



EPN2020-RI

EUROPLANET2020 Research Infrastructure

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Deliverable 5.2 Second PSWS VA Review Board Report

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Start date of project: 01 September 2015

Duration: 48 months

Responsible WP Leader: CNRS, Nicolas André

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Dissemination level		
PU	Public	x
PP	Restricted to other programme participants (including the Commission Service)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (excluding the Commission Services)	

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Title of Deliverable	Second PSWS VA Review Board Report
Contributing Work package (s)	WP5
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Author (s)	Nicolas Andre (CNRS)

Abstract: Under Horizon 2020, the Europlanet 2020 Research Infrastructure (EPN2020-RI) will include an entirely new Virtual Access Service, WP5 VA1 "Planetary Space Weather Services" (PSWS) that will extend the concepts of space weather and space situational awareness to other planets in our Solar System and in particular to spacecraft that voyage through it. WP5 will make five entirely new 'toolkits' accessible to the research community and to industrial partners planning for space missions: a general planetary space weather toolkit, as well as three toolkits dedicated to the following key planetary environments: Mars (in support of ExoMars), comets (building on the success of the ESA Rosetta mission), and outer planets (in preparation for the ESA JUICE mission to be launched in 2022). This will give the European planetary science community new methods, interfaces, functionalities and/or plugins dedicated to planetary space weather in the tools and models available within the partner institutes. It will also create a novel event-diary toolkit aiming at predicting and detecting planetary events like meteor showers and impacts. The present report summarizes the review of the project after the second year.

The PSWS External review board is composed of the following independent persons:

Chair : Mark Lester (Male / Univ. Leicester, UK). He will help us connecting with ESA/SSA and space weather-related FP7 projects.

Apostolos Christou (Male, Armagh Observatory, Ireland). He will help us connecting with the amateur community.

Angelica Sicard (Female, ONERA, France). She will help us connecting with industries / space agencies.

Kirsti Kauristie (Female / FMI, Finland). She will help us connecting with COSPAR and their space weather roadmap.

The PSWS consortium could unfortunately not meet face to face with our external Review Board during the European Space Weather Week in Ostend, Belgium on Monday, 27 November 2017, 14:00-17:15. We have however presented our developments during a Europlanet-sponsored NA1 workshop (23 participants) and during a PSWS-dedicated session at last ESWW (30-50 participants) and we have obtained there feedback from users on each of our services.

The user feedback on each of our services is given in the next pages.

The deliverable will be updated on 31/12/2018, with its Third version, D5.3

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NA1 Workshop Sun's influence on planets, IRAP, Toulouse, France 09-11 October 2017

Monday 09/10

09:30-09:45 Nicolas André Welcome and Objectives of the workshop

09:45-10:15 Catherine Dieval Solar wind and IMF dependence of the Martian ionosphere

10:15-10:45 Norberto Romanelli

Variability of the Martian upper atmosphere and IMF control of the location of the Martian lobes

10:45-11:00 Coffee break

11:00-11:30 Beatriz Sanchez Cano

Mars plasma system response to space weather variability with solar cycle

11:30-12:00 Yoshifumi Futanaa Space weather by ENA imagings in the (inner) solar system

12:00-12:30 Niklas Edberg Space Weather at Venus, Mars (and Titan)

12:30-14:00 Lunch at IRAP

14:00-14:30 Chihiro Tao 1D MHD propagation model

14:30-15:00 Andrei Fedorov, Elena Budnik MEX and VEX Solar wind data

15:00-15:30 Moa Persson Solar wind and EUV dependent models for the Venusian environment

15:30-16:00 Coffee break

16:00-16:30 Martin Volwerk Ahead and behind - IMF interaction with a weakly outgassing comet

16:30-17:00 Aniko Timar

Solar wind dynamic pressure proxy from near comet observations

17:00-17:30 Niklas Edberg

Solar wind interaction with comet 67P

Tuesday 10/10

09:30-10:00 Tomoki Kimura Multi-wavelength observations of Jupiter's aurora during Juno's cruise phase

10:00-10:30 Chihiro Tao

Variation of Jupiter's aurora observed by Hisaki/EXCEED

10:30-11:00 Go Murakami

HISAKI observation results related to solar wind effect on Jupiter's inner magnetosphere

11:00-11:15 Coffee break

11:15-11:45 Daniel Santos-Costa Multifrequency analysis of the Jovian electron-belt radiation dynamics with ground-based and remote sensing observations and modeling tools

11:45-12:15 Quentin Nenon Space and time variability of the Jovian radiation belts as seen by the physical model Salammbô

12:15-12:45 Carley Martin Solar wind and seasonal influences on Saturn's current sheet

Lunch at IRAP

14:00-14:30 Mika Holmberg Seasonal and solar cycle modulations of Saturn's inner plasma disk

14:30-15:00 Nicolas André CDPP/Propagation Tool and Heliopropa

15:00-15:30 Benjamin Grison Event prediction at the outer planets

15:30-15:45 Coffee break

15:45-16:15 Rui Pinto Propagation of solar wind from 30 Solar radii to 1 AU

16:15-16:45 Yoshifumi Futaana Solar wind control of Moon environment (incl surface interaction and mini-magnetosphere).

16:45-17:15 Baptiste Cecconi Radio emissions as planetary space weather probes

19:30 Workshop Dinner at restaurant Le Bibent, place du capitole

Wednesday 11/10

09:30-10:00 Geraint Jones Cometary observations and derivation of SW properties

10:00-10:30 Andrea Opitz Propagation of solar wind by magnetic lasso

10:30-11:00 Benjamin Grison ICME propagation: testing the CDPP propagation tool

11:00-11:15 Coffee break

11:15-11:45 Go Murakami Space Weather at Mercury – two point measurements with BepiColombo

11:45-12:15 Nicolas Andre, Vincent Génot, etc CDPP Tools: AMDA+3DView

12:15-12:45 Tomoki Kimura, Daniel Santos-Costa, etc VO Databases: Hisaki, VLA, etc

12:45-14:00 Lunch at IRAP cafeteria

14:00-15:30 Open forum

15:30-16:00 Coffee break

16:00-17:00 Nicolas André

Conclusions, Topical issue of JSWSC

Session 1 - Planetary Space Weather Services at ESWW, 27/11/2017

Nicolas Andre (irap/cnrs); Manuel Grande (Aberystwyth University); Jean Lilensten (cnrs/ipag); Iwona Stanislawska (src/pas)

Monday 27/11, 14:15 - 17:15 Mercator

KEYWORDS - planet; space weather; prediction; detection ; modelling ; alerts;

Planetary Space Weather Services (PSWS) aims at extending the concept of space weather to other planets in our Solar System. New studies, methods, interfaces, functionalities distributed over 4 service domains – 1) Prediction, 2) Detection, 3) Modelling, 4) Alerts are available or developed in order to extend the concepts of space situational awareness to planetary space weather. The session will be dedicated to a presentation of operational services and welcomes papers on all aspects of planetary space weather related to the above service domains. A topical issue in SWSC-journal will follow this session.

Poster Viewing

From Monday noon to Wednesday morning

Talks: Time schedule

Monday November 27, 14:15 - 15:30, Mercator
Monday November 27, 16:00 - 17:15, Mercator

Monday November 27, 14:15 - 15:30, Mercator

14:15	Planetary Space Weather Services for the Europlanet 2020 Research Infrastructure	<i>Andre, N et al.</i>	Oral
14:27	An heliospheric propagation model for solar wind prediction at planets	<i>Andre, N et al.</i>	Oral
14:40	Extensions of the CDP/Propagation tool to the case of comets, giant planet auroral emissions, and catalogues of solar wind disturbances	<i>Andre, N et al.</i>	Oral
14:52	The reasons for false alarms at the prediction of high-speed solar wind streams near Earth, and consequences for the prediction at other planets	<i>Hofmeister, S et al.</i>	Oral
15:05	The Hohmann-Parker Effect and HESPERIA: Strategies for Solar Radiation Hazard Predictions Before, During and After Planetary Transits	<i>Posner, A et al.</i>	Oral

15:17	Estimating solar wind speeds from comet ion tail images	<i>Jones, G et al.</i>	Oral
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Monday November 27, 16:00 - 17:15, Mercator

16:00	Mars Radiation Surface Model	<i>Grande, M et al.</i>	Oral
16:12	A generalized approach to model the spectra and radiation dose rate of solar particle events in deep space and on the surface of Mars	<i>Guo, J et al.</i>	Oral
16:25	A Transplanet model of magnetosphere-ionosphere coupling at Earth, Mars, Jupiter, (Saturn and Venus)	<i>Andre, N et al.</i>	Oral
16:37	A software tool for the finding of potential cometary tail crossings	<i>Jones, G et al.</i>	Oral
16:50	Implementation of a Space Weather VOEvent service at IRAP in the frame of Europlanet H2020 PSWS	<i>Gangloff, M et al.</i>	Oral
17:02	mach number and thetabn co-relation classification for space weather	<i>Pipaliya, J et al.</i>	Oral

Posters

1	Planetary and cometary space weather predictions from observations near and far	<i>Opitz, A et al.</i>	e-Poster
2	Automatic Lunar Flash Investigation (ALFI) Software	<i>Cook, A et al.</i>	e-Poster
3	Testing space weather connections in the solar system	<i>Grisson, B et al.</i>	p-Poster
4	Representation of planetary environments by universal paraboloid magnetospheric magnetic field model	<i>Kalegaev, V et al.</i>	p-Poster
5	Study on a statistical model of the relativistic electron flux forecast at geostationary orbit	<i>Zhong, Q et al.</i>	p-Poster

6	Revealing the pivot energy of SEPs contributing to the Martian surface radiation environment	Guo, J et al.	p-Poster
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Feedback from our users received for our 12 PSWS services

PSWS WP5 includes 12 services.

User reviews and feedback received during the NA1 workshop and the ESWW for each of these services are summarized below (in parenthesis the institute responsible for the service):

A1. 1D MHD Solar Wind Prediction Tool (CNRS)

The service is operational and works pretty well but it seems to be limited to a 2-year time span. This should be changed. Quality flags should be added to let the user know about the accuracy of the prediction. The model input data should not be only restricted to L1 data; STEREO-A or B input data should also be proposed to the user when possible. Adding catalogues of solar events (CMEs, CIRs) on the time series would be useful for the user to identify the reliability of the tool.

A2. Propagation Tool (GFI Informatique)

There were a few questions about the reliability of the prediction since the model is simple. A good example of the reliability of the prediction was given by Witasse et al. (2017) in Journal of Geophysical Research – Space Physics.

A3. Meteor showers (OBSPARIS)

The service is not yet opened but it raised strong interest in the community, especially after the Siding Spring comet encounter with Mars.

A4. Cometary tail crossings (UCL)

The service is not yet operational so it cannot be tested. The service should be linked to database of cometary observations by amateurs.

B1. Lunar impacts (ABER)

The service is not yet operational so it cannot be tested. The software should also enable the analysis of images of other Solar System moons, rings. The service should also be linked to the HELIOTA project (<https://neliota.astro.noa.gr/>).

B2. Giant planet fireballs (EHU-UPV)

The service is operational and has demonstrated its interest to the amateur community in the past. Dedicated observing and analysis campaigns should be organized in relation to the Juno mission.

B3. Cometary tails (UCL)

The service is not yet operational so it can not be tested.

C1. Transplanet – Earth, Mars (Venus), Jupiter (CNRS)

The service is operational and has demonstrated its interest in the context of Mars. More visibility should be given to the service for Venus and Jupiter in relation to future missions to Venus and to the Juno mission.

C2. Mars radiation environment (ABER)

The service is not yet operational and can not be tested. It raised strong interest in the Exomars 2020 community as expected. The service should be compared to the MEREM model available in the ESA SPENVIS system.

C3. Giant planet magnetodiscs (UCL)

The service is operational since December 2017. The service should link the model outputs to the Juno and JUICE trajectories if possible.

C4. Jupiter's thermosphere (UCL)

The service is not yet operational and cannot be tested. No feedback received on the presentation since not given.

D. Alerts (OBSPARIS)

The service is not yet operational and cannot be tested. It raised strong interest for the heliopropa service and it should enable the user to define its own threshold for the alert. The VOevent should also include an information on the reliability of the prediction if possible.