Solar System data access and analysis with AstroGrid

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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
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, e.g., 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 instruments.
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