Solar System data access and analysis with AstroGrid

Silvia Dalla

School of Physics & Astronomy,
University of Manchester, UK

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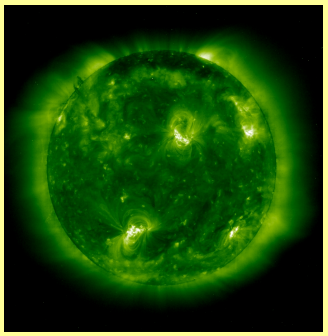
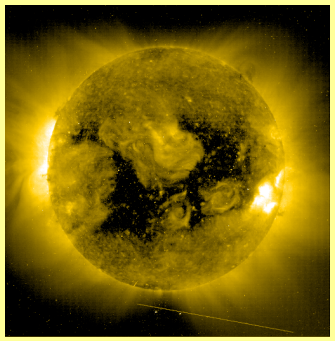
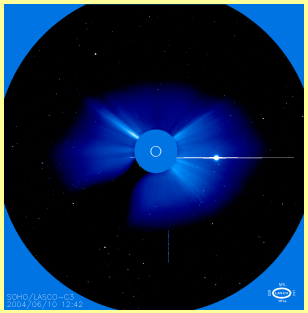
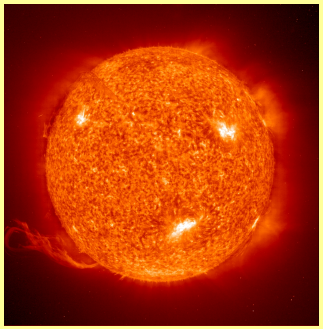
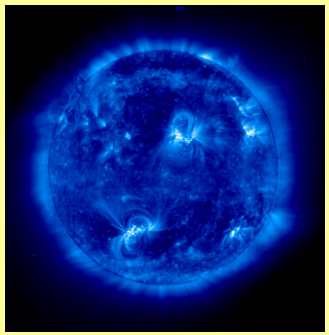
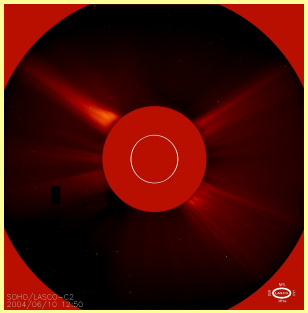
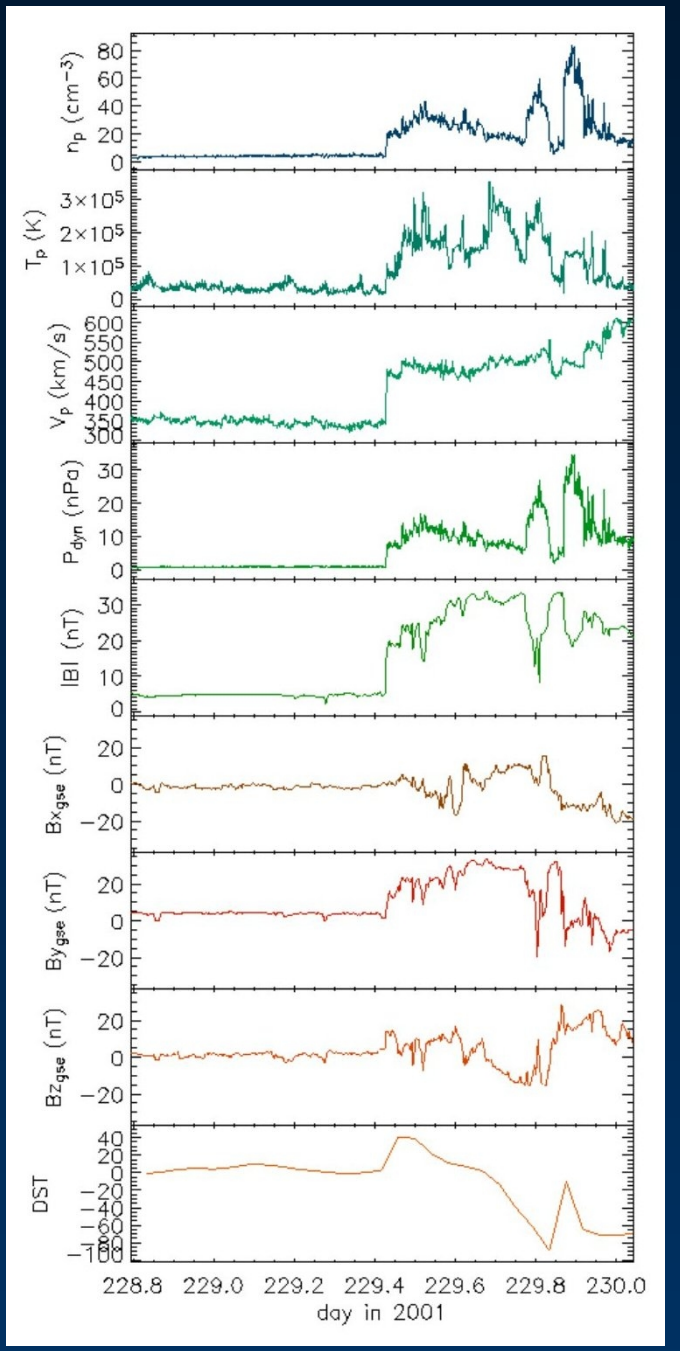
Solar System datasets

- From solar images to time series data
- Sun, planets, solar wind, near Earth space environment, …

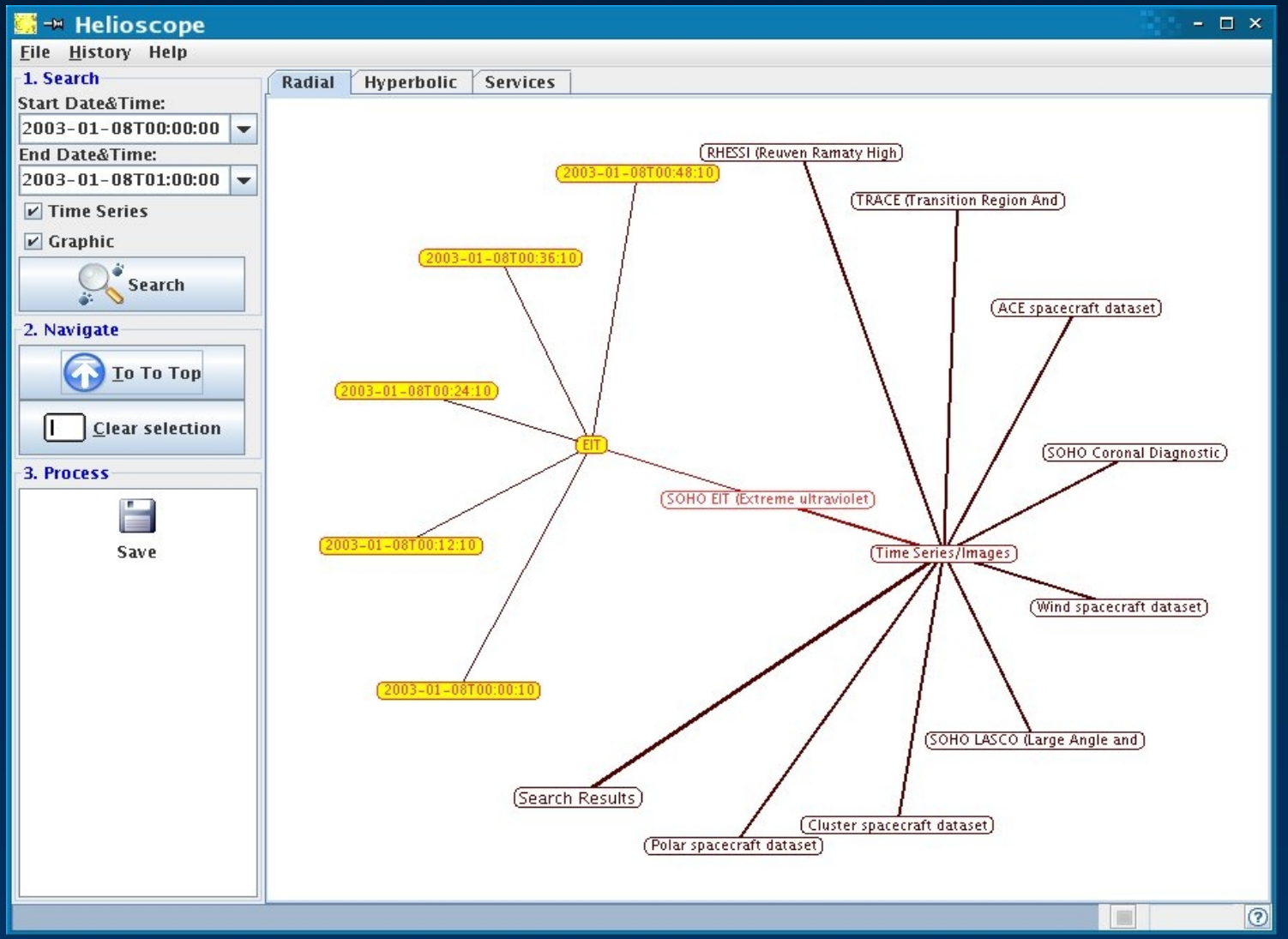


Objectives

- Facilitate data retrieval and analysis across traditional Solar System ‘boundaries’. See: HelioScope
- Make available easy-to-use science services. Eg: Solar Movie Maker application.
- Provide a framework for making models and applications available to the community. Feed real data as input to models.
- Allow users to develop their own science workflows (multi-instrument, large dataset work).

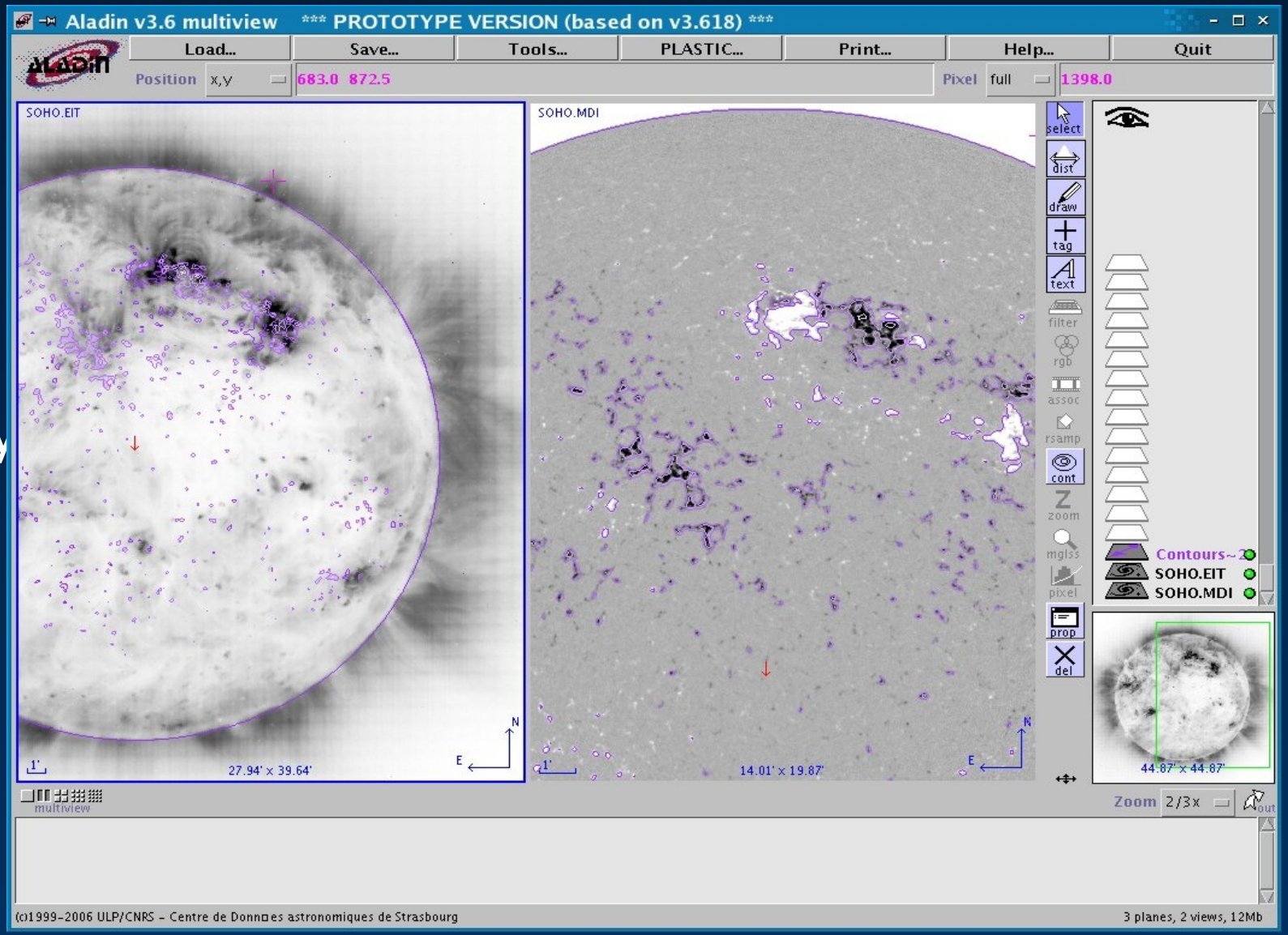
Data discovery: HelioScope

- Solar system is highly variable in time – time range query
- Solar data from Virtual Solar Observatory + Space Physics data from NASA CDAW



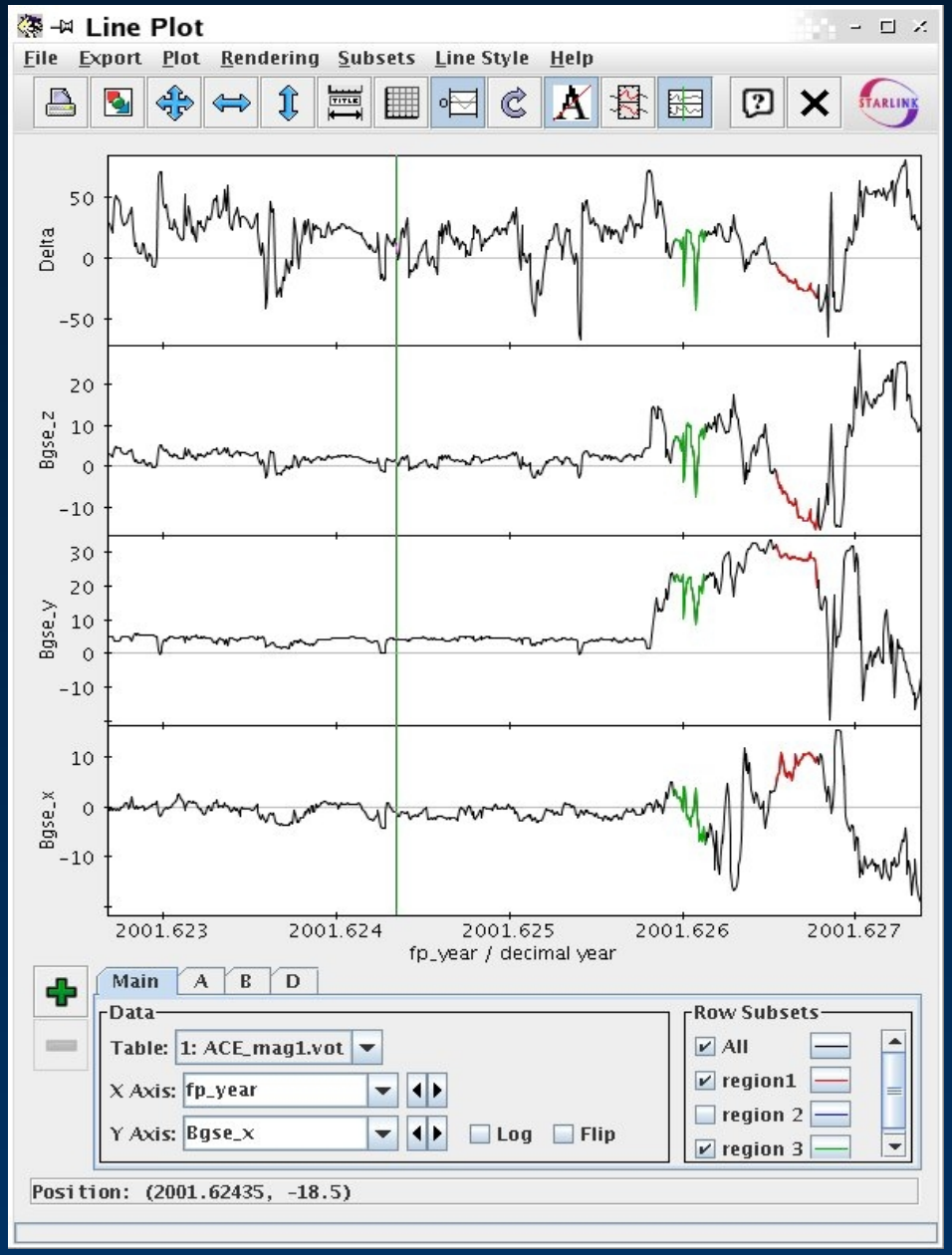
Solar image visualisation with Aladin

- PLASTIC allows streaming of images retrieved by HelioScope to Aladin



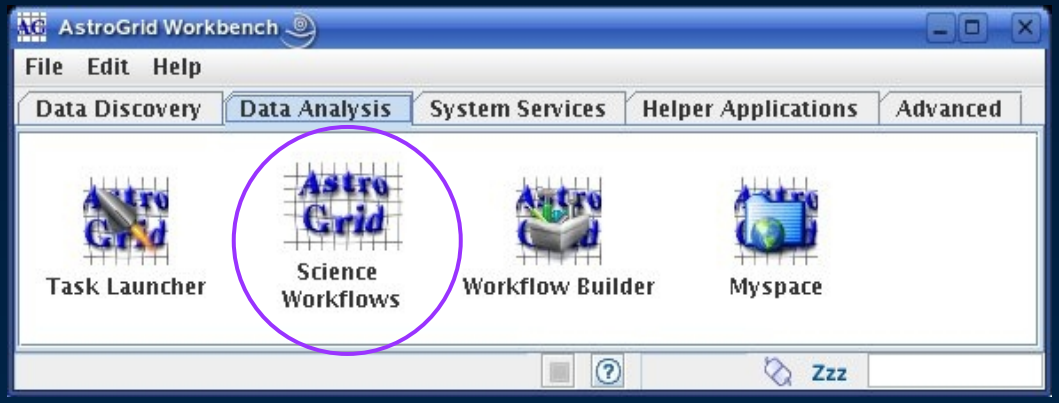
Topcat time series visualisation

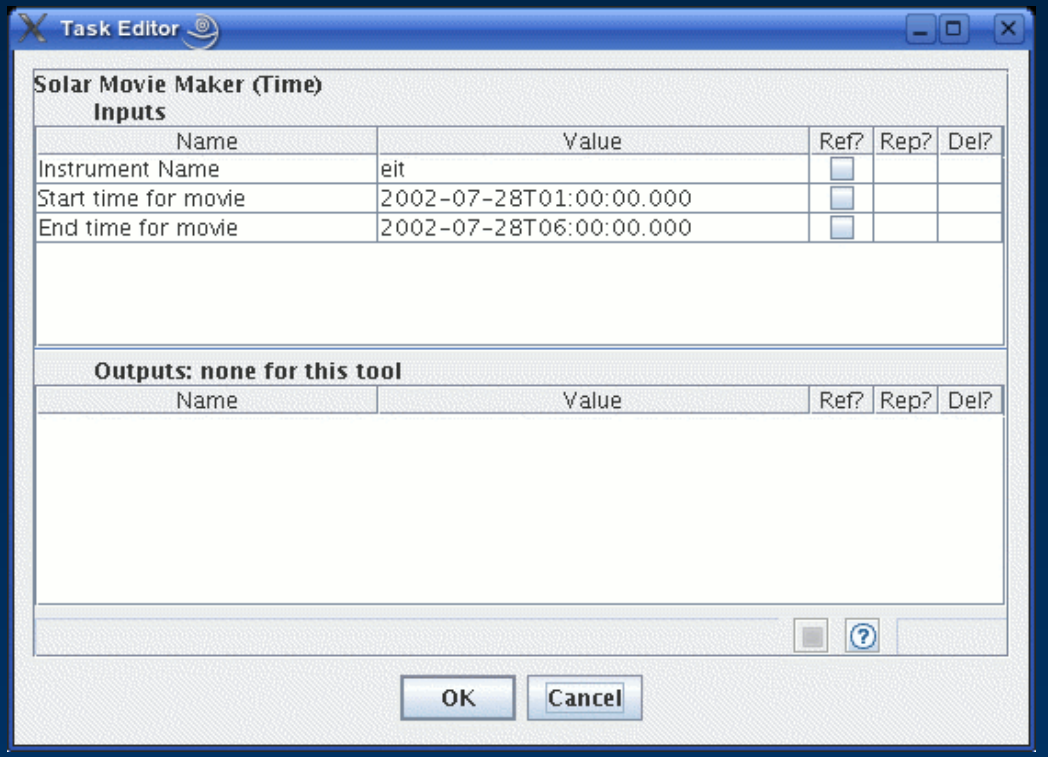
- Topcat stackplots
- Automatic conversion of ISO8601 strings to numeric



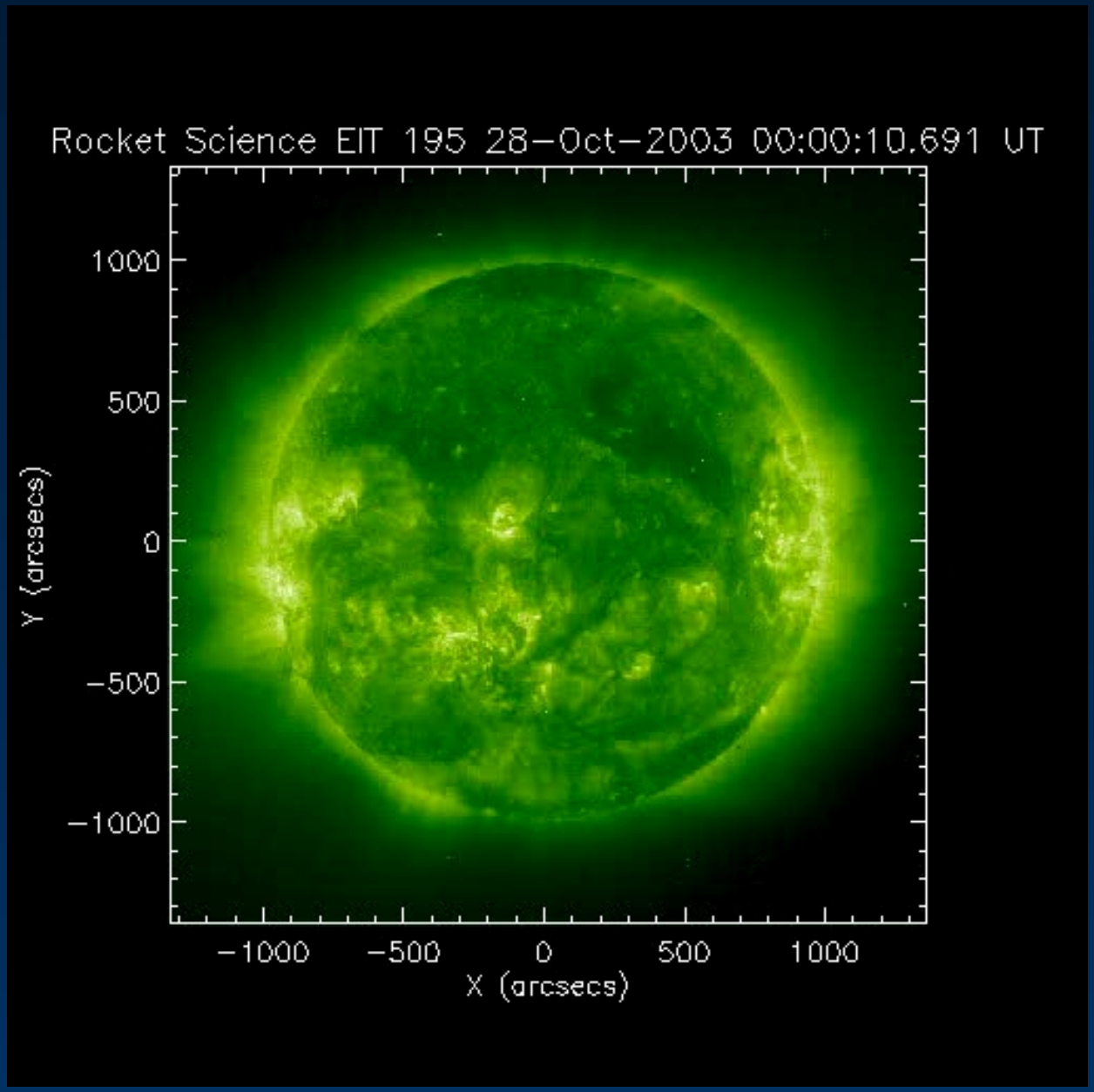
Solar Movie Maker

- Ready made workflow that retrieves solar images and combines them into a movie
- Based on capability to send an ADQL query to database of solar observations (via AstroGrid DSA)+ run movie maker CEA application





Output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0
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Y (arcsecs)
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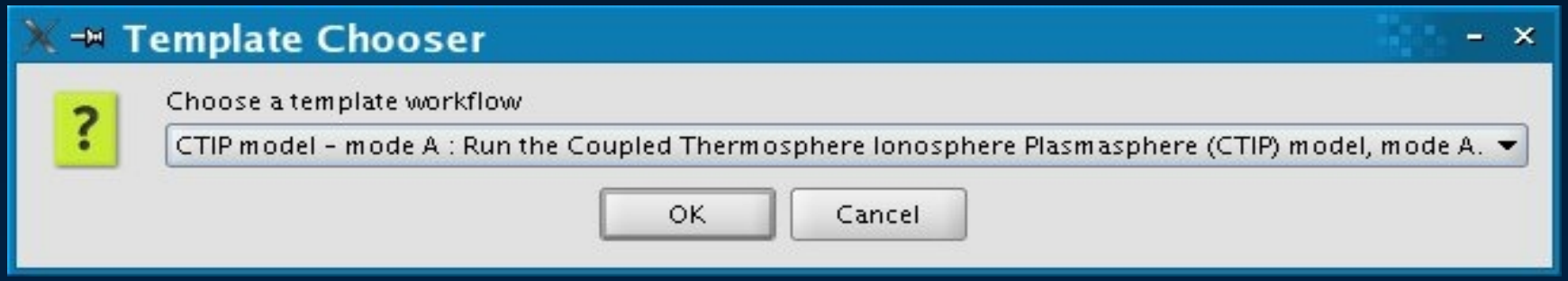
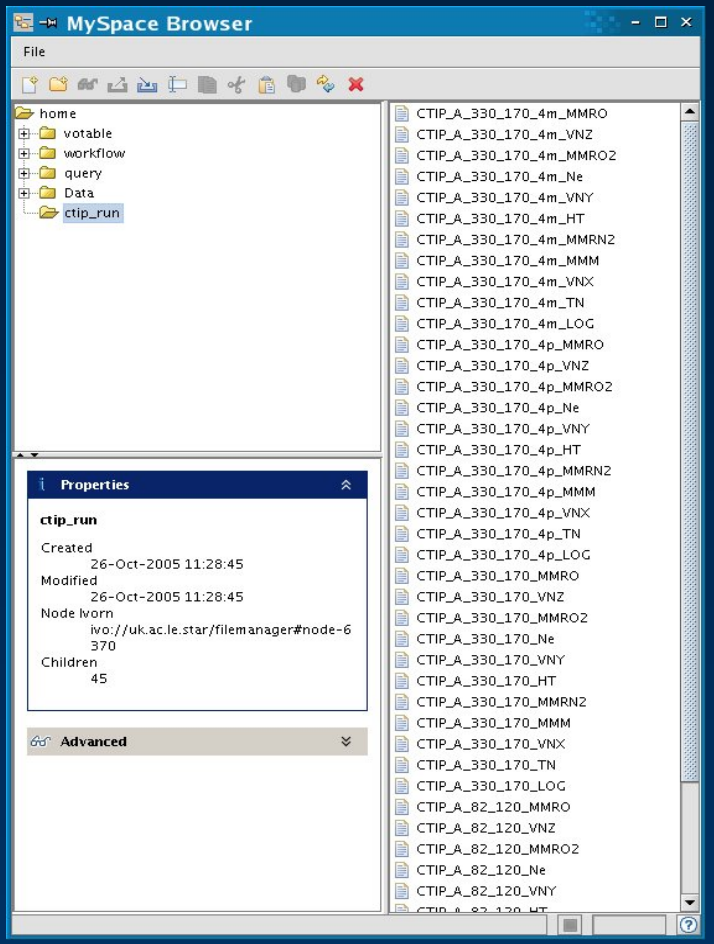
CTIP model

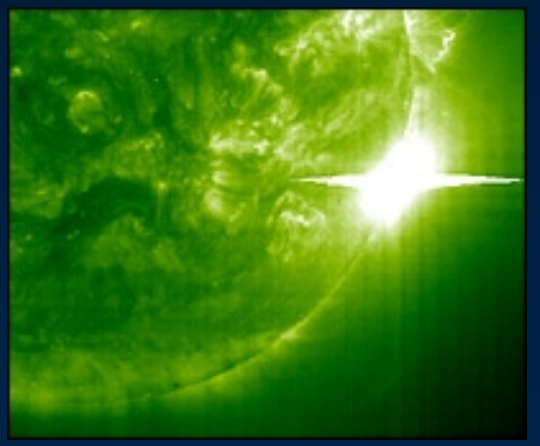


- CTIP (Coupled Thermosphere Ionosphere Plasmasphere) model, Atmospheric Physics Lab, UCL
- Data retrieved from database query is passed as input to the model
- AstroGrid as the means by which model is made available to community
- Output files returned in user's VOSpace

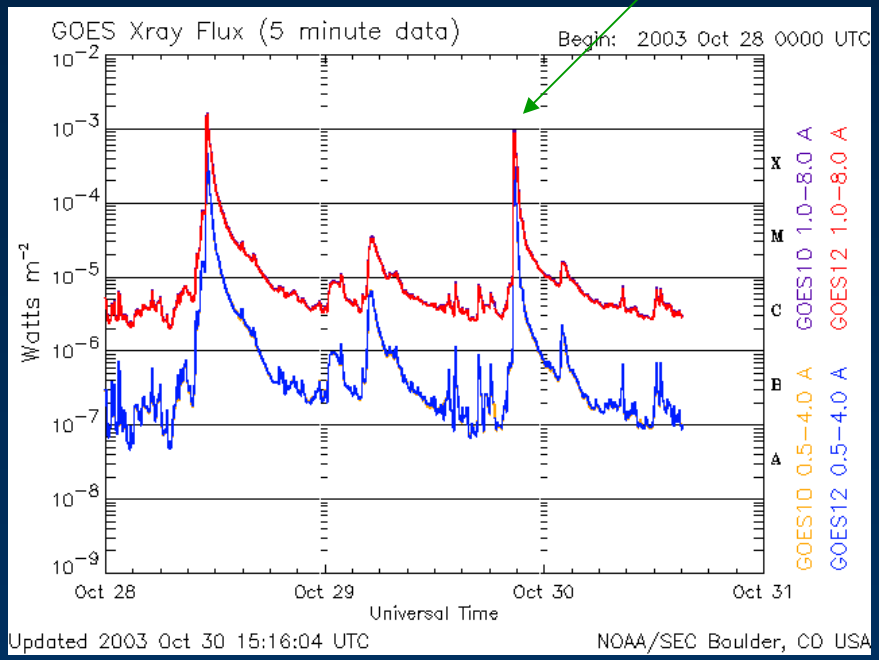


Solar events

- A variety of events, eg solar flares, coronal mass ejections, filament eruptions etc
- Need to follow up initial solar event observations – IVOA VOEvent
- In addition: need to retrieve data from archives *by event*
- Time-cross matching of events observed by several instrument

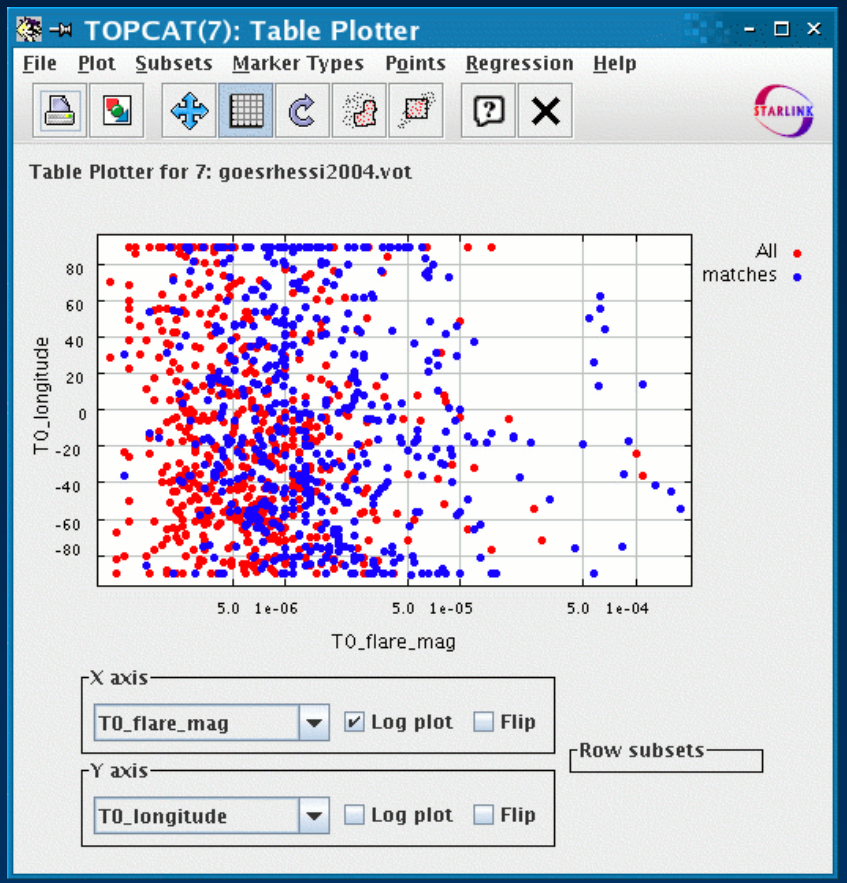


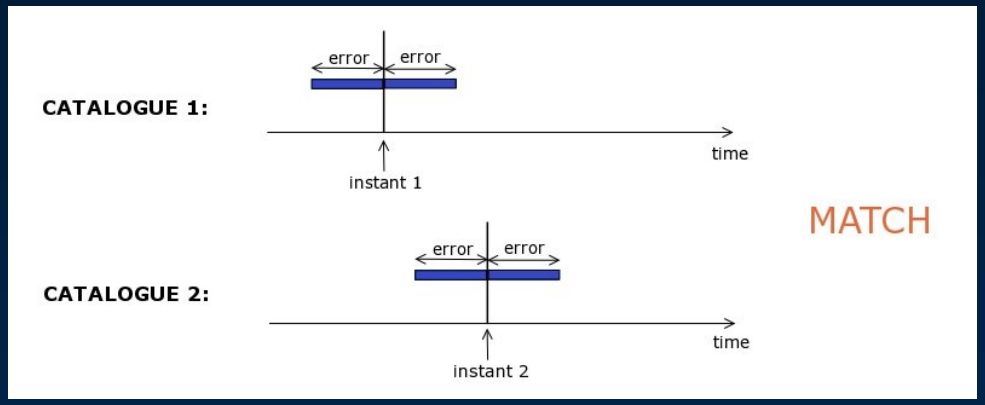
Solar flare

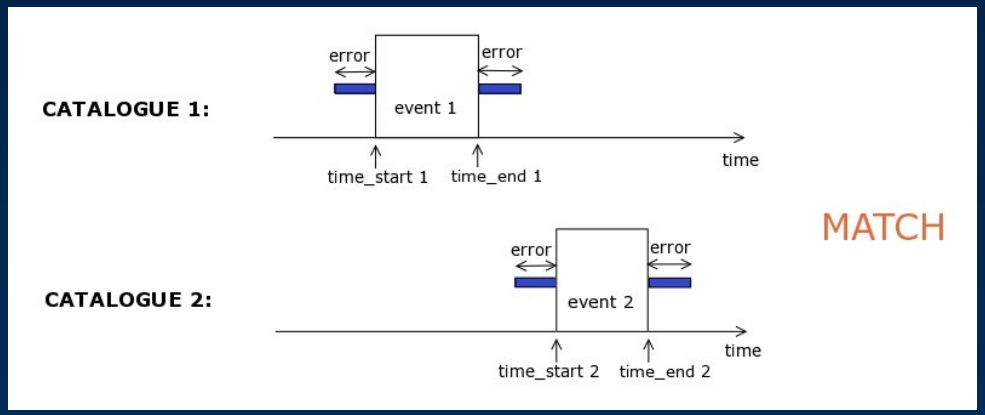


Cross matching on time

- 1D cross matching either for time instants or intervals







Conclusions

- Several VO tools are being developed for accessing and analysing Solar System data
- Definition of standards friendly to solar system data, eg data access protocols that allow specification of the coordinate system, etc
- Interaction with Astronomy community very positive – where possible use common tools and standards
- Overlap with time-domain work within Astronomy