

Space Weather Activities in Germany

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Wissen für Morgen



Space Weather activities in Germany - status

- Solar and Space weather research is performed in Germany at several universities and research institutes:
 - Christian-Albrechts-University (CAU) of Kiel (Heliophysics, Neutron monitor)
 - German Aerospace Center (DLR) operates the “Space Weather Application Center, Ionosphere” (SWACI), contributes to the RTSW network of NOAA at European sector, just establishing a global flare monitoring system, ISWI
 - German Research Centre for Geosciences (GFZ), Geomagnetic research and observations (Sat missions: SWARM, GRACE, TerraSAR-X, Tandem-X)
 - Leibniz-Institut für Astrophysik Potsdam (AIP), Flares, CMEs, LOFAR
 - Max-Planck Institute for Solar System Research (MPS) in Katlenburg-Lindau (SOHO, STEREO, SUNRISE, SDO, SOLAR ORBITER)
 - University of Goettingen (STEREO, AFFECTS)
- German Aerospace Center (DLR) as agency supports SW related projects e.g. STEREO, and the establishment of a National Space Situational Awareness Center hosted by aviation forces
- Fraunhofer institutes develop measurement techniques and payloads
- Industry (Astrium) is developing satellites and payloads



Space weather activities in Germany – plans

- Recommendation of the 3. National Space Weather Workshop in Freiburg:
 - National activities should focus on Ionospheric research and monitoring guided by enhanced national cooperation in a broad spectrum of different activities, e.g. solar physics field and development of related payloads
- Establishment of the „*National Space Situational Awareness Center*“ including SWE components
- Establishment of an „*Ionospheric Monitoring and Prediction Center*“ (IMPC) in DLR Neustrelitz in the frame of ESA’s SSA program to establish the „*Expert Service Center*“ (ESC) „*Ionospheric Weather*“
- Coordination of European research and monitoring activities in the frame of the ESA’s SSA program
- Planning / development of SWE related satellite missions and payloads
- Active role in current and future European SWE projects funded by the European commission or ESA (e.g. AFFECT, ESPAS, TRANSMIT, MONITOR)



International cooperation status / plans

- Lol with NOAA for SWE cooperation
 - ACE reception at European longitude sector and NRT data provision to NOAA including reception of data from the follow-up mission (DSCOVER)
 - Collaboration in the field of ionospheric monitoring, modelling and development of SWE products (ionosphere)
- SWE projects of ESA related to the SSA-program (in particular referring to the ESC “Ionospheric Weather”), EGNOS V3 (extension to Africa) and monitoring activities, e.g. MONITOR
- Cooperation with Norwegian Mapping Authority (NMA), The MOA refers to cooperation in the field of space weather / ionospheric research and for developing space weather products, services.
- Joint organization of Space Weather Summer Camps with University of Alabama Huntsville (UAH), 3rd this year



International cooperation status / plans

- Cooperation with SANSA, agreement refers to technological and scientific coordination and the coordinated execution of interrelated projects, among them SWE related projects (ionosphere), joint organization of a Space Weather School (under discussion)
- Cooperation with the University of Bahir Dar / Ethiopia (scintillation monitoring, research, education of a PhD student)
- Joint research agreement with Japan Aerospace Exploration Agency (JAXA) in the field of ionospheric research and monitoring
- Cooperation with University of Barcelona to generate of a joint global NRT TEC product for the International GNSS Service (IGS)
- Establishment of a Global Ionospheric Flare Detection System (GIFDS) including close cooperation (e.g. Boston College, Stanford University, JAXA)



Space Weather Application Center Ionosphere

SWACI provides ionospheric information and data primarily deduced from ground and space based GNSS measurements: e.g. European and global TEC maps, electron density profiles from radio occultation data

