

Substorm Zoo

A browser-based tool for science and social data analysis

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Why Zoo?

The web site is called Substorm Zoo, because the aim is to present events in a variety of data series. In a sense, these events are the animals of heliospheric wild life. Hence the zoo.

The goal of the SZoo

Substorm Zoo provides a browser-based tool for time-series analysis of data. Particular interest is in the identification of geo-effective and other space weather structures.

The web site enables the social data analysis by providing a possibility to create discussion groups, share event lists, upload own events, share the comments to the data etc.

Szoo tools

- Browser-based **data analysis** canvas for space weather and space climate time scales data.
- **Real-time Dashboard** for solar storm and space weather monitoring.
- **Event catalogues** from solar, solar wind and ground-based data.
- **Social data analysis tools** e.g. discussion groups, file upload/download, customized views, public/private options, user pages.
- **LabNotebook** and historical events for education and public outreach.
- MANY MANY MORE FEATURES...

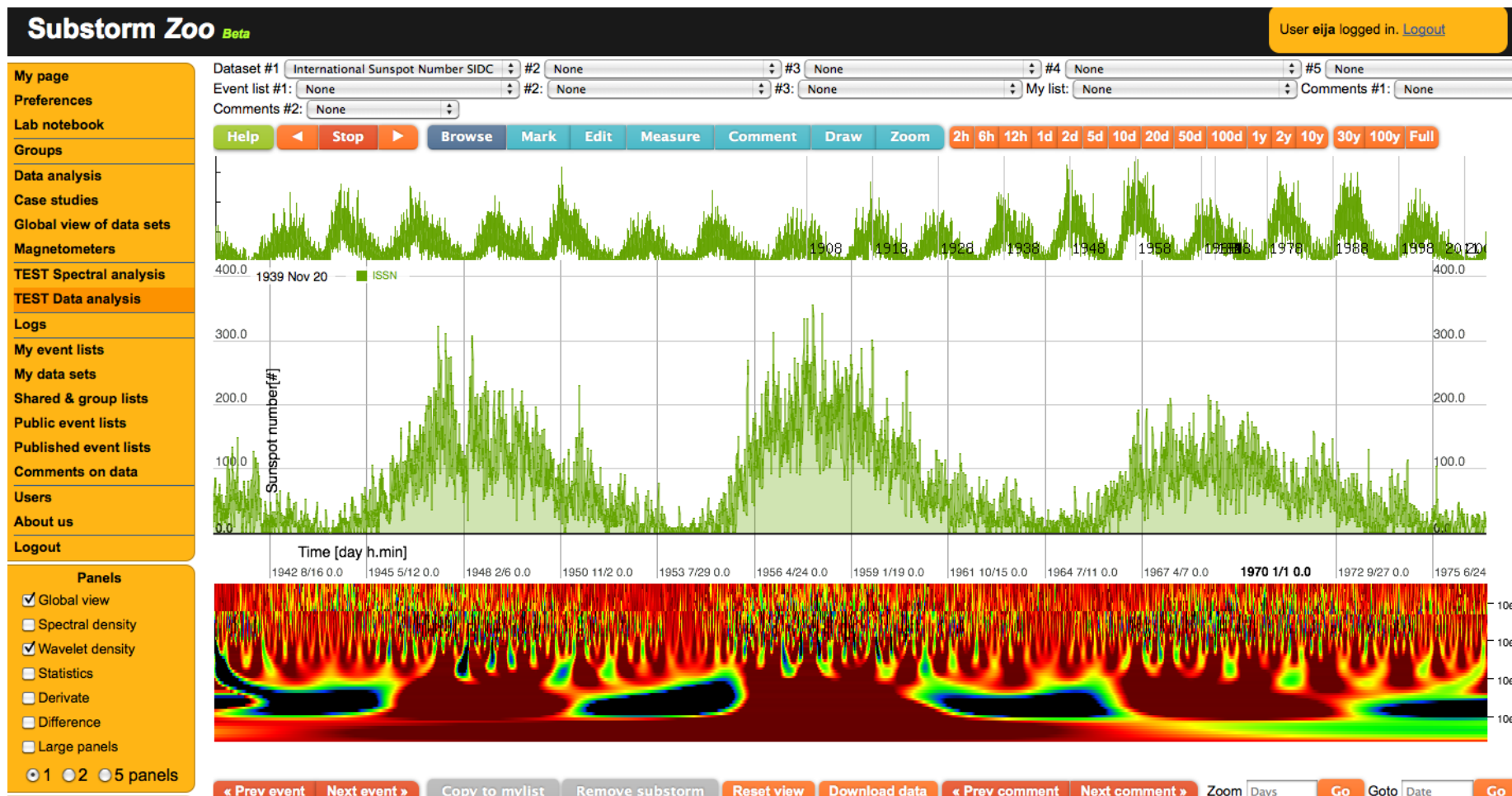
Browser-based data analysis tools



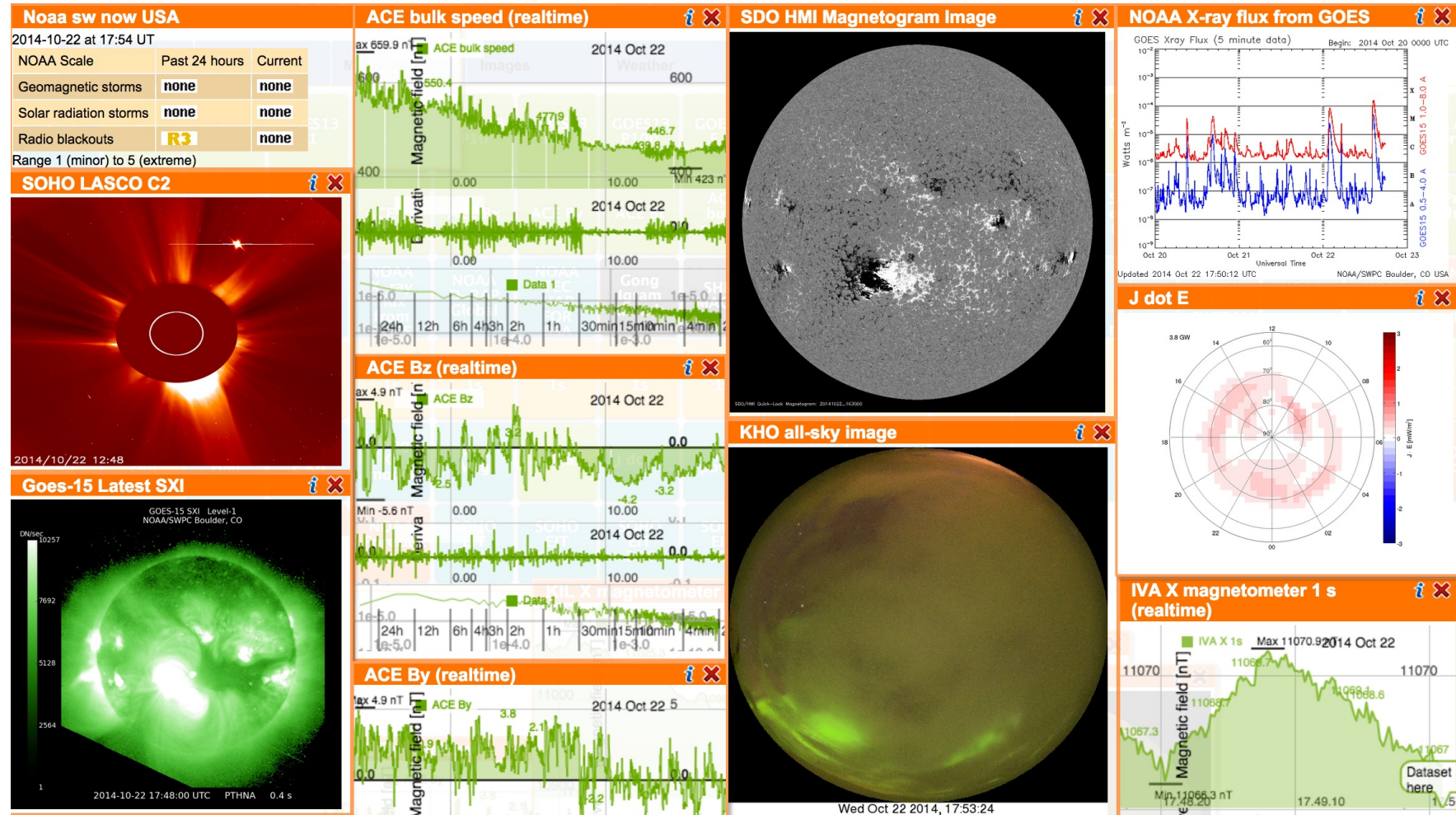
Easy comparison of data



Powerful online analysis methods



Dashboard for real-time data



Event catalogues and statistical tools

Choose list	Figure list	Text list	Most liked
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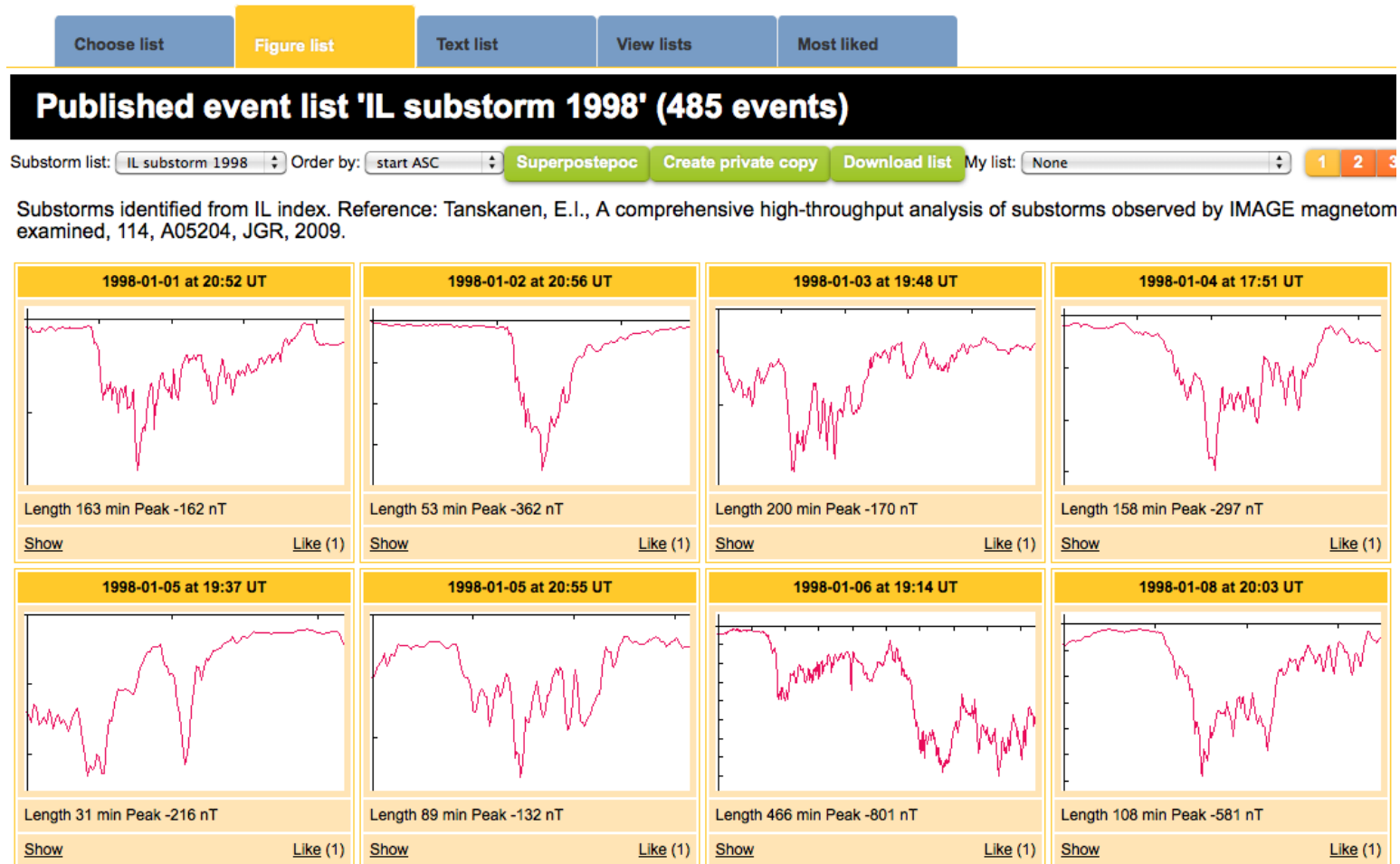
Published list 'IL substorms2003' (699 events)

List: IL substorms2003 Display: 100 Download list Create private copy Superpostepoc My list: ClusterNSC03_05il 1 2 3 7 Next page

Substorms identified from IL index. Reference: Tanskanen, E.I., A comprehensive high-throughput analysis of substorms observed by IMAGE magnetometer network: years 1993 - 2003 examined, 114, A05204, JGR, 2009.

ID	Start date	Start (UT)	Onset (UT)	Peak (UT)	End (UT)	Length (min)	Start value (nT)	End value (nT)	Peak value (nT)	Drop value (nT)	Type	Likes	Actions
14564	2003-01-01 at 20:09 UT	20.09	20.27	23.22	00.40	271	-11	-86	-447	88	0	Show	Copy to mylist Like
14565	2003-01-02 at 23:21 UT	23.21	23.43	00.10	01.35	134	-23	-46	-233	86	0	Show	Copy to mylist Like
14566	2003-01-03 at 16:00 UT	16.00	16.05	16.19	17.30	90	-122	-178	-905	83	0	Show	Copy to mylist Like
14567	2003-01-03 at 19:52 UT	19.52	20.36	20.46	22.56	184	-35	-107	-571	84	0	Show	Copy to mylist Like
14568	2003-01-03 at 23:14 UT	23.14	23.19	01.22	03.00	226	-56	-164	-595	84	0	Show	Copy to mylist Like
14569	2003-01-04 at 16:02 UT	16.02	16.25	16.52	17.23	81	-91	-62	-319	82	0	Show	Copy to mylist Like
14570	2003-01-04 at 18:46 UT	18.46	19.03	19.38	20.46	120	-55	-98	-498	90	0	Show	Copy to mylist Like
14571	2003-01-04 at 21:53 UT	21.53	22.23	23.25	02.12	259	-26	-57	-287	81	0	Show	Copy to mylist Like
14572	2003-01-05 at 20:05 UT	20.05	20.16	21.45	22.21	136	-62	-97	-527	81	0	Show	Copy to mylist Like
14573	2003-01-06 at 21:11 UT	21.11	21.43	22.32	23.57	166	-11	-74	-374	82	0	Show	Copy to mylist Like
14574	2003-01-07 at 17:48 UT	17.48	18.04	18.25	19.09	81	-44	-95	-528	81	0	Show	Copy to mylist Like
14575	2003-01-07 at 20:38 UT	20.38	21.05	22.11	22.50	132	-8	-34	-177	83	0	Show	Copy to mylist Like
14576	2003-01-08 at 21:29 UT	21.29	21.39	21.54	23.14	105	-21	-25	-127	93	0	Show	Copy to mylist Like
14577	2003-01-10 at 17:47 UT	17.47	18.12	23.37	00.53	426	-49	-84	-442	90	0	Show	Copy to mylist Like
14578	2003-01-11 at 2:23 UT	02.23	02.48	02.58	03.00	37	-30	-196	-216	84	0	Show	Copy to mylist Like

Libraries of pre-identified events



Social data analysis tools

Substorm Zoo BetaUser eiija logged in. [Logout](#)

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Photo missing

[Hulda Fadnes](#) joined group AGF345_2011
1 month ago

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[PHYS352 Student 3](#)
1 month ago
wrote comment 'What has happened here?' on [dataset IL-indeksi 2000 at 16066341](#).

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Photo missing

[Christine Johnsen](#)
1 month ago
According to the all sky cameras, there were som aurora around 19 UT last evening, and later that night around 4 o'clock. The magnetometer measurements show the first event as a strong drop in the H component in Longearbyen, and later in the magnetometers further south. The event later that night is not so easy to detect from the magnetometer measurements.

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[PHYS352 Student 3](#) likes this update.
1 month ago

Photo missing

[Christer van der Meeren](#)
1 month ago
wrote comment 'Difference between IL and AL is often largest outside of the substorms; AL surpasses IL here. This is natural since IL is only local, while AL is a global index.' on [dataset IL-index 1999 at 15263112](#).

like · [send a message](#) · [comment](#)

Photo missing

[PHYS352 Student 3](#)
1 month ago
UiB student

like · [send a message](#) · [comment](#)

Photo missing

[Christine Johnsen](#) joined group AGF345_2011
1 month ago

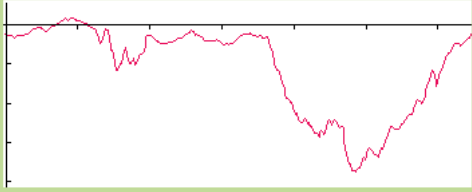
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Status

Visit to Ann Arbor University 12.-19 Dec, 2011


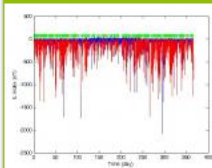

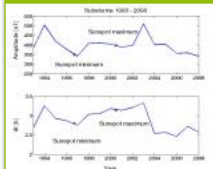


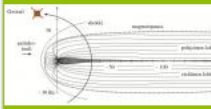


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Random event



Random event from [IL substorms1999](#) 1999-08-09 [Show »](#)

Discussion groups

Case5nov2001 (Owner) Examines the spacecraft charging on 5th Nov 2001.	Guo_etal_study (Owner) Statistical substorm study in IMAGE UT-sector.	Bugs Squash the bugs! 	Workshop13April (Owner) Workshop on 13th April 2012 at FMI about data analysis of magnetic measurements.	Elja's test group (Owner) No description 	COST TOSCA (Owner) A discussion group for COST ES-1005 action called TOSCA.	HISSI FMI (Owner) Academy project HISSI	Science questions (Owner) A set of science questions
Aalto space weather (Owner) Basics of space weather and observational methods.	Thierry's group (Owner) This group is intended for educational purposes in University of Orleans.	Jim's group (Owner) This discussion group is to generated to deliver science questions and tasks to the students. 	FP7_elja (Owner) Discussion about the FP7 project led by ET. 	Hands-on-data (Owner) Hands-on-data course during the COST School Sun2Climate. 	Sun2Climate_test (Owner) No description. Please update.	Russian community Discussion of the Substorm Zoo data. 	RamboRainbow Charades in the solar storms
Sun2climate school Discussion group of Sun2climate school	Space Climate/HY2013 (Owner) Avaruusilmasto Helsingin yliopistolla 2013 	NASA GSFC group (Owner) NASA Goddard SFC 	AGF-345 2013 (Owner) Substorm course in UNIS 				

LabNotebook for education

Substorm Zoo Beta

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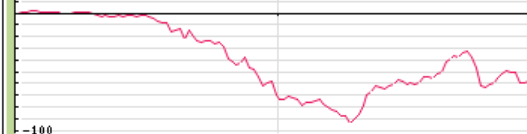
Logout

Lab notebook of Eija Tanskanen

Failed to log in on 2012-5-22 13:28.12.

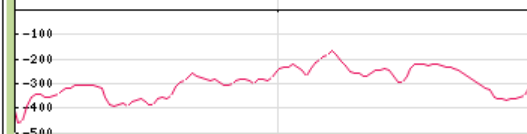
24 seconds ago (2012-05-22 13:28:17)

Wrote private comment "\What is this?" on dataset IL index at [1998-10-03 23:04](#).



1 hour ago (2012-05-22 12:21:45)

Wrote private comment "\Recovery phase of a large substorm.\" on dataset IL index at [2003-08-24 20:38](#).



1 hour ago (2012-05-22 11:49:59)

Failed to log in on 2012.5.21 13.49.19.

23 hours ago (2012-05-21 13:49:24)

Created a new event list [ClusterNSC03_05il](#).

6 days ago May 16, 2012 (2012-05-16 13:00:27)

Created a new event list [ICMEbegin96_2011il](#).

6 days ago May 16, 2012 (2012-05-16 12:57:48)

Created a new event list [ICMEbegin96_2011](#).

6 days ago May 16, 2012 (2012-05-16 12:57:06)

Created a new event list [ClusterNSC2005_sc1](#).

6 days ago May 16, 2012 (2012-05-16 12:16:07)

Created a new event list [ClusterNSC2004_sc1](#).

6 days ago May 16, 2012 (2012-05-16 12:13:53)

Created a new event list [Cluster_sc1](#).

6 days ago May 16, 2012 (2012-05-16 12:09:49)

Created a new event list [Cluster_test](#).

6 days ago May 16, 2012 (2012-05-16 11:32:30)

Wrote private comment "\Cluster neutral sheet crossing ends.\" on dataset IL index at [2004-10-15 15:52](#).

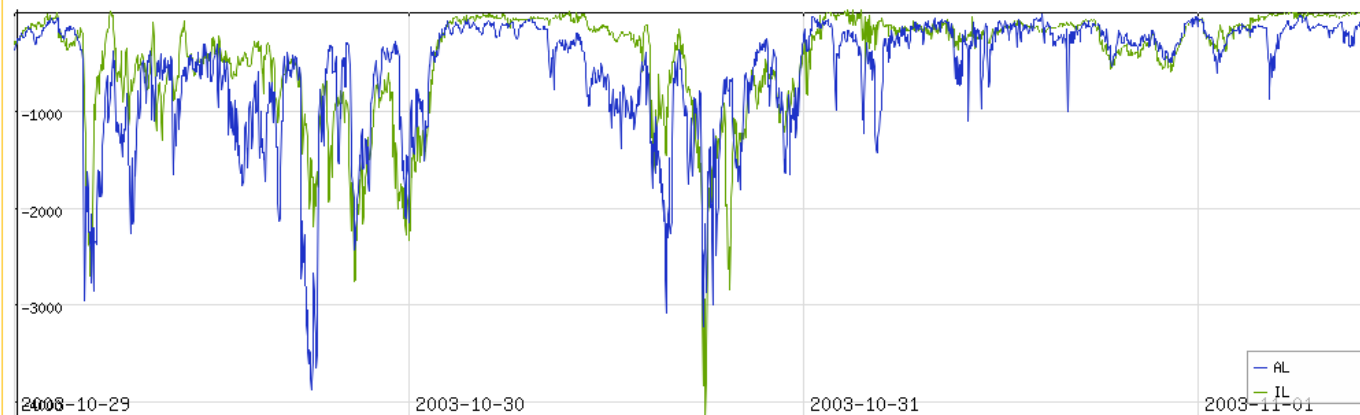


Historical events for public outreach

[Index comparisons](#)[Solar storms](#)[Historical events](#)[Educational](#)[Outreach](#)[Data issues](#)[Satellites](#)

Solar storms

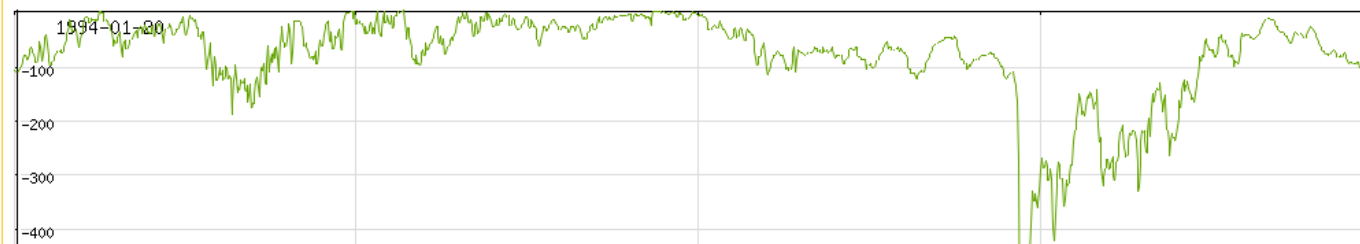
A few of the Solar storms in the observation history.



Halloween storms of 2003

Halloween storm on Oct 31, 2003 was a particularly significant event. Energetic storms began two to three years after solar maximum, when solar activity was on the decline. During this time few sunspots are visible, an outbreak of 17 major flares erupted on the sun.

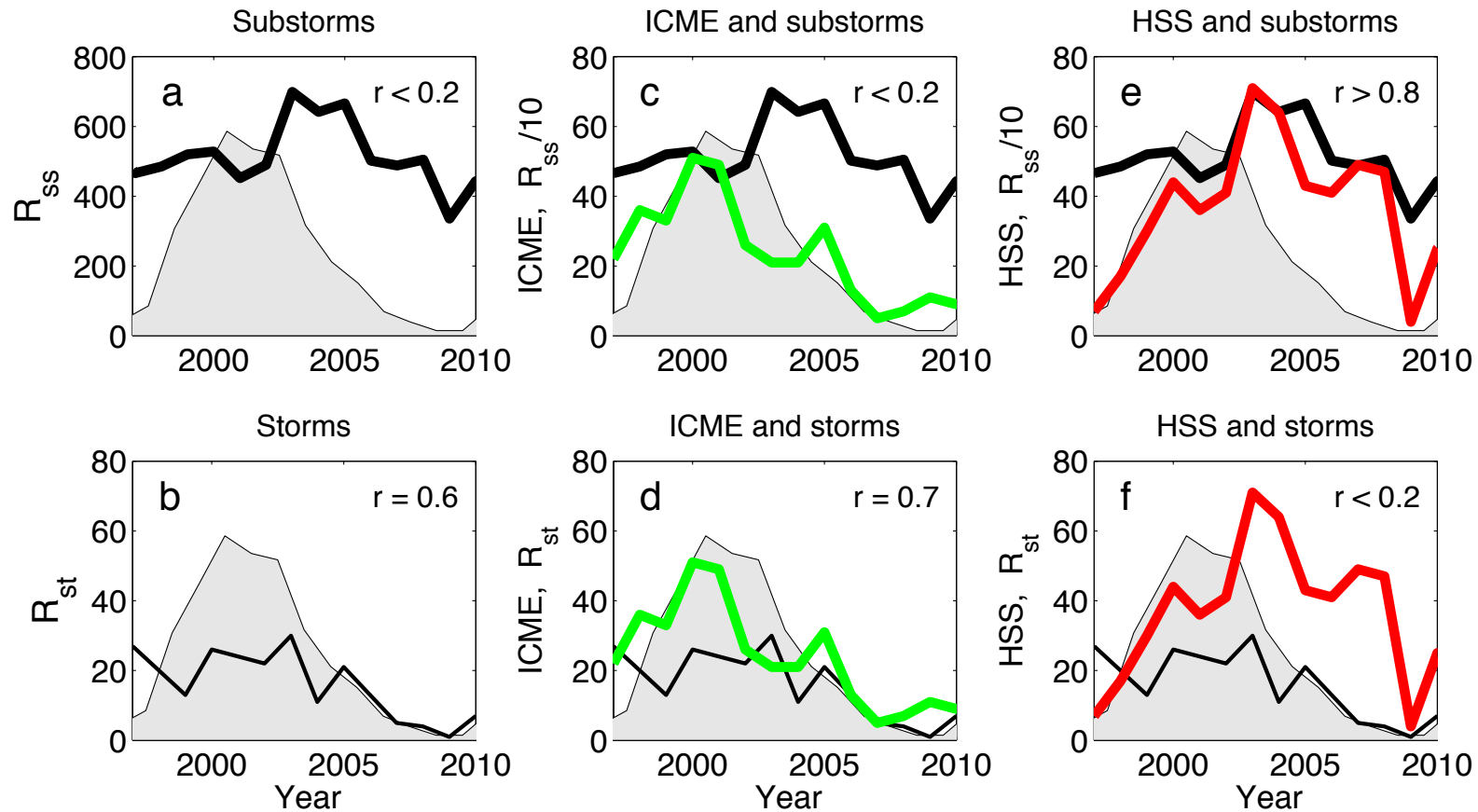
The flares caused the sun's magnetic field lines to stretch then suddenly snap like a rubber band stretched beyond its limit. The result was coronal mass ejections, enormous explosions on the sun's surface that can blast billions of tons of electrified gas and subatomic particles into space at speeds up to 5 million miles per hour. This 'space weather' can and does affect Earth.

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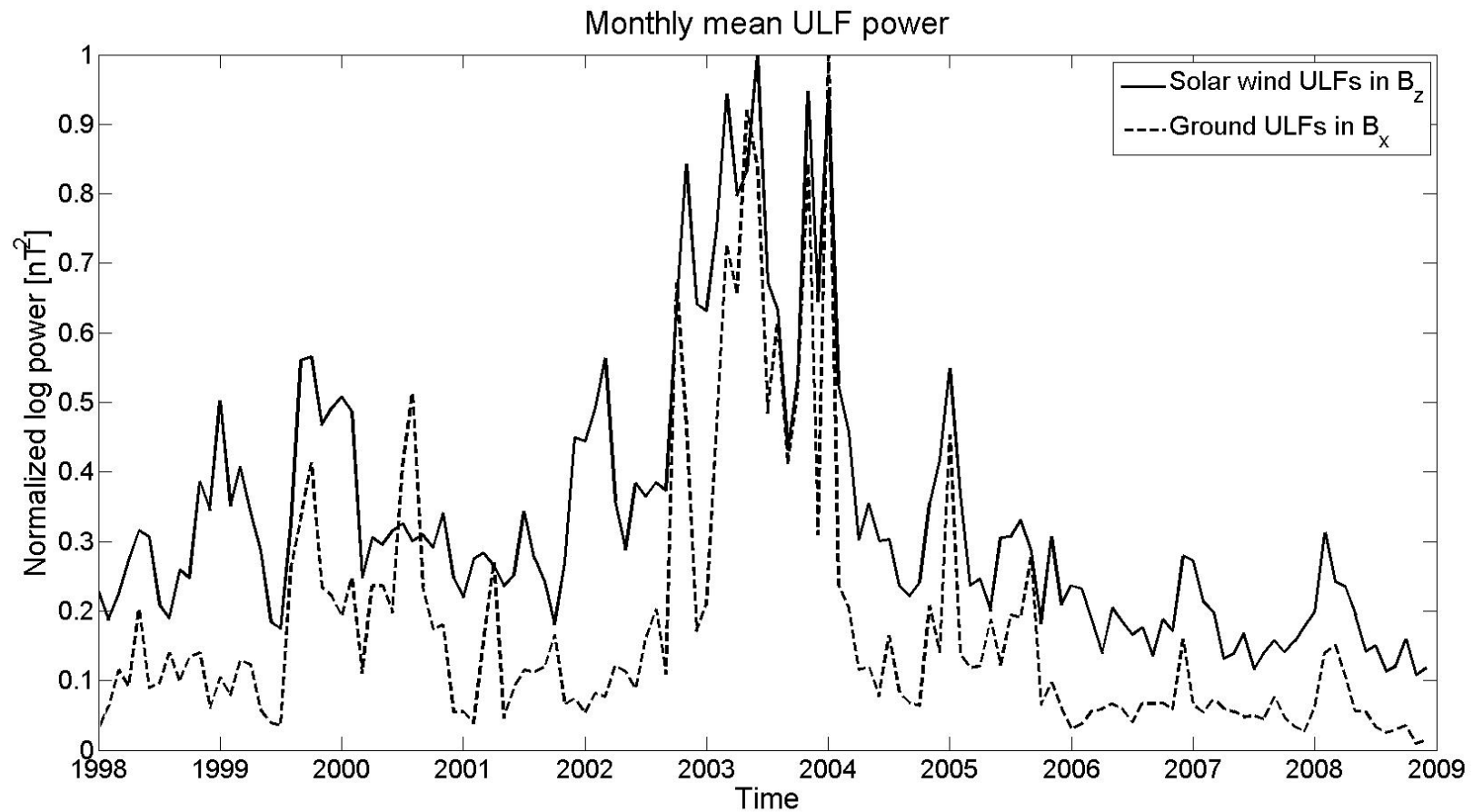
January 1994 Solar storm

January 20, 1994, a geomagnetic storm temporarily disabled two Canadian communication satellites, Aniks E1 and E2 and the international communication satellite Intelsat.

Science case 1: “low” resolution data



Science case 2: “high” resolution data



Welcome to Substorm Zoo

Our mission is to provide a best-in-class, browser-based tool for time-series analysis of data derived from magnetometer measurements, satellites and other instrument that provide time-series data of interest to the space science community. The aim is to provide a tool that is best suited for preliminary analyses, rapid data checks and comparisons of various data sets, not for all-encompassing comprehensive analyses.

In addition to data analysis, the website allows identification of important events in the data. The website is dedicated to the analysis of zoo of magnetospheric substorms and other meaningful events. For an account, please see [More information](#).

[To the login page!](#)

[More information](#)



<http://www.substormzoo.org>

www.substormzoo.org