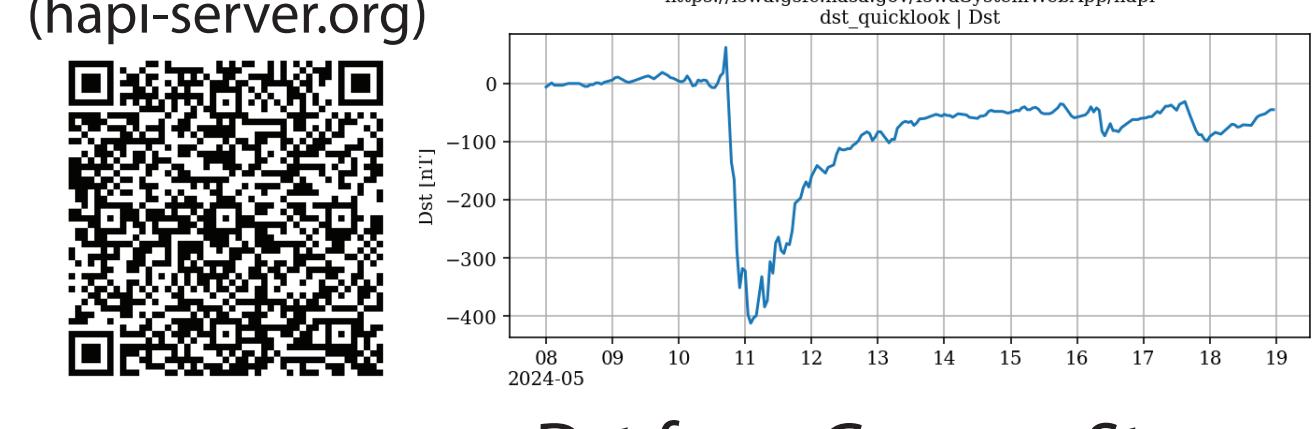
Sunspot images and number
<https://spaceweather.knmi.nl/viewer/>

ViRES



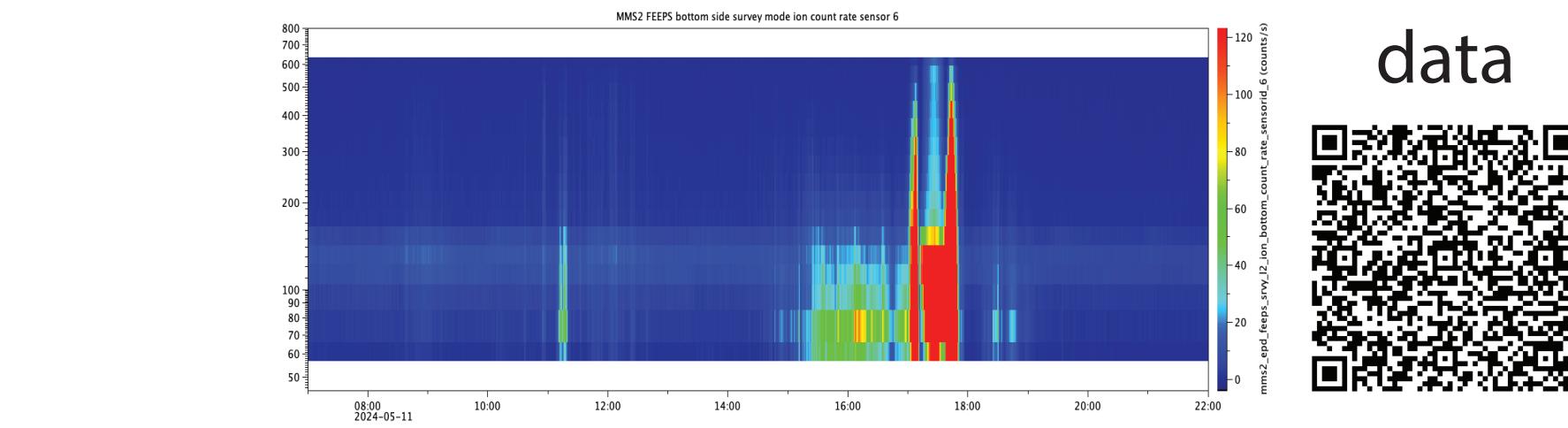
Ground Magnetic Field Disturbance

CCMC



Dst from Gannon Storm

CDAWeb

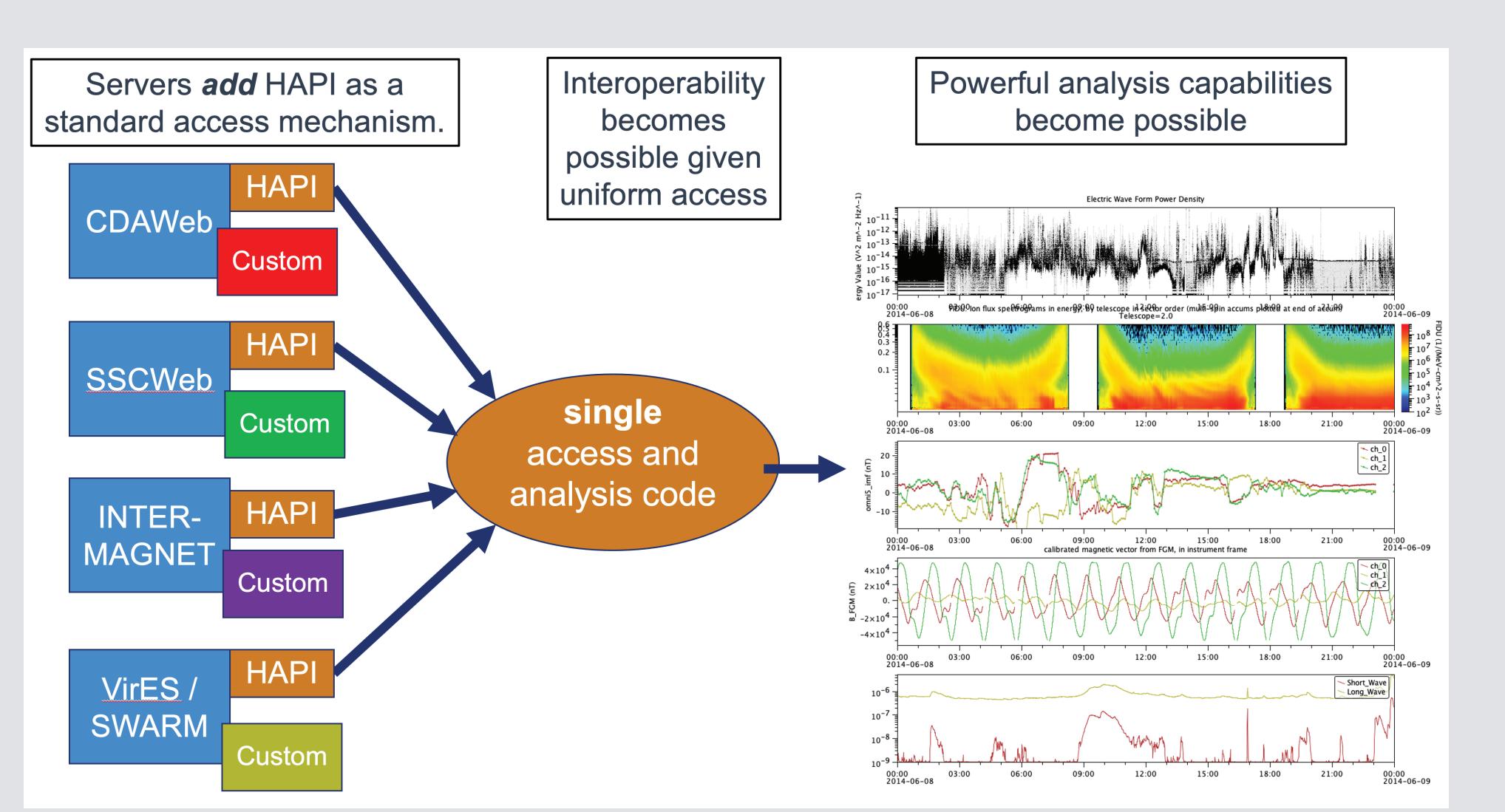


MMS FEEPS Proton Ion Count Rate Gannon storm

Share your HAPI data!

Notice all the QR codes!! They connect to live data or plots.
When you analyze any data using HAPI, you can always share the exact data you used with a URL.

What is HAPI? (conceptually)



HAPI enables interoperable access to time series datasets at many providers around the world.

What is HAPI? (specification details)

There are 5 required endpoints for a HAPI server:

/catalog lists names of datasets the server can provide

/info?id=<DATASET_ID>

metadata for one dataset, including the parameters in the dataset; the metadata is minimal, but enough to make a science-worthy plot

/data?id=<DATASET_ID>&start=<TIME1>&stop=<TIME2>

streams data for the given time range in a simple CSV, JSON, or binary format defined by the spec; time values must be standardized (ISO8601)

/about like a README for the server, with contact info, etc.

/capabilities describes optional elements available at the server

List of Known HAPI Servers

Institution	Server	Version	Type of Data	Num Datasets
NASA / GSFC	CDAWeb	2.0	Heliophysics	3425
	SSCWeb	2.0	Ephemeris	298
	Helioviewer	3.1	Solar Images (URLs)	79
	CCMC	2.0	Space Weather Indices	275
IRAP Plasma Data Ctr	AMDA	2.0	Helio. & Planetary Data and Ephemeris	1029
University of Iowa	Das2 Server	1.1	Helio. & Planetary	19
CU Boulder / LASP	LISIRD	2.0	Solar Irradiance	29
SWARM Mission	ViRES Data Server	3.0	Space Mag Data	123
INTERMAGNET	INTERMAGNET	3.1	Ground-based Mag	2915
Royal Netherlands Meteorological Institute	KNMI	2.0	Space Weather	665
ESA / ESAC	ESAC / Cluster Mission Data	3.2	Helio. (magnetosphere)	1989
				Total 10846

Over 10,000 datasets!!

HAPI Catalog Examples



Helioviewer

Recent Updates to the HAPI specification

- string parameters that are URLs can be identified as such to enable file listings
- catalog can now be asked to include all details from every info response
- new optional element in capabilities that offers clients a valid data query to use for server aliveness testing
- added items to fully represent FAIR data:
 - license (uses SPDX.org)
 - provenance (free text for now)