The Helioviewer Project

Helioviewer.org: Enhanced Solar and Heliospheric Data Visualization

Project Overview

The Helioviewer Project is an open-source effort to provide simple and intuitive interfaces to solar datasets in service of both the scientific community and the general public.

The Project is comprised of:

- **Helioviewer.org**: Web app, embed client, & public API
- **JHelioviewer**: Java/OpenGL desktop client application
- **ESA JPIP Server**: FP2 & JPA streamer
- **JPGen**: FITS to JPEG2000 converter

This poster highlights the latest enhancements to the web client application and the public API.

Visit our beta site to explore new features and data sets.

http://aas.helioviewer.org/

We encourage your feedback, bug reports, code contributions, data source requests, and feature requests:

- contact@helioviewer.org
- http://launchpad.net/Helioviewer

Interactive Data Coverage Timeline

Introduction

The new Data Coverage feature demystifies the availability of image data sets on Helioviewer.org. This interactive timeline helps you visualize the distribution of available images for each selected data layer, providing an intuitive way of browsing sparse data sets of sub-field images, or simply understanding which missions overlap during a time period of great interest.

Binned View

Each data layer selected for display in the image Viewport is represented as a series in a stacked histogram plotted on the Timeline. The number of available images per data set is summarized into bins of a discrete duration such as a day or an hour. Zooming in decreases the size of each bin, providing a finer-grained look into the availability of data.

Individual Images View

Zooming the histogram beyond a bin resolution of 30 minutes switches the Timeline into a un-binned mode where images are plotted individually along the timeline. Each data layer is given it's own color-coded row, and each image as a point on a 1-dimensional scatter plot.

Interactivity

Use the discrete zoom buttons to display a 1 hour, 1 day, 1 week, or 1 month portion of the timeline. Or click and drag within the plot area to select an arbitrary zoom window. Use the navigator below the plot area to scroll forwards or backwards in time.

Mouse-over a histogram column for a textual display of the number of images available for each dataset within the selected time period.

Double-click a histogram column to zoom the chart to display that particular time range in finer detail. Once zoomed in far enough to reveal individual images, double-clicking on one will update the image Viewport to display that exact date and time.

Show or hide individual layers by toggling its label in the key.

Future Timelines

We are planning timeline-based interfaces to other data sets such as HEK Solar Features and Events as well as interactive plots of spectra and other non-image based science data.

Public API Improvements

Advanced users and software developers can access the same data used by the official web and desktop clients via our Public API:

http://helioviewer.org/api/

Our documentation has been greatly expanded, now covering all available API endpoints. For each API a detailed listing of required and optional parameters is provided, along with parameter descriptions, example requests, and example responses.

Integration with open source libraries for Python, PHP, Java, Ruby, Objective-C, Node.js, .NET, and Windows 8 help get your project off the ground much more quickly than ever before.

Science Data Download Scripts

A new capability of the Helioviewer Project web client is a science data downloader.

Solar physicists can generate a custom script that will request the original science-quality data files form the Virtual Solar Observatory (VSO), SDO AIA Cut-out Service, and the Heliophysics Event Knowledge-base (HEK).

Science data download scripts can be generated in either Python/ Sunpy format, or IDL/SolarSoft format.

The content of scripts is customizable and is based on the state of the web client's Viewport.

Specify a time range to fetch all the data associated with one or more solar features or events.

New Image Data Set Support

**HINODE XRT**

Full-disk images from the Hinode X-Ray Telescope (XRT) from 2006 to the present is available on the beta site. XRT provides 2 arc-sec images of coronal material from 1 million to 10 million Kelvin.

**TRACE**

8.6\(\times\)8.5 field-of-view images from TRACE of the photosphere, transition region, and corona are available on the beta site. TRACE mosaic support is also planned.

**YOHKOH SXT**

Support for full-disk images from the Yohkoh Soft X-ray Telescope (SXT) instrument was added to Helioviewer.org in February, 2013.

SXT imaged X-rays in the .25-4.0 KeV range. Imagery is available from the thin aluminum filter (thin-Al) and the aluminum-magnesium-manganese filter (AlMgMn) from September 1991 to December 2001. White-light images are available up to November 1992.