The Space Weather TREC (SWx TREC) Data Portal

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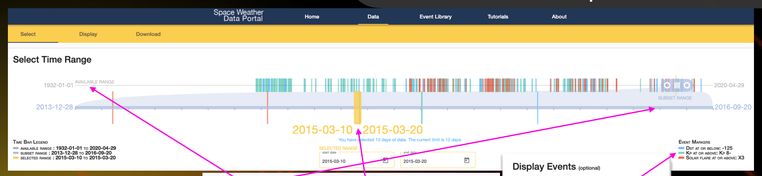
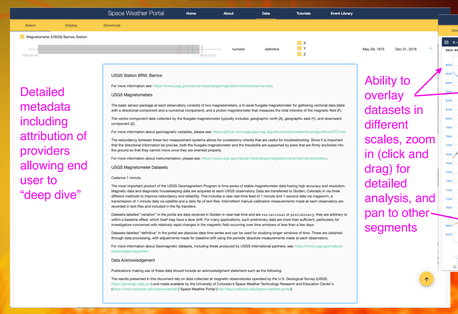
Grand Challenge
UNIVERSITY OF COLORADO BOULDER
SPACE WEATHER CENTER

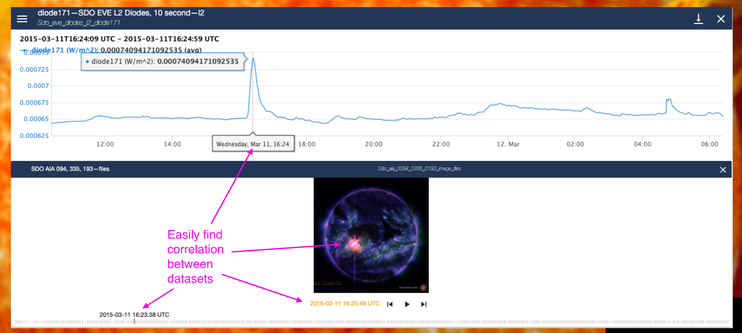


- Available, Subset, and Selected levels of control to ease choosing timeframe (plus direct input)
- Events placed on timelines based on index values
- Tools for filtering and searching over datasets



Detailed metadata including attribution of providers allowing end user to "deep dive"

Ability to overlay datasets in different scales, zoom in (click and drag) for detailed analysis, and pan to other segments



Easily find correlation between datasets

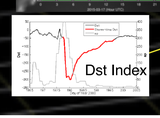
Measurement/ Modelling System

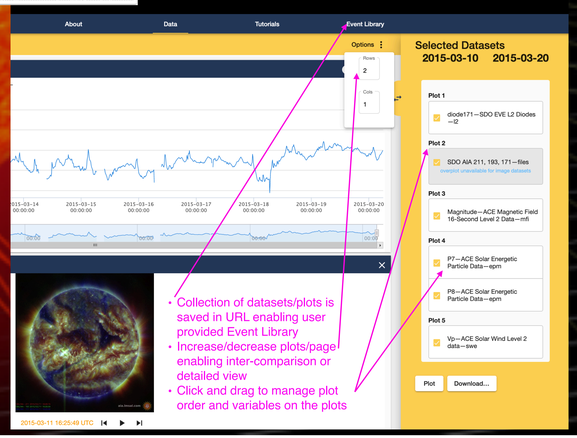
Data Provider

SWx TREC Data Portal lasp.colorado.edu/space-weather-portal provides the ability to discover, learn about, plot, and download space weather datasets to describe a space weather event.

These datasets show the event:

- occurring on the Sun (SDO EVE and AIA)
- generating energetic particles and increased solar wind between Sun and Earth (ACE and Van Allen)
- affecting Earth's atmosphere (GRACE-A) and magnetic field (Magnetometer and Model data)

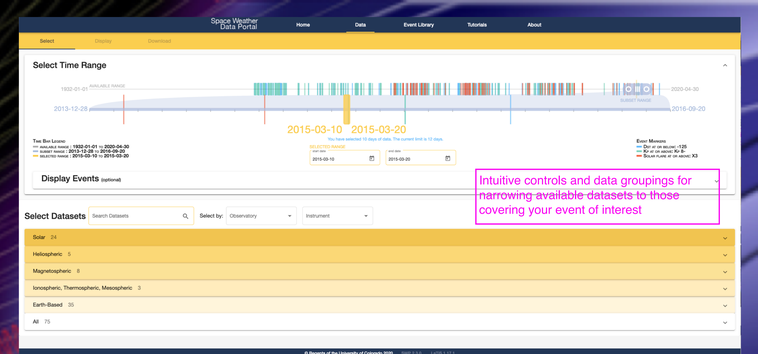




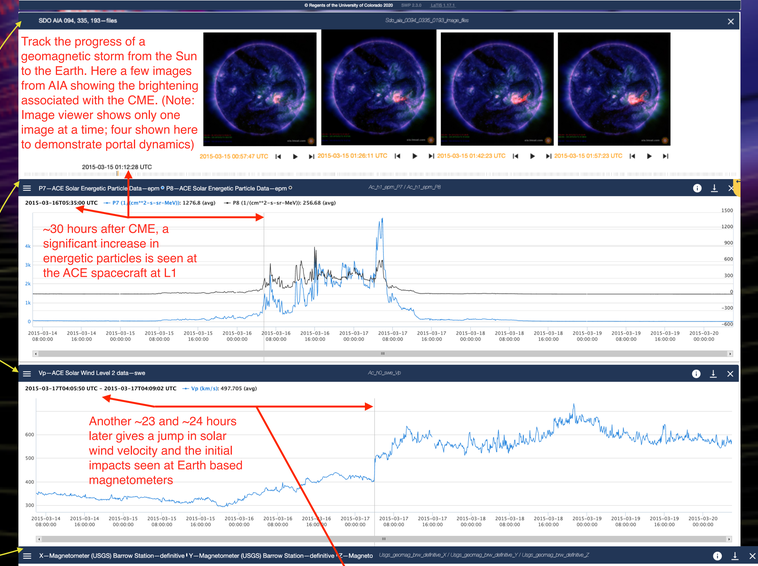
- Collection of datasets/plots is saved in URL enabling user provided Event Library
- Increase/decrease plots/page enabling inter-comparison or detailed view
- Click and drag to manage plot order and variables on the plots

Going forward, we will continue to:

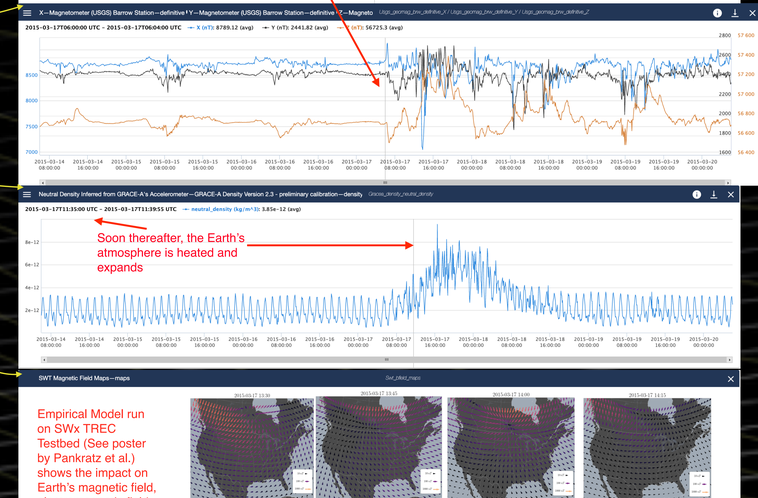
- reach out to data providers to add datasets
- extend the sources and types of datasets
- provide for download of selected subsets in additional formats, including code snippets for programmatic access
- perform usability testing to guide design
- expand the metadata offerings
- further integrate with the SWx TREC testbed environment (see poster by Lucas et al.)
- add events to the library



Intuitive controls and data groupings for narrowing available datasets to those covering your event of interest



Track the progress of a geomagnetic storm from the Sun to the Earth. Here a few images from AIA showing the brightening associated with the CME. (Note: Image viewer shows only one image at a time; four shown here to demonstrate portal dynamics)



Another ~23 and ~24 hours later gives a jump in solar wind velocity and the initial impacts seen at Earth based magnetometers

~30 hours after CME, a significant increase in energetic particles is seen at the ACE spacecraft at L1

Soon thereafter, the Earth's atmosphere is heated and expands

Empirical Model run on SWx TREC Testbed (See poster by Pankratz et al.) shows the impact on Earth's magnetic field, electromagnetic field, and power grid

Van Allen Probes show flushing of electrons from the belts followed by significant influx afterward

As part of the University of Colorado's Space Weather Technology, Research, and Education Center https://www.colorado.edu/spaceweather/, (SWx TREC), we are pleased to announce the public release of the Space Weather Data Portal https://lasp.colorado.edu/space-weather-portal to provide unified and highly interactive access to disparately located and formatted datasets. This tool intends to help close the Research to Operations (R2O) and Operations to Research (O2R) gaps by lowering the barrier to space weather data access and visualization. This poster shows a subset of the currently available datasets and data providers which together exemplify the 2015 St. Patrick's Day storm as it makes its way from Sun to Earth (red). The poster also shows the **highly interactive** capabilities offered by the Space Weather Data Portal (purple).

Built on LaTiS
https://github.com/latis-data/latis