

Discussion with IAP, Wigner, DLR, ABER

- IAP/Wigner

Wigner : induced magnetospheres (Venus, Mars, Comet-Chury)

IAP : intrinsic magnetospheres (Mercury, Earth, Jupiter, Saturn)

Inputs :

- Solar data (from HELCATS catalogues)
- MESSENGER data (AMDA) ;
- Catalogue of CMEs from MESSENGER observations (Winslow et al., 2015)
- VEX data (AMDA) ; solar wind datasets from VEX (ask Andrei or ASPERA Team)
- MEX data (AMDA) ; solar wind datasets (AMDA)
- Rosetta data (preliminary)
- MAVEN data (AMDA) ; solar wind datasets (AMDA)
- Earth : ACE/Wind real-time and processed data available
- Juno data (?, in AMDA) ; Galileo data

Outputs :

- Timetable of CMEs included in HELCATS catalogues
- Timetable of CMEs observed by MESSENGER (Winslow et al., 2015 ; excel file)
- Timetable of radial alignment of Mercury with other planetary bodies
- Intersection of the various timetables
- Use PropTool / 1DMHD Tool to estimate arrival time of CMEs from Mercury to the targets (systematic survey, 1st step)
- Case studies on selected ones when real observations at target are available
- Estimate delta T between predictions and observations

- Venus : start with the 42 events in the Vech et al. 2015 paper and the events from Good and Forsyth, 2016
- Build a Timetable of CMEs
- Timetable of CMEs observed by Vech et al.
- TimeTable of radila alignment of Venus and other planetary bodies
- Intersection of the various timetables
- Use PropTool / 1DMHD Tool to estimate arrival time of CMEs from Venus to the targets (systematic survey, 1st step)
- Case studies on selected ones when real observations at target are available
- Estimate delta T between predictions and observations

- Mars : a few CMEs in early 2012 to start with (Eduardo)
- Collect all published information about CMEs observed by MEX and build the corresponding timetable
- Repeat same process

- Earth : intersection with MESSENGER propagated data

In the second year :

- Comet
- Jupiter : check if there is a catalogue of CMEs from WIND (SOHO ?) when Galileo is operating and propagate them with the PropTool/1DTool ; maybe play with auroral emissions ; also use the Cassini Jupiter flyby (12/2000-01:2001)
- Saturn : time table of SKR enhancements to compare with predictions of the tools

- Shall we do timetable of time periods when spacecraft orbiting planets are outside of the induced/intrinsic magnetospheres ?
- Shall we extend catalogues to include all events observed in situ by VEX/MEX ?
- Catalogue ingestion functionality developed in the tool

- DLR/ABER : Mars radiation environment
 - 1) Solar wind
 - 2) Atmosphere
 - 3) surface

Parameter space : SEP/GCR spectra, seasonal variations in atmosphere

SEP spectra / GCR transport are issues

1st step :

Start with a few runs for variable parameter sets inc. different solar modulation
Use SEP measurements from Stereo, find the events with good magnetic connectivity
Predict **dose rate** (*in Si and in tissue*) at various altitudes (in relation to MEX, MAVEN, TGO orbits, and also at the planetary surface at MSL location and at Exomars locations)

Validation of model outputs wrt MSL/RAD data (investigate if radiation monitors onboard MEX, MAVEN, TGO have useful data)

Parametrized model with SEP should be feasible ; more difficult with GCR
Identify the end users and their needs

2nd step / (2nd year) :

Seasonal variations ? how to include them ?
More output parameters ? which ones ?

Develop prototyped parametrized model

3rd step (3rd year ?) :

how to make the model available for others from all the runs ? through a web-interface ?

The computing architecture should be in place at ABER so that a PDRA can make all the required runs with guidance/expertise/first inputs from DLR

PDRA possibly hired in May ?

Architecture possibly in place at ABER by September ?

Then it will be possible to run intensively the model