

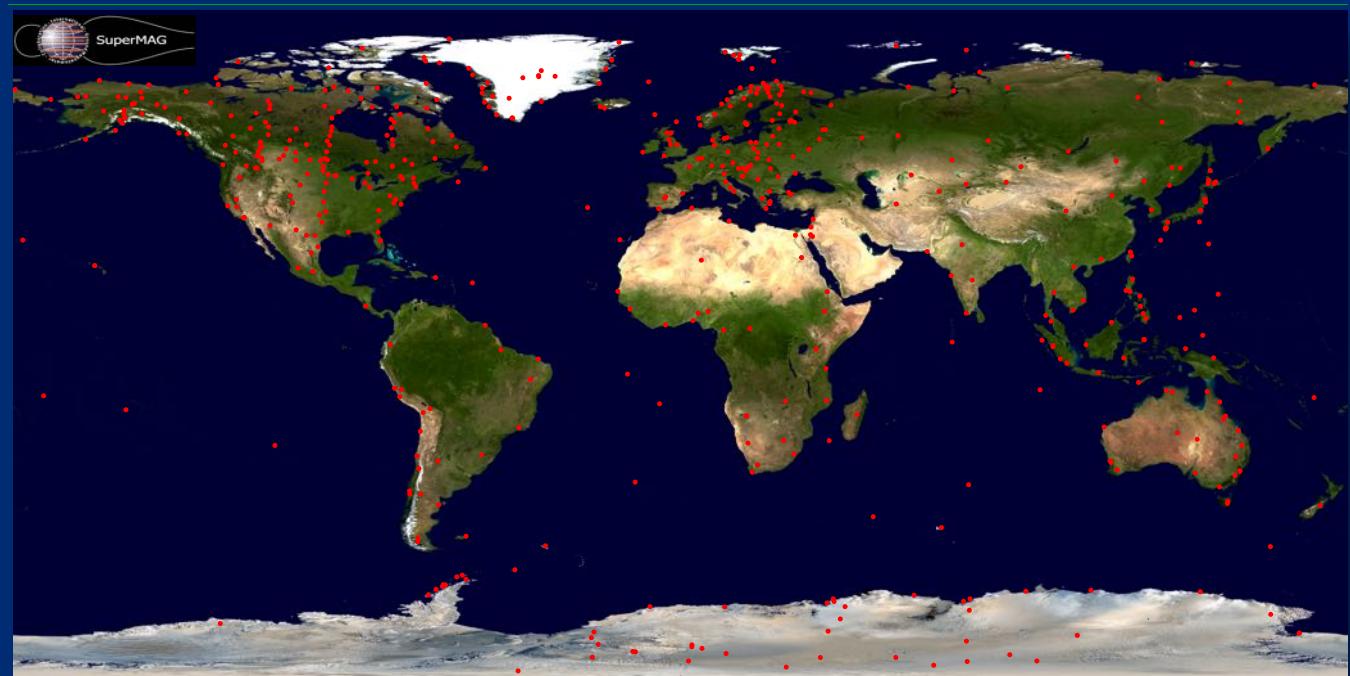


# SuperMAG

R.J.Barnes

# SuperMAG - Overview

- SuperMAG provides access to ground based magnetometer data
  - 49 years of data from 1969-2018
  - 487 ground stations
  - 36 contributors

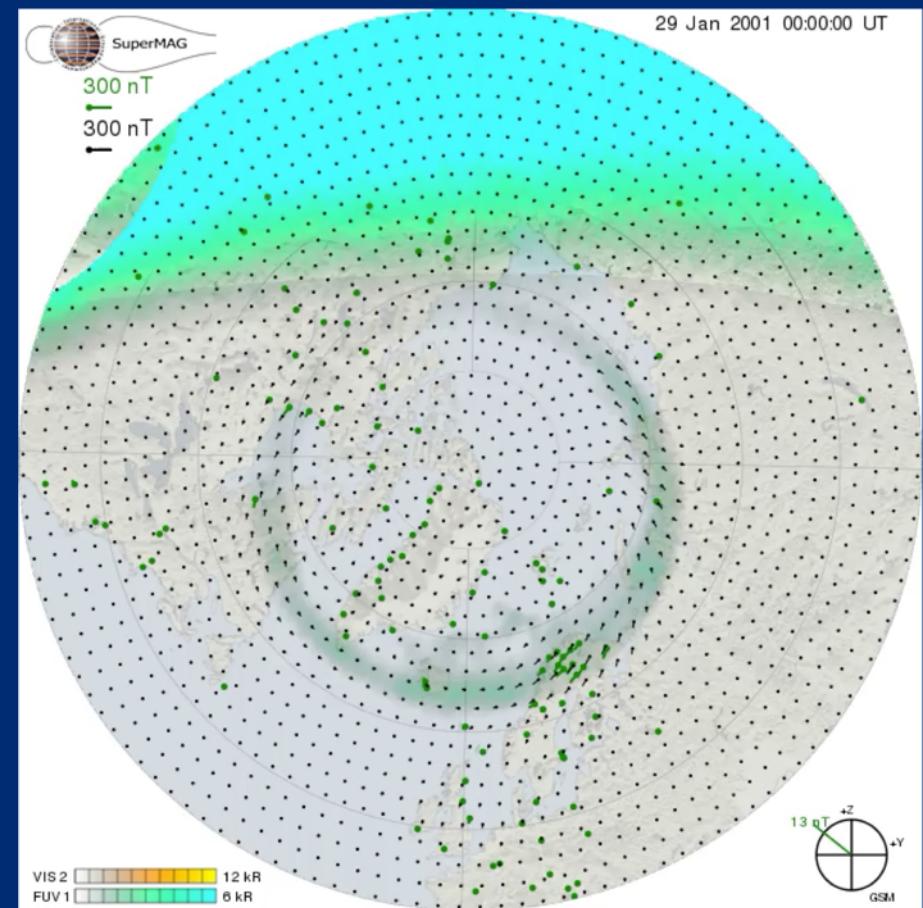


# SuperMAG - Overview

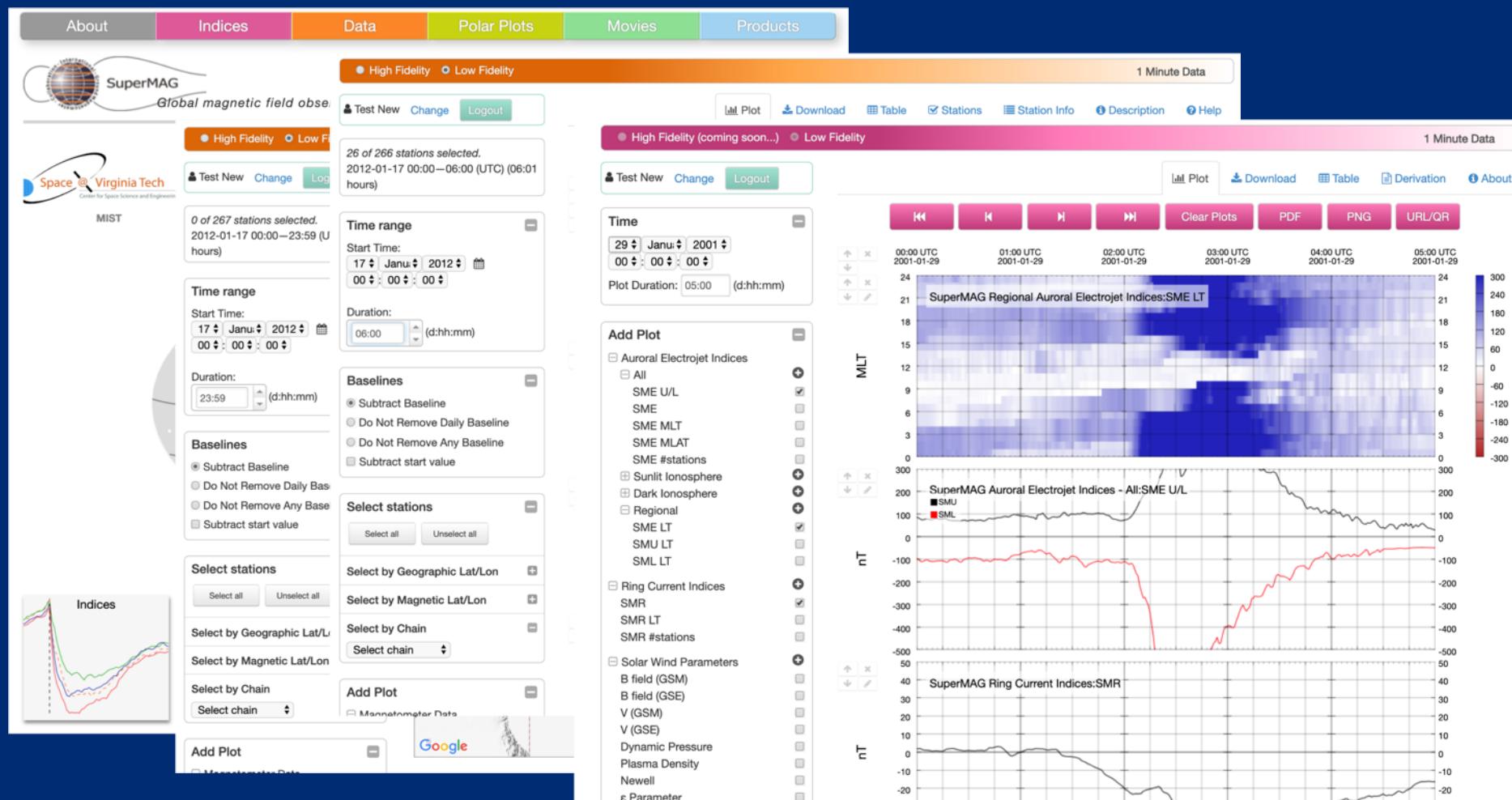
- SuperMAG is not a data provider
  - We do not serve the raw mag data
- SuperMAG is a data curator
  - SuperMAG cleans the data removing abnormalities
  - Baseline subtraction (yearly, daily)
  - Coordinate transformation into NEZ magnetic coordinate system
  - Consistent for all stations
- SuperMAG provides higher level data products
  - Fitted (Gridded) estimates of ground level magnetic field perturbations
  - Geophysical indices (SME,SMR, Solar wind parameters)
  - Derived ULF parameters PC2,PC3,PC4,PC5

# SuperMAG – Overview

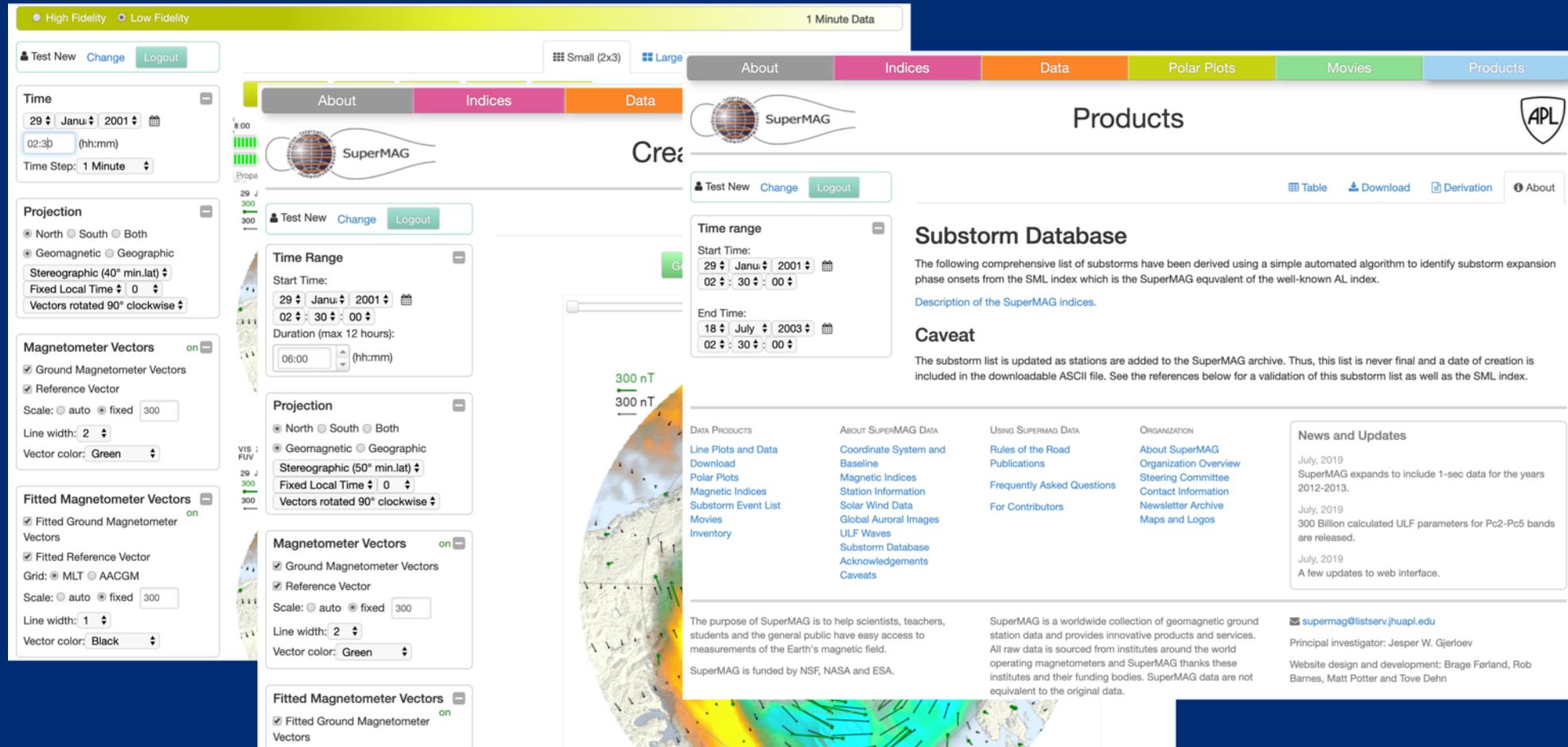
- SuperMAG has had a huge impact
  - 2000 registered users
  - 100 publications a year
  - 10 thesis per year
  - 3500 active users per month



# <http://supermag.jhuap.edu>



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The screenshot shows the SuperMAG Magnetometer Data website. At the top, there is a navigation bar with tabs: About (grey), Indices (pink), Data (orange), Polar Plots (yellow-green), Movies (green), and Products (light blue). Below the navigation bar is the SuperMAG logo and the APL logo.

The main title "Magnetometer Data" is centered above a search bar. The search bar includes options for "High Fidelity" and "Low Fidelity", and a dropdown menu showing "1 Minute Data". Below the search bar are buttons for "Test New", "Change", and "Logout".

On the left side, there are several input fields and dropdown menus:

- Time range:** Set to "29 Jan 2001 02:30:00" to "30 Jan 00:00".
- Duration:** Set to "06:00".
- Baselines:** Options include "Subtract Baseline" (selected), "Do Not Remove Daily Baseline", "Do Not Remove Any Baseline", and "Subtract start value".
- Select stations:** Buttons for "Select all" and "Unselect all".
- Select by Geographic Lat/Lon:** A dropdown menu.
- Select by Magnetic Lat/Lon:** A dropdown menu.

In the center, there is a section titled "Download options" with the following settings:

- Include MLT and MLAT
- Include Declination from IGRF Model
- Include Solar Zenith Angle (SZA)
- Download Duration:** Set to "06:00" (d:hh:mm).
- Format:** Set to "ASCII (self documented)" (selected).

Below these options is a note: "By downloading data from SuperMAG you agree to follow the Rules of the Road".

At the bottom of the central area, there is a "Enter Security Code:" field containing "6QCS" and a "Download Magnetometer Data" button.

On the right side, there is a "Rules of the Road" section with the following text:

SuperMAG is made possible by the generous contribution of data by numerous collaborators. To ensure their continued operation the user must follow the below rules-of-the-road. Data, plots or derived data products are provided under the limitations of "fair use" and cannot be redistributed. Contact the individual instrument PI and the SuperMAG PI for requests that are in conflict with these restrictions.

The user is requested to acknowledge individual collaborators and SuperMAG when original data, derived data, movies, or data products are used in publications and/or presentations.

[Show full text](#)



# **http://supermag.jhuapl.edu**

- Hybrid system using a mixture of client and server side software
- Extensive use of HTML5 (JavaScript)
- Based on software from the Van Allen Probes Science Gateway
  - <http://rbspgway.jhuapl.edu/>
- Runs on stock browsers – does not require any extensions/software downloads
- Server side software does the heavy lifting
- Parallel operations for speed
- What you see is what you get – data downloads reflect what you have plotted.

<http://supermag.jhuapl.edu>

- Higher level data products:
  - Geophysical indices derived from SuperMAG data
  - Gridded (Fitted) maps of ground magnetic field perturbations
  - Substorm database derived from SuperMAG observations
  - Publication quality plots, custom movies

**<http://supermag.jhuapl.edu>**

- SuperMAG supports digital download of data
  - ASCII file for indices and magnetometer data
  - netCDF files for fitted data
- Web services interface
  - Custom implementation to fit our unique data set

# Lessons learned

- The three click rule
  - If you are more than three clicks from a useful product you've failed
  - User interface must be intuitive
  - Be responsive – web site must provide immediate feedback to users

# Lessons Learned

- Versioning of data is important
  - SuperMAG data is reprocessed on a near continuous basis
  - Currently yearly updates are added at the start of the year – this will change
  - SuperMAG has developed a deployment strategy
    - Data is staged on the server (sandbox)
    - Data is versioned and inspected
    - Data is deployed

# Lessons Learned

- Attribution is important
  - SuperMAG is dependent on the good will of data providers
    - We have no agency mandate
  - Data providers need to know how and who are using their data
  - Data providers often request consultation and credit when their data is used
    - Co-authorship or citation

# Lessons Learned

- SuperMAG “Rules of the Road” clearly state how SuperMAG products should be referenced in publications
- SuperMAG has a simple user registration system for logging purposes
  - Only required for download of plots/movies/data
- We record detailed logs of all activity on the web site
- Each data provider has a private page on the SuperMAG web site that lists statistics on their data use
- SuperMAG has appointed a steering committee for governance

# Going forward

- Implement standard web service interfaces such as HAPI
- Improve download capability to support more data standards
- Build python interface to the data system

