Content

SAVE THE DATE! During the upcoming ESWW10 in Antwerp, AFFECTS will organize a **splinter meeting dedicated to the AFFECTS services**. You are welcome to attend this meeting on Thursday afternoon, 17:15 to 18:45h in room Scala 3.

1. Project News

- On September 23rd – 25th, 2013, the AFFECTS project partners met in Göttingen for an **extraordinary Project Meeting and Steering Committee meeting** to discuss the roadmap for the successful finalization of the project. Additional material concerning this meeting can be found at: http://www.affects-fp7.eu/project/meetings/pm-2013/.
- All presentations and further material from the **AFFECTS User Workshop** on February 28th, 2013 can be downloaded from the AFFECTS website at http://www.affects-fp7.eu/news-events/user-ws/.
- AFFECTS has been presented by the coordinator at the following meetings:
  - DLR/ESA Collaborative Solar Sail Technology Demonstration Roadmap, 3rd DL1 Working Group Meeting, ESA/ESTEC, Noordwijk, The Netherlands, 2 October 2013.
  - FP7 Space Weather Projects: Results and way forward, EU/REA, Brussels, Belgium, 3 October 2013.
  - Space weather effects on power grids, EU/JRC, Ispra, Italy, 29-30 October 2013

NEW SUBSCRIPTION SERVICE: The AFFECTS team developed a new rss feed covering space weather reports and storm warnings for severe space weather events. Stay informed about major space weather conditions and subscribe at: http://www.affects-fp7.eu/weather/

2. Status of Deliverables

The deliverable reports from the **first and the second project year** can be found at http://www.affects-fp7.eu/project/deliverables/.

Project year 3 (March 2013 – February 2014) comprises the following 11 deliverables:
D5.2: Report on product generation test (Lead: DLR)
D5.3: Report on quality control checks (Lead: DLR)
D6.3: Report on User Workshop results (Lead: ROB)
D5.4: Report on overall functionality test (Lead: DLR)
D5.5: Establishment of continuous online operation system at DLR/SWACI (Lead: DLR)
D6.1: Establishment of continuous online operation system at ROB/RWC (Lead: ROB)
D3.1: Provision of online operational integration of software packages in full operational chain (Lead: ROB)
D6.4: Report on long-term product sustainability (Lead: ROB)
D6.5: Space Weather Multimedia Show (Lead: UGOE)
D6.6: AFFECTS Space Weather Mobile Phone App (Lead: UGOE)
D2.3: Online provision of SEPS EUV and plasma data (Lead: FHG)

3. Status of Work Packages

3.1 WP2: Data, Calibration, Maintenance and Instrumentation

For WP2 all deliverables have been completed except D2.3 – Online provision of SEPS EUV and plasma data, for which a replacement is in progress. The ongoing flow of data from instruments to databases/repositories is problem-free, ensured by use of AFFECTS funds for travel, maintenance and calibration. A substantial geomagnetic storm was registered by the AFFECTS instrumentation in early October (Fig.1), reaching a magnitude of Kp 8-, giving good opportunities for case-studies. A warning has been released before through the L1 solar wind, Kp, aurora alert services provided as RSS feeds and the solar wind data plot is provided through the AFFECTS website (http://www.affects-fp7.eu/rssfeeds/rssfeed_sw/alert_archive/2013-10-02_105002.png).

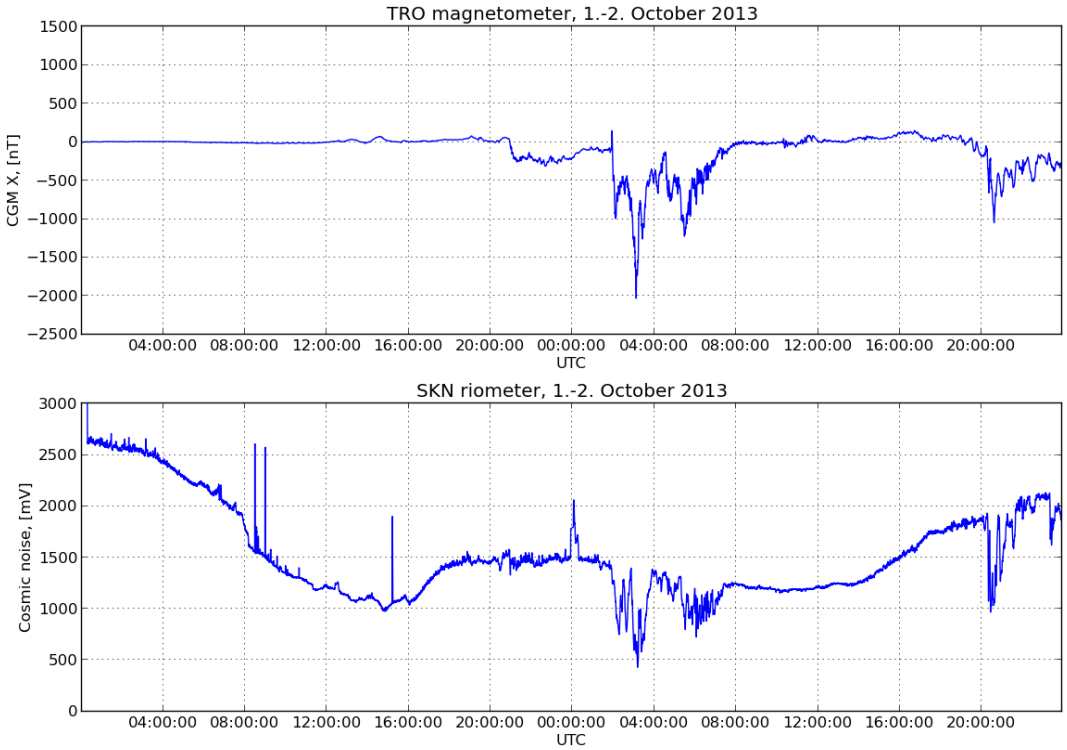

Fig. 1: TRO magnetometer and SKN riometer in comparison.

The figure shows the event as detected by the Tromsø magnetometer, together with the newly established riometer (funded at UoT through AFFECTS). The distinct negative excursions of the riometer record indicate absorption of cosmic noise by an enhanced lower ionosphere.
The group has also released a publication – Johnsen, M. G. (2013), Real-time determination and monitoring of the auroral electrojet boundaries, Space Weather Space Climate, **3** A28 (http://www.swsc-journal.org/articles/swsc/full_html/2013/01/swsc130002/swsc130002.html).

At Fraunhofer IPM, the definition of a storm onset for the TEC forecast is progressing. Cooperative activities of FHG, DLR Neustrelitz and UGOE are undertaken in order to quantify the relationships between ionospheric plasma and ACE solar wind and magnetic field data. Plasma data are provided by NOAA-SWPC through the DMSP (Defense Meteorological Satellite Program, UT Dallas) satellites which have a spherical Langmuir probe and Faraday cup aboard. These sensors provide ionospheric plasma measurements, such as electron and ion density and temperature. For three storm events (in May 2005, December 2006 and October 2011) as identified by DLR, the DMSP data have been analyzed. Further investigations of other events and a comparison with solar EUV data are aimed.

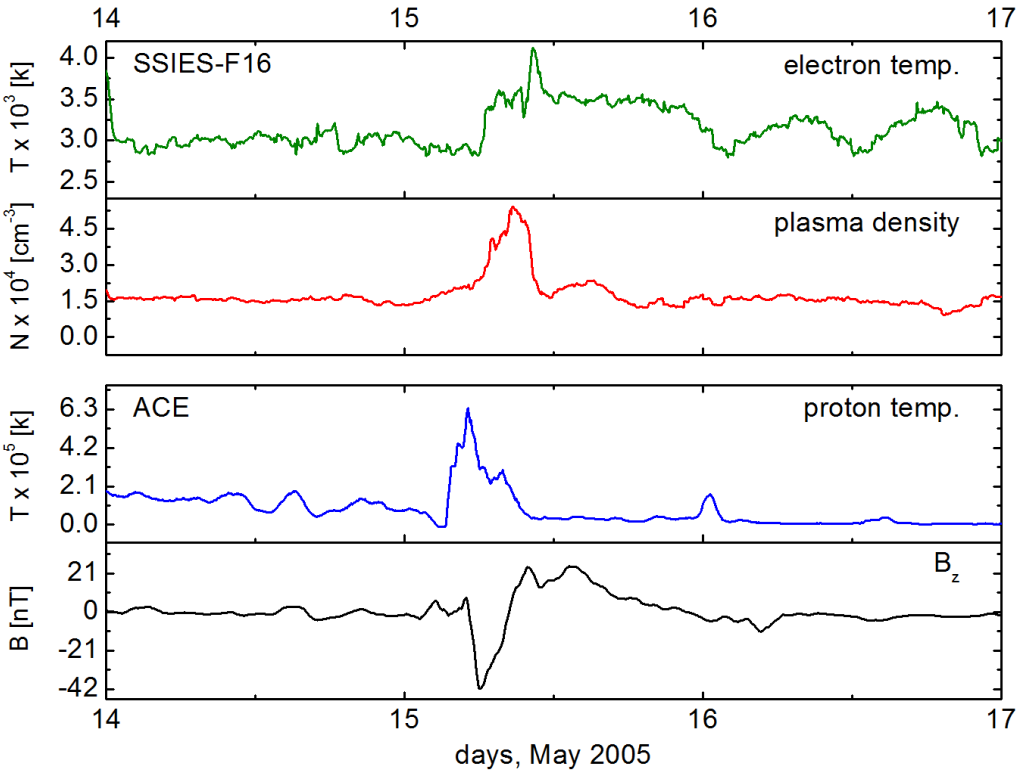

Fig. 2: The figure exemplarily shows the comparison of DMSP ionospheric plasma data (upper two graphs) and ACE solar wind data (lower two graphs) for a solar/geomagnetic/ionospheric storm event in May 2005. The correlation between plasma density and temperature measured by DMSP (no.16) with the variation of the solar wind -Bz component measured by ACE is obvious.

Furthermore EUV data from SolACES and EVE spectrometers have been combined, yielding a complete set for three Carrington-rotations, covering the time interval between 15th October 2012 and 2nd February 2013. This data set has been provided to Prof. Jacobi (University Leipzig) for test calculations and simulations of TEC values based on solar EUV data.

At ROB, several improvements were made regarding STAFF, the Solar Timelines viewer for AFFects (http://www.staff.oma.be). Prediction timelines are now available for the geomagnetic indices Kp, Ap, and Dst, and for the F10.7 radio index. Descriptions were added for all timelines, and a series of timelines produced by the SPoCA algorithm were added to STAFF. This algorithm (C. Verbeeck, V. Delouille, B. Mampaey, R. De Visscher (2013) The SPoCA-suite: software for extraction, characterization, and tracking of Active Regions and Coronal Holes on EUV images. *Accepted by A&A*) automatically segments EUV images into Active Regions, Coronal Holes, and Quiet Sun. Hence, timelines such as the area of Active Regions, derived from EIT or AIA images, can now be consulted in STAFF. STAFF will be presented as a poster, at the fair, and during the AFFECTS splinter at the 10th European Space Weather Week.

3.2 WP3: Early Warning System

The Solar Demon criteria for excluding automatic exposure control images in strong flares were altered in view of some recent M and X flares in the last week of October. Solar Demon now also divides the image into 32 angular sectors, providing a radial EUV wave profile for each of these sectors for each moment in time. Solar Demon dimming thresholds were optimized to accommodate a good detection of separate, simultaneous dimmings.
The format of Solar Demon output was much improved, following feedback from users; it is available at http://www.solardemon.oma.be. Solar Demon was presented at an internal ROB meeting and sparked a lot of interest from scientists and forecasters alike. The latest version will be presented at the 10th European Space Weather Week, as a poster, at the fair, and during the AFFECTS splinter.

ROB's forecast verification analysis on the forecast of flaring probabilities is nearly completed. It includes a break-up of the analysis per forecaster, has been presented at an internal ROB meeting, and will be presented as an oral presentation in the 10th European Space Weather Week.

Within SWACI the AFFECTS members are now able to register for the **early warning message for GNSS users** (http://swaciwebdevelop.dlr.de/early-warning-gnss/emailsubscription/).

3.3 WP4: Forecasting Tools and Modelling

All deliverables have been successfully completed. The main activities in WP4 now aim at improving the developed products and in supporting the activities of the other work packages. One of the main activities is related to the sustainability of the products after the end of the project, taking also into account future modifications, such as the planned replacement of the ACE spacecraft by DSCOVR in 2015.

To ensure sustainability of products, all programming code was converted to the Python programming language on order to simplify and standardize data integration and maintenance procedures, and to reduce the dependence on third-party software. The geomagnetic forecast tool, which is directly dependent on L1 data availability and quality, the same way as the UGOE L1 alerts, is currently being updated to accept data from other spacecraft and orbits, e.g. from the Sunjammer solar sail project. This new version is currently in the test phase.

At DLR, a comprehensive quality check procedure has been added to the TEC forecast module. It generates and saves error maps and computes error statistics for each TEC forecast map.

3.4 WP5: Forecast System Ionosphere, User Interfaces

The establishment of the **Forecast System Ionosphere (FSI)** is in its final phase. During the last month, quality control procedures have been added to the FSI processing modules and to the overall FSI. The results of the quality control, showing the quality of the products as

well as the operability of the FSI, have been described in Deliverable D5.3. Recently, tests of diverse scenarios have been sketched to represent the functionality of the FSI which will be described in Deliverable D5.4. Currently, lots of efforts are put into the finalization of the continuous online operation of the SWACI-AFFECTS service under http://swaciwebdevelop.dlr.de/homeaffects/?L=1.

3.5 WP6: Data and Product Dissemination, Product Sustainability

Deliverable D6.1 (Establishment of continuous online operation system at ROB/RWC) was delivered in October 2013. It describes the establishment of continuous operations at ROB-RWC Belgium for services incorporating data and tools developed in other work packages, focusing on solar observations and prediction products, services, displays and interfaces that provide users and customers with more accurate information in a format that is easy to use and interpret.

4. Press & Media

During the last project meeting in Goettingen in September 2013, the AFFECTS team organized a press event that was attended by more than a dozen media representatives, covering press, TV and radio. Please find below a selection of press articles covering this event:

- Press release University of Göttingen: http://www.uni-goettingen.de/en/3240.html?cid=4563
- Further articles in German only:
  - http://www.nwzonline.de/wissenschaft/forscher-entwickeln-fruehwarnsystem-fuer-weltraumwetter_a_9,3,2907912552.html
  - http://www.ndr.de/regional/niedersachsen/harz/weltraumwetter123_p-7.html
  - http://www.wiwo.de/technologie/forschung/sternstunde-fruehwarnsystem-fuer-weltraumwetter-soll-stromausfaelle-verhindern-seite-all/8842244-all.html
  - http://www.goettinger-tageblatt.de/Nachrichten/Wissen/Wissen-vor-Ort/Weltraumwetter-auf-dem-Smartphone-Goettinger-Wissenschaftler-ist-Projektleiter

The latest project news is provided through the AFFECTS website.

Usually, we introduce one project partner in each newsletter. The next will be **Planetarium Hamburg** (Germany). But due to important deadlines in November we were not able to present the planetarium in this newsletter. Please have a look at the Planetarium Hamburg's website to get to know one of the world's most successful stand-alone-planetarium: http://www.planetarium-hamburg.de/.

Fig. 3: Planetarium Hamburg (Raimond Spekking (raimond.spekking@gmail.com))

5. Collaborations

AFFECTS is actively collaborating with several other EU FP7 projects, such as eHeroes, and COMESEP. Media collaboration with **infoNetwork GmbH** has been officially established through a letter of agreement. Collaboration with Dusan Odstrcil at **NASA/GSFC** is progressing to develop CME modelling input for the **ENLIL** code. Dr. Odstrcil visited the Institute for Astrophysics in Göttingen in January and also participated in the 2nd General Meeting and User Workshop in Brussels in February 2013. Further collaborations are ongoing with **ESA DLR Solar Sail WG, SSA activities, SPP and the Planetarium Hamburg show "Flammender Himmel"** featuring AFFECTS.

6. Upcoming Events

November 18-22: **10th European Space Weather Week**, Antwerp, Belgium, http://www.stce.be/esww10/.

December 04-06: **4th International Galileo Science Colloquium**, Prague, Czech Rep., http://congrexprojects.com/13c15.

December 09-13: **AGU Fall Meeting 2013**, San Francisco, USA, http://fallmeeting.agu.org/2013/.

February 17-18, 2014: **3rd AFFECTS General Meeting** at the Royal Observatory Belgium, Brussels. More information will follow soon!

April 28 – May 3, 2014: **21st Young Scientists' Conference on Astronomy and Space Physics**, Kyiv, Ukraine, http://www.ysc.kiev.ua/

For further meetings see e.g., http://sohowww.nascom.nasa.gov/community/

All previous newsletters can be downloaded from the AFFECTS website at http://www.affects-fp7.eu/news-events/.