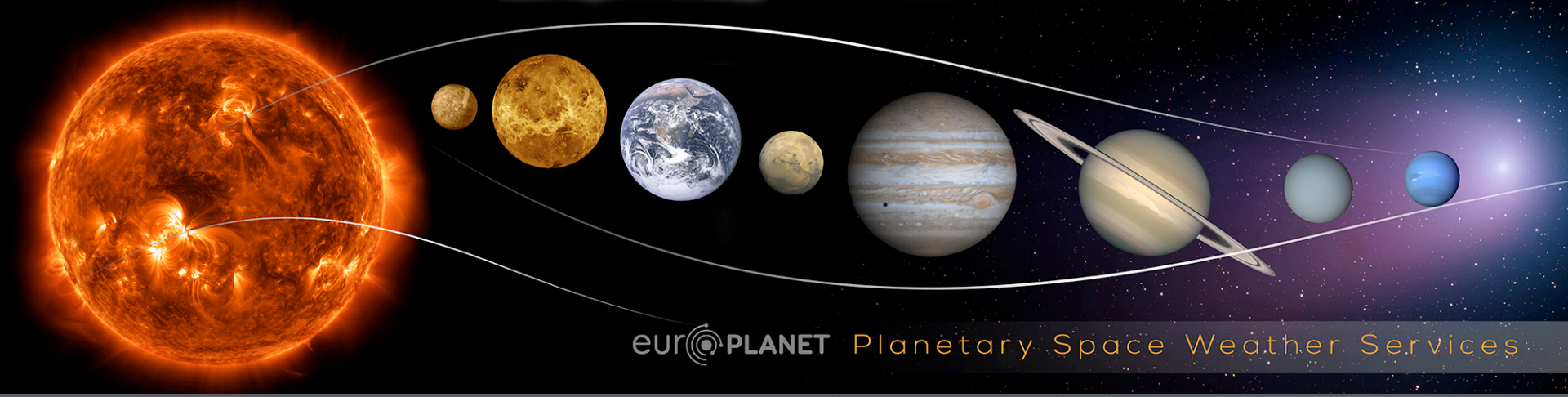

Extensions of the CDPP/Propagation tool to the case of comets, giant planet auroral emissions, and catalogues of solar wind disturbances

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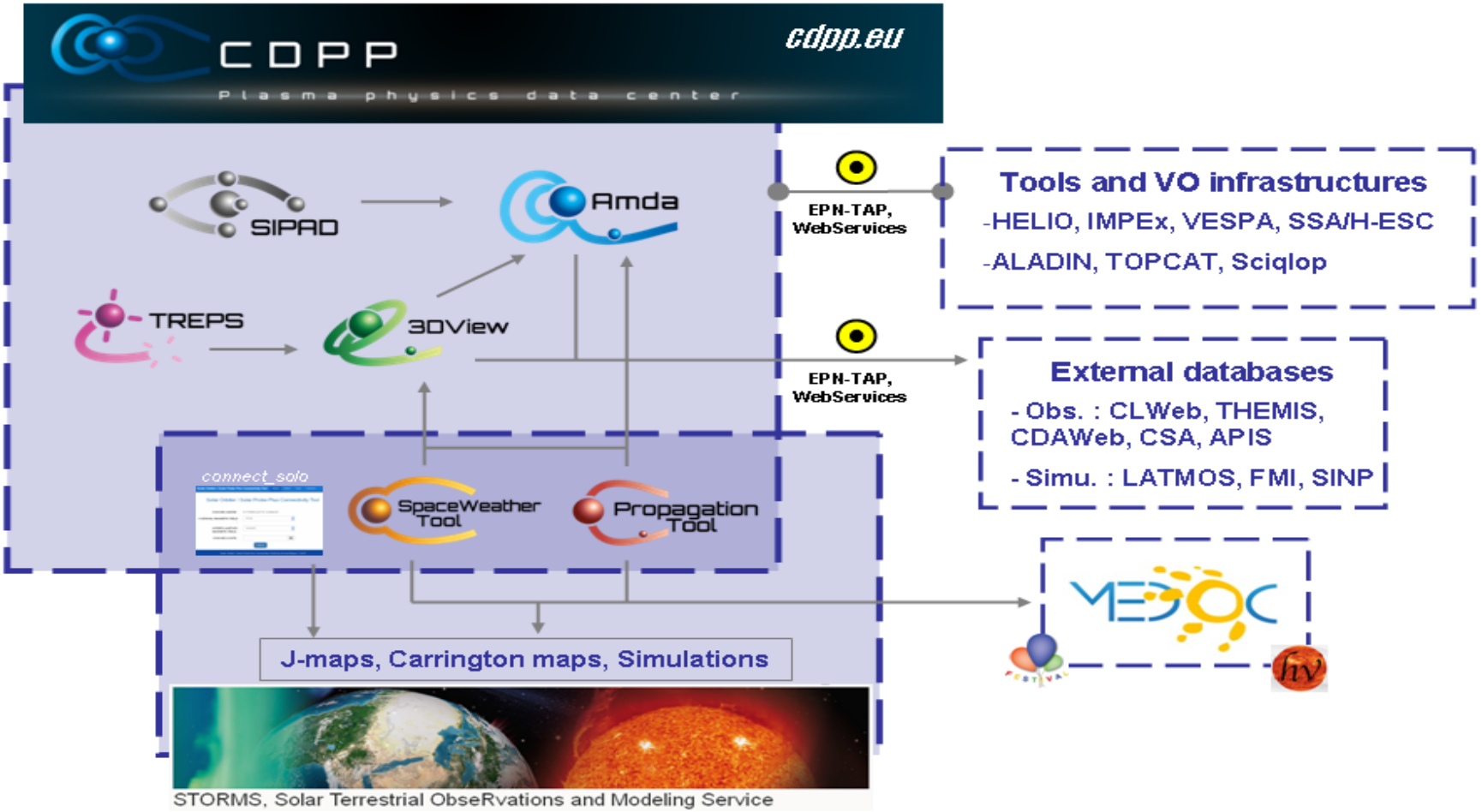
IRAP, CNRS/UPS, CNES, Toulouse, France (nicolas.andre@irap.omp.eu)
S. Caussarieu, L. Beigbeder, J.-P. Toniutti, and D. Popescu
GFI Informatique


CDPP
Plasma physics data center
cdpp.eu
SIPAD
Amda
TREPS
3DView
EPN-TAP,
WebServices
Tools and VO infrastructures
-HELIO, IMPEx, VESPA, SSA/H-ESC
-ALADIN, TOPCAT, Sciqlop
EPN-TAP,
WebServices
External databases
- Obs. : CLWeb, THEMIS, CDAWeb, CSA, APIS
- Simu. : LATMOS, FMI, SINP
connect_solo
SpaceWeather Tool
Propagation Tool
MEDOC
J-maps, Carrington maps, Simulations
STORMS, Solar Terrestrial ObseRvations and Modeling Service

CDPP/Propagation Tool

- http://propagationtool.cdpp.eu
- Rouillard et al., A propagation tool to connect remote-sensing observations with in-situ measurements of heliospheric structures, PSS, 2017

3 propagation methods included

Type of propagation	Mode of J-map usage	
Radial propagation (ballistic radial propagation)	Carrington/In situ	Specify a CME's properties
	Catalogue of fits	Use existing CME catalogues
	J-map click	Locate a CME by J-map clicking
Corotation (ballistic radial + corotation)	Carrington/In situ	Specify a CIR's properties
	Catalogue of fits	Use existing CIR catalogues
	J-map click	Locate a CIR by J-map clicking
SEP propagation (ballistic particle trajectory along a Parker spiral)		

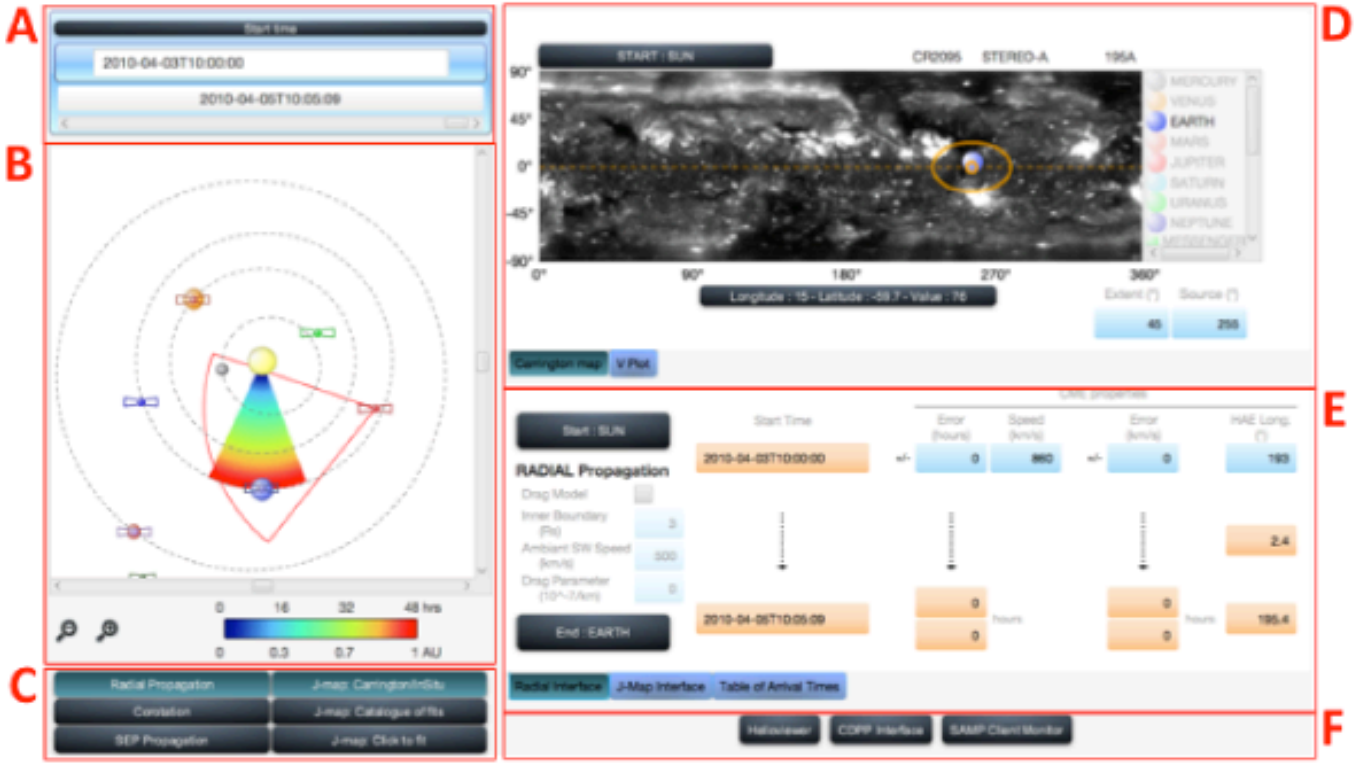


Figure 3: The basic interface of the propagation tool with seven of its components shown: (B) the ecliptic plane, (C) the propagation type selector, (D) the Carrington map/V plot, (E) the parameter interface, (F) the database selector, (G) the J-map interface.

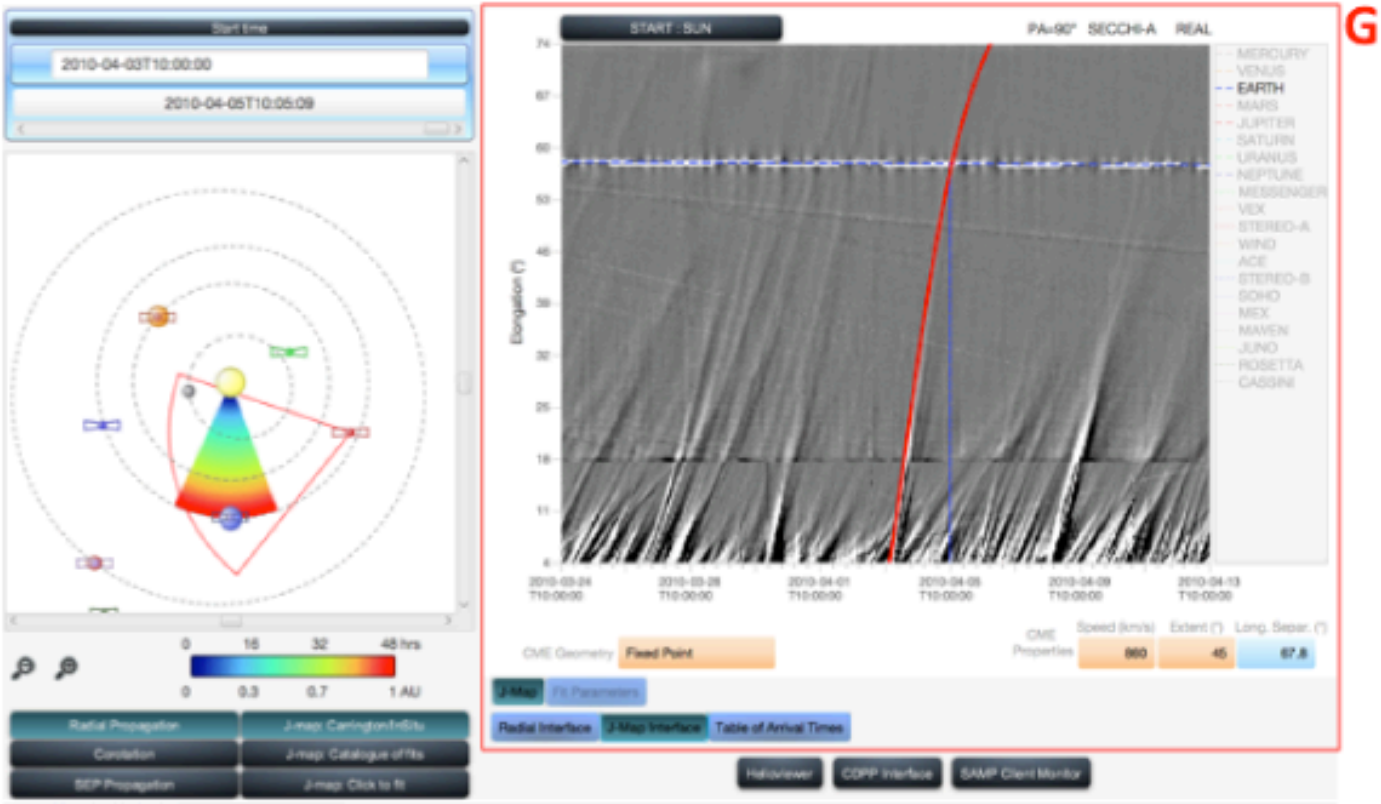
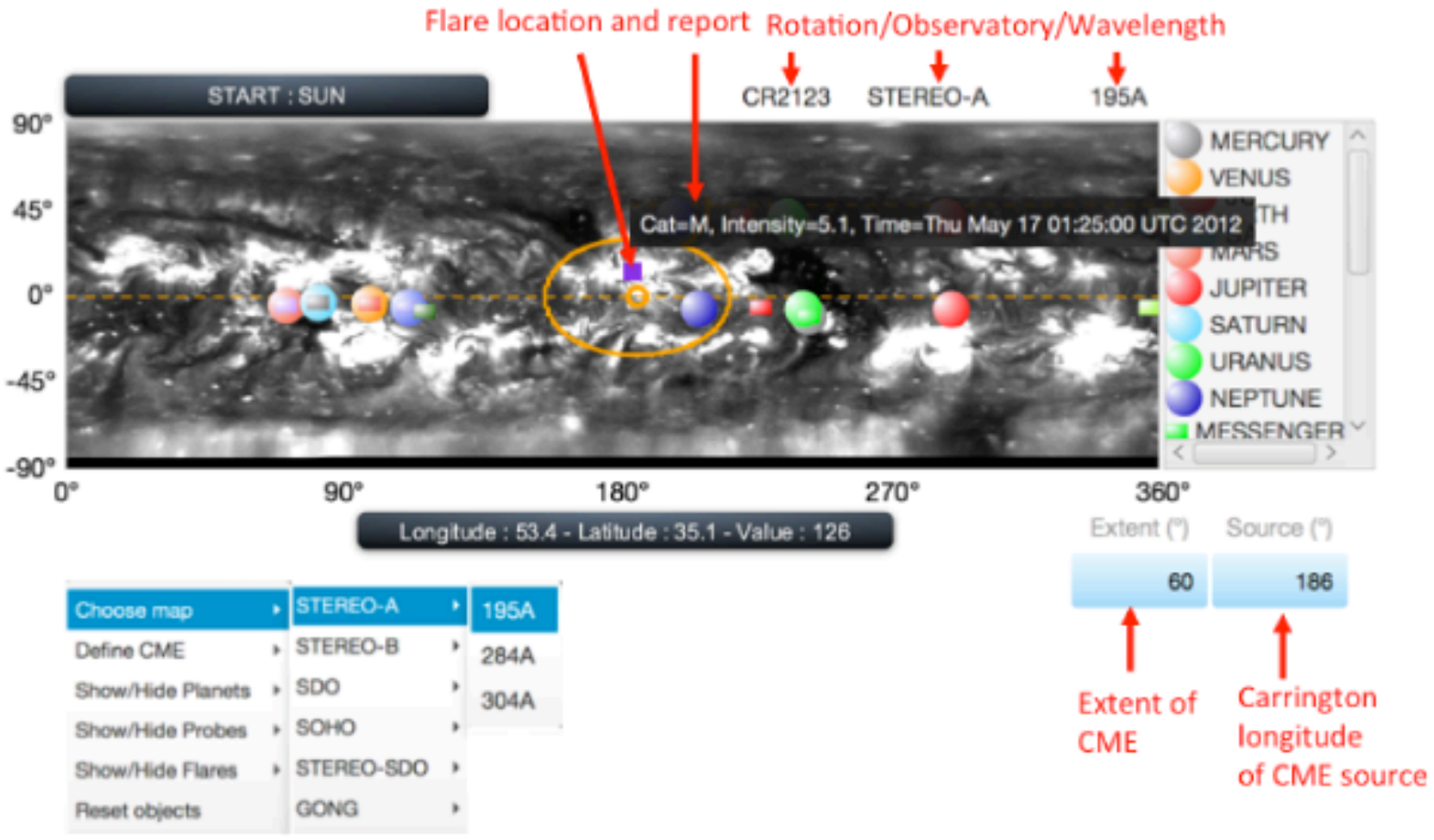


Figure 3: The basic interface of the propagation tool with seven of its components shown: (B) the ecliptic plane, (C) the propagation type selector, (D) the Carrington map/V plot, (E) the parameter interface, (F) the database selector, (G) the J-map interface.

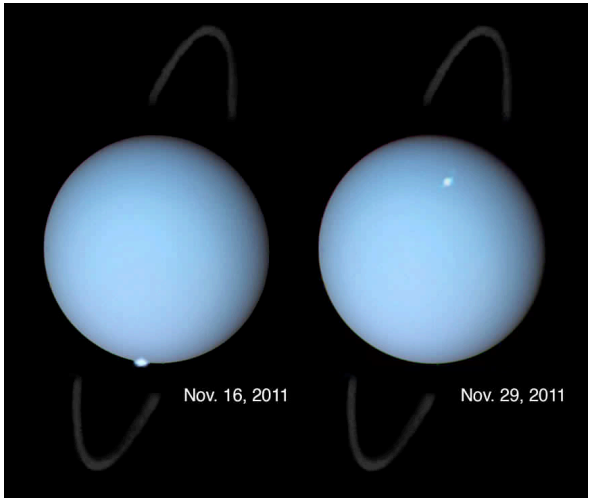

Flare location and report
Rotation/Observatory/Wavelength
START : SUN
CR2123
STEREO-A
195A
90°
45°
0°
-45°
-90°
Cat=M, Intensity=5.1, Time=Thu May 17 01:25:00 UTC 2012
MERCURY
VENUS
MARS
JUPITER
SATURN
URANUS
NEPTUNE
MESSENGER
0°
90°
180°
270°
360°
Longitude : 53.4 - Latitude : 35.1 - Value : 126
Choose map
Define CME
Show/Hide Planets
Show/Hide Probes
Show/Hide Flares
Reset objects
STEREO-A
STEREO-B
SDO
SOHO
STEREO-SDO
GONG
195A
284A
304A
Extent (°)
Source (°)
60
186
Extent of CME
Carrington longitude of CME source

Extension for planetary sciences

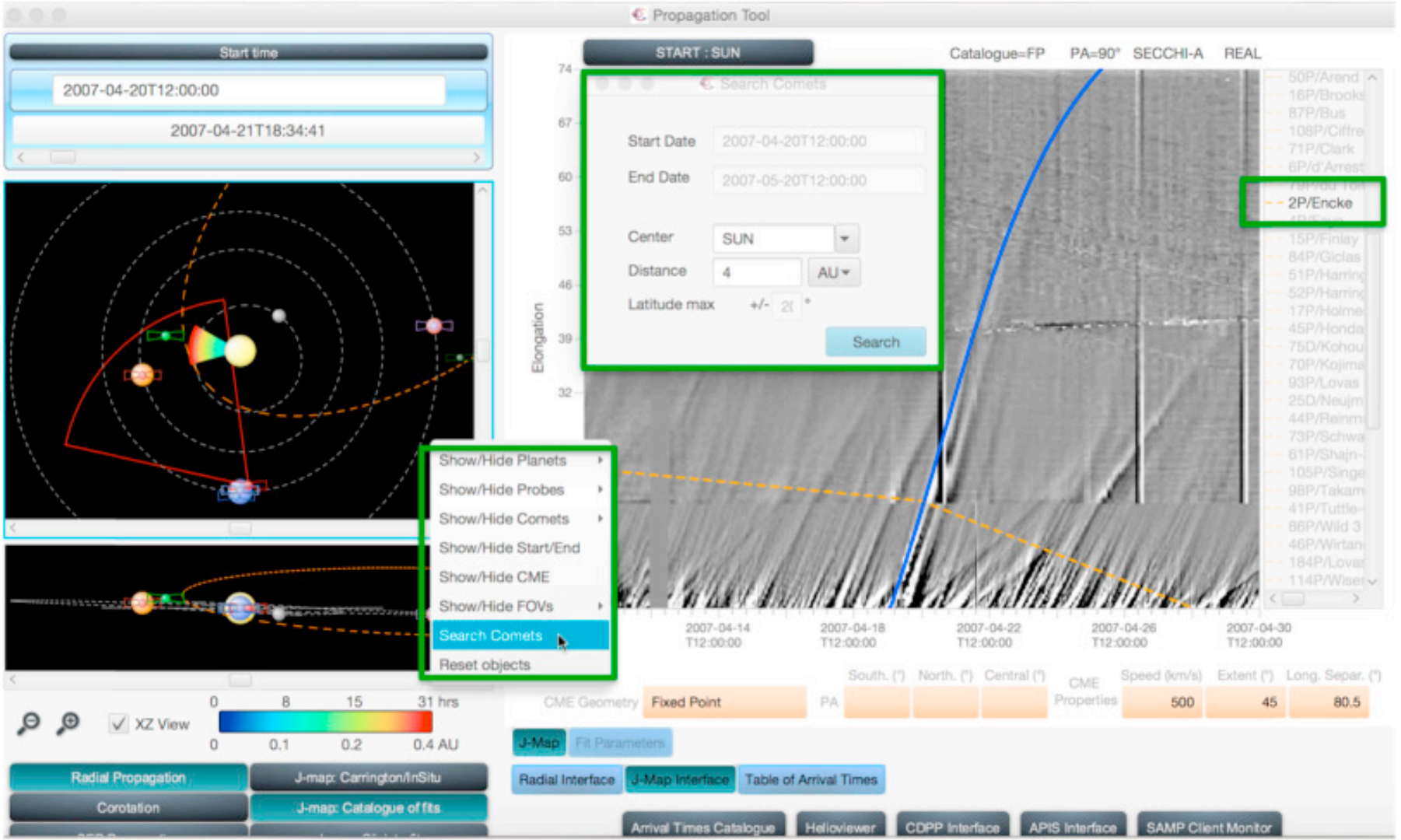
Cometary Tail
Disconnection Event

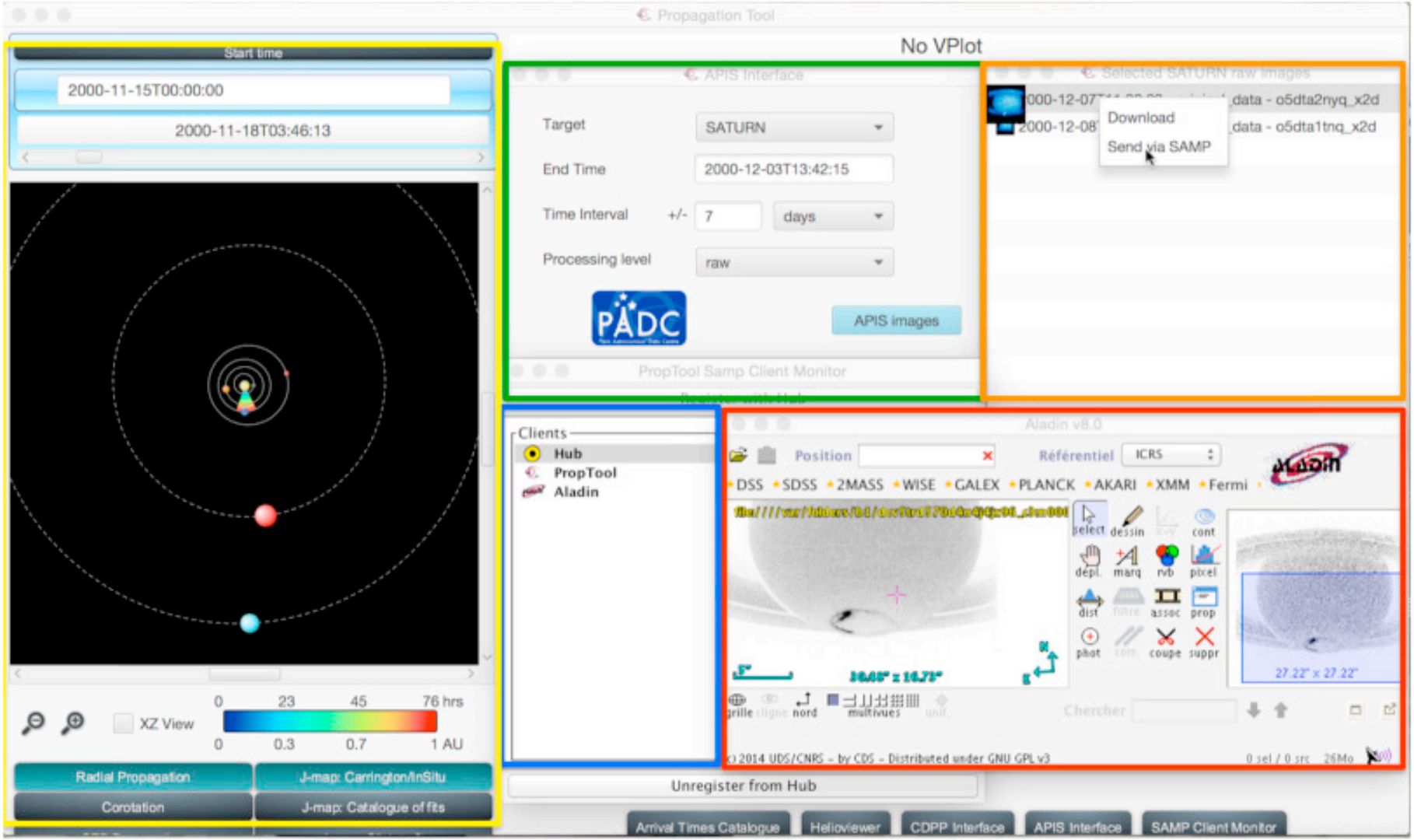
Solar wind
driven ?

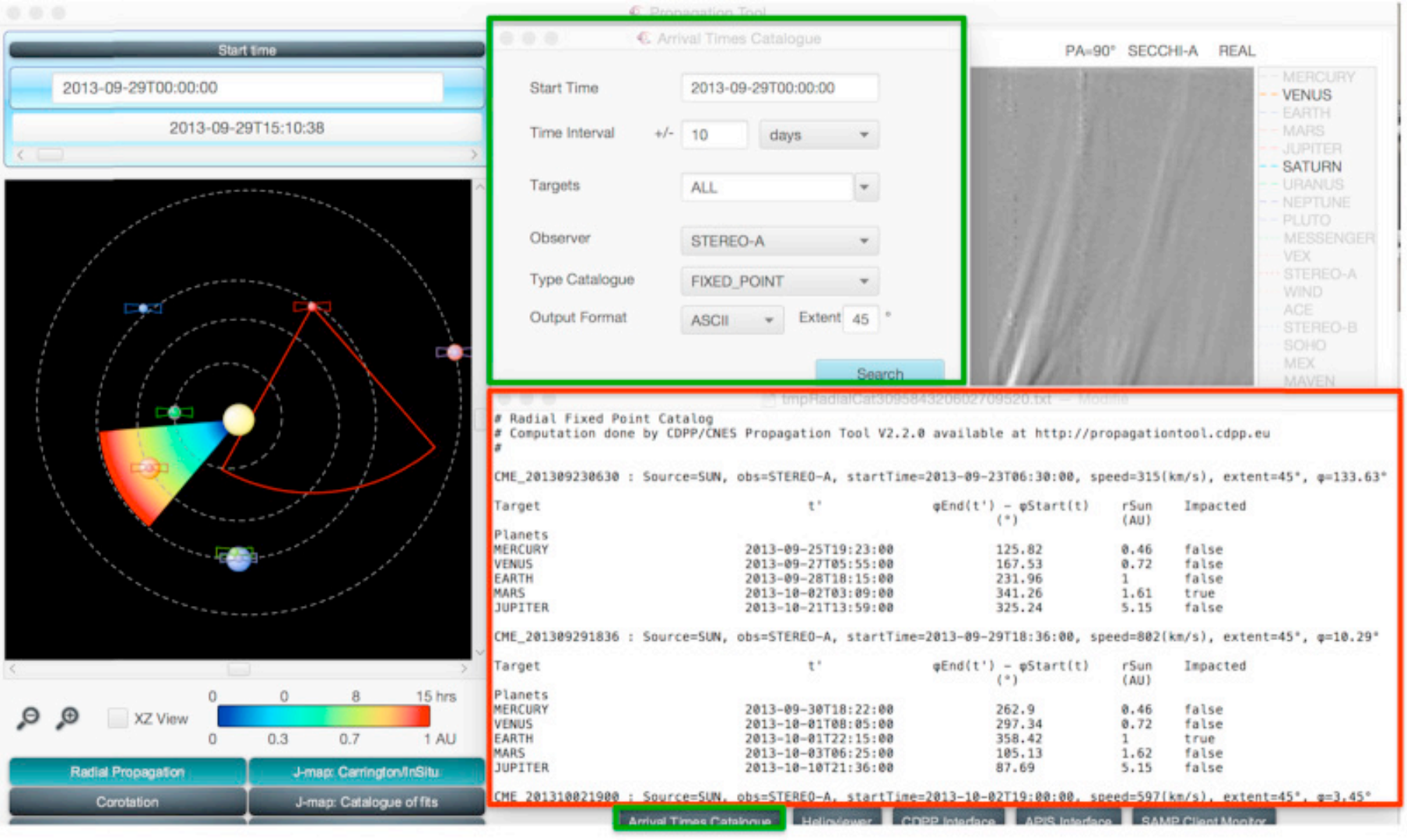
Giant planet auroral emissions



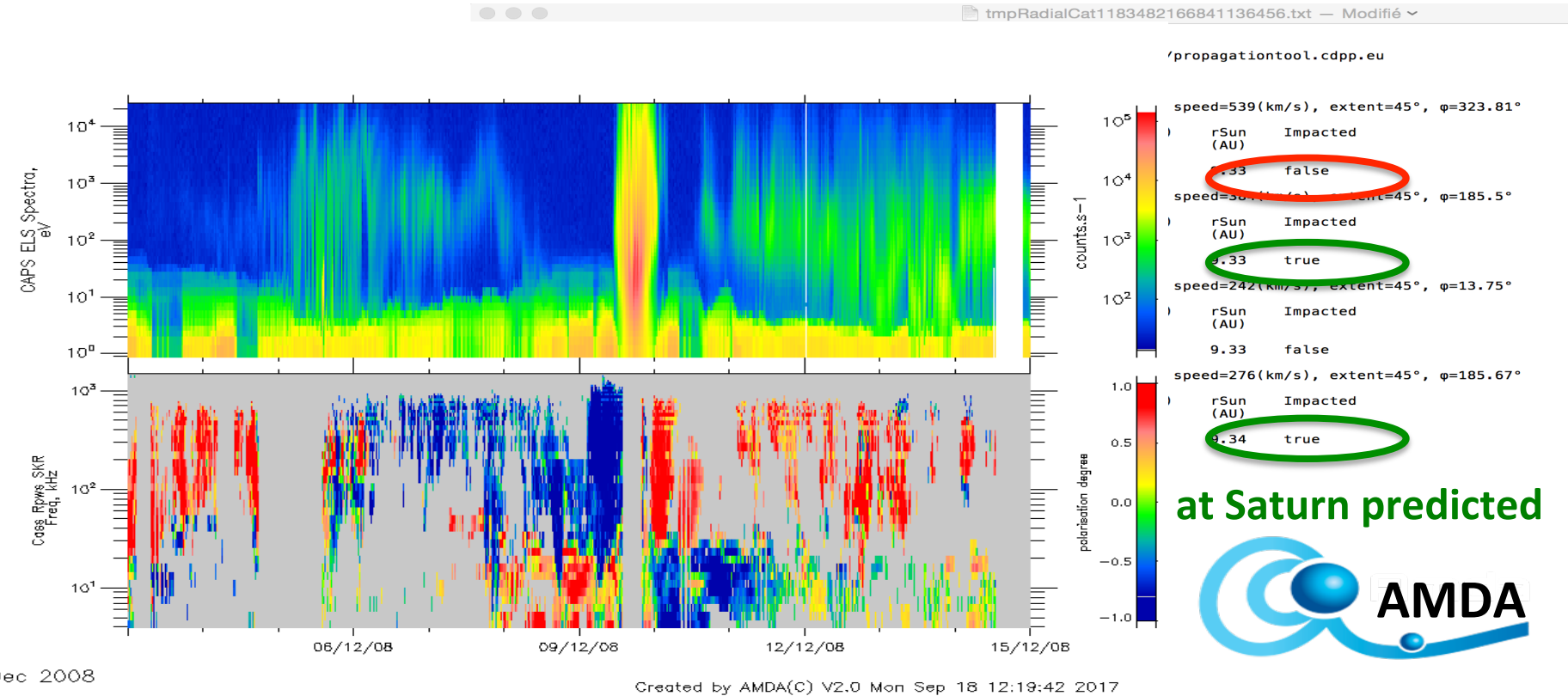
Catalogues of SW disturbances from HELCATS http://helcats-fp7.eu


Propagation Tool
Start time
2007-04-20T12:00:00
2007-04-21T18:34:41
START : SUN
Catalogue=FP
PA=90°
SECCHI-A
REAL
Search Comets
Start Date
2007-04-20T12:00:00
End Date
2007-05-20T12:00:00
Center
SUN
Distance
4
AU
Latitude max
+/-
Search
Elongation
74
67
60
53
46
39
32
2P/Encke
Show/Hide Planets
Show/Hide Probes
Show/Hide Comets
Show/Hide Start/End
Show/Hide CME
Show/Hide FOVs
Search Comets
Reset objects
2007-04-14 T12:00:00
2007-04-18 T12:00:00
2007-04-22 T12:00:00
2007-04-26 T12:00:00
2007-04-30 T12:00:00
South. (°)
North. (°)
Central (°)
CME Properties
Speed (km/s)
Extent (°)
Long. Separ. (°)
CME Geometry
Fixed Point
PA
500
45
80.5
XZ View
0
8
15
31 hrs
0
0.1
0.2
0.4 AU
J-Map
Fit Parameters
Radial Propagation
J-map: Carrington/InSitu
Radial Interface
J-Map Interface
Table of Arrival Times
Corotation
J-map: Catalogue of fits
Arrival Times Catalogue
Helioviewer
CDPP Interface
APIS Interface
SAMP Client Monitor


Propagation Tool
No VPlot
Start time
2000-11-15T00:00:00
2000-11-18T03:46:13
0
23
45
76 hrs
XZ View
0
0.3
0.7
1 AU
Radial Propagation
J-map: Carrington/InSitu
Corotation
J-map: Catalogue of fits
APIS Interface
Target
SATURN
End Time
2000-12-03T13:42:15
Time Interval
+/-
7
days
Processing level
raw
PADC
APIS images
PropTool Samp Client Monitor
Selected SATURN raw images
Download
Send via SAMP
Clients
Hub
PropTool
Aladin
Aladin v8.0
Position
Référentiel
ICRS
DSS
SDSS
2MASS
WISE
GALEX
PLANCK
AKARI
XMM
Fermi
27.22' x 27.22'
© 2014 UDS/CNRS - by CDS - Distributed under GNU GPL v3
Unregister from Hub
Arrival Times Catalogue
Helioviewer
CDPP Interface
APIS Interface
SAMP Client Monitor


Propagation Tool
Start time
2013-09-29T00:00:00
2013-09-29T15:10:38
Arrival Times Catalogue
Start Time
2013-09-29T00:00:00
Time Interval
+/-
10
days
Targets
ALL
Observer
STEREO-A
Type Catalogue
FIXED_POINT
Output Format
ASCII
Extent
45
°
Search
PA=90° SECCHI-A REAL
MERCURY
VENUS
EARTH
MARS
JUPITER
SATURN
URANUS
NEPTUNE
PLUTO
MESSENGER
VEX
STEREO-A
WIND
ACE
STEREO-B
SOHO
MEX
MAVEN
tmpRadialCat3b858432060270952O.txt — Modified
Radial Fixed Point Catalog
Computation done by CDPP/CNES Propagation Tool V2.2.0 available at http://propagationtool.cdpp.eu
#
CME_201309230630 : Source=SUN, obs=STEREO-A, startTime=2013-09-23T06:30:00, speed=315(km/s), extent=45°, φ=133.63°
Target t' φEnd(t') - φStart(t) (°) rSun (AU) Impacted
Planets
MERCURY 2013-09-25T19:23:00 125.82 0.46 false
VENUS 2013-09-27T05:55:00 167.53 0.72 false
EARTH 2013-09-28T18:15:00 231.96 1 false
MARS 2013-10-02T03:09:00 341.26 1.61 true
JUPITER 2013-10-21T13:59:00 325.24 5.15 false
CME_201309291836 : Source=SUN, obs=STEREO-A, startTime=2013-09-29T18:36:00, speed=802(km/s), extent=45°, φ=10.29°
Target t' φEnd(t') - φStart(t) (°) rSun (AU) Impacted
Planets
MERCURY 2013-09-30T18:22:00 262.9 0.46 false
VENUS 2013-10-01T08:05:00 297.34 0.72 false
EARTH 2013-10-01T22:15:00 358.42 1 true
MARS 2013-10-03T06:25:00 105.13 1.62 false
JUPITER 2013-10-10T21:36:00 87.69 5.15 false
CME_201310021900 : Source=SUN, obs=STEREO-A, startTime=2013-10-02T19:00:00, speed=597(km/s), extent=45°, φ=3.45°
0 0 8 15 hrs
XZ View
0 0.3 0.7 1 AU
Radial Propagation
J-map: Carrington/InSitu
Corotation
J-map: Catalogue of fits
Arrival Times Catalogue
Helioviewer
CDPP Interface
APIS Interface
SAMP Client Monitor

e.g., Cassini – Connexion to catalogues of Solar Wind disturbances



at Saturn predicted

AMDA

Future perspectives

- Connect the tool with HELIOPROPA
  - Access to 1D MHD method

- Add in the tool a VESPA EPN-TAP query interface
  - Studies of planetary bodies are pluri-disciplinary