

TECHNICAL NOTE

SSA Space Weather Network Service Product Summary

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Purpose of this document

The purpose of this document is to list the Space Weather data products available through the ESA SSA Space Weather Portal.

The SSA Space Weather Portal provides the main online entry point to the ESA SSA Space Weather Service Network and consequently gives access to a range of space weather products and applications for the eight SWE Service Domains ('Spacecraft design', 'Spacecraft operation', 'Human spaceflight', 'Launch operation', 'Transionospheric radio communications', 'SSA surveillance & tracking', 'Non-space system operation', 'General Data Service') and links all elements of the Space Weather Service Network, including the five Expert Service Centres.

In this document, details of each SWE data product currently available are presented as well as contact information of their provider. Note that this document does not list all Expert Groups participating in each of the Expert Centres with products in development. For this information, the reader is referred to the ESC pages available via the SSA SWE portal (<http://swe.ssa.esa.int>). Only groups actively providing products are listed in this document. The document will be updated following each new product deployment.

This document has been prepared by the SSA Space Weather Coordination Centre (SSCC).

Part 1 of this document lists the Space Weather data products available on the SWE Portal.

Part 2 describes the Expert Groups providing these products.



Part 1: Space weather products

The first part of this document presents the Space Weather federated products available through the ESA SSA Space Weather Network.

The products are classified per Expert Service Centre (ESC) and Expert Group. The different ESC's and contributing number of Expert Groups currently providing SWE data products are:

	Number of Expert Groups	Number of SWE data products
Geomagnetic conditions	5	23
Heliospheric weather	5	14
Ionospheric weather	8	47
Solar weather	5	27
Space radiation	8	27

The expert groups referred to here are only those which are currently providing products, and not an exhaustive list of all EGs affiliated with each Expert Service Centre.

One chapter is dedicated per Expert Service Centre. It includes a short description of the Centre (coordinator, point of contacts and members) and a detailed description of the products grouped by product provider.

The details of each product provider are gathered in Part 2.

1 Geomagnetic conditions products

ESC Coordinator

Daniel Martini, TGO

Expert groups

Solar Influences Data analysis Center (SIDC)

G.105 Provisional AA index

Swedish Institute of Space Physics (IRF)

G.113 Forecast of dB/dt

Tromsø Geophysical Observatory (TGO)

G.102 Provisional K-indices from Northwest Europe

G.103 Geomagnetic Activity index for auroral zone (AZ), last 33 days

G.104 Geomagnetic Activity index for auroral zone (AZ), long term variation

G.117 Day global forecast issued every 24 hours

G.118 Short term (1 hour) Kp forecast

G.119 Short term (1 hour) local geomagnetic forecast

G.120 Real-time and historic geomagnetic activity plots and data files for geomagnetic surveying (Total field)

G.121 Real-time and historic geomagnetic activity plots and data files for directional drilling (Total field, declination and inclination)

G.122 E-mail alerts for geomagnetic disturbances

Helmholtz-centre Potsdam (GFZ)

G.107 Quicklook Kp index (Nowcast Kp plot)

G.108 Most recent definitive Kp index

G.109 Kp and Ap index in tabular form

G.110 Kp/Ap archive

G.123 Swarm Polar Electrojets (PEJ)

G.124 Swarm Field-Aligned Current (FAC)

G.125 Swarm Vector Magnetic Field (MAG)

Finnish Meteorological Institute (FMI)

G.101 Magnetogrammes from North(west) Europe and Greenland

G.106 Auroral alert and forecast service

G.111 Maps for power and pipeline operators

G.112 Table of modelled GIC

G.114 PSP difference



G.101 Magnetogrammes from North(west) Europe and Greenland

Description

This display shows the magnetic condition in northwest Europe during the previous 24 hours in the form of time series - magnetogrammes - from 10 observing stations. They range from Svalbard and Tromsø in the auroral zone to mid-latitude in Denmark.

Provider

Finnish Meteorological Institute (FMI)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/fmi-federated>

G.102 Provisional K-indices from Northwest Europe

Description

In this figure we present last week's local K-index at four stations. The stations are Ny-Ålesund (NAL) and Tromsø (TRO) in the auroral zone, Dombås (DOB) at subauroral latitude and Brorfelde (BFE) at magnetic mid-latitude.

Provider

Tromsø Geophysical Observatory (TGO)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/tgo-federated>

G.103 Geomagnetic Activity index for auroral zone (AZ), last 33 days

Description

This figure tells the geomagnetic activity as observed from Tromsø (in the auroral zone) during the last 33 days. As a measure of activity we have used an index describing the average deviation of the horizontal field component from its normal value.

Provider

Tromsø Geophysical Observatory (TGO)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/tgo-federated>

G.104 Geomagnetic Activity index for auroral zone (AZ), long term variation

Description

In this plot we see the magnetic activity back to 1987, i.e. during the previous two solar cycles. The activity measure is the AZ-index.

Provider

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Tromsø Geophysical Observatory (TGO)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/tgo-federated>

G.105 Provisional AA index

Description

PROVISIONAL AA INDICES from the SIDC (RWC-Belgium), based on K indices from Hartland (UK) and Canberra (Australia)

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/sidc-G105-federated>

G.106 Auroral alert and forecast service

Description

The estimated present auroral oval and expected location of the oval up to 12 hours from the present are shown for Finland and Norway.

Provider

Finnish Meteorological Institute (FMI)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/fmi-federated>

G.107 Quicklook Kp index (Nowcast Kp plot)

Description

This product shows the 3-hourly nowcast Kp index of global geomagnetic activity during the present UTC day as a bar plot. The height of the bar(s) corresponds to the index value (0 to 9) and the colour represents the geomagnetic activity level (low - green ($K_p < 3.3$), intermediate - yellow ($3 < K_p < 6.3$), high - red ($K_p > 6$)). A smaller version of this plot is given for the preceding 6 days. The nowcast Kp values are calculated at GFZ from near real-time geomagnetic observatory data provided by the contributing observatories. Nowcast values of Kp are typically made available at the end of the measurement interval.

Provider

Helmholtz-centre Potsdam (GFZ)

Portal Entry point



<http://swe.ssa.esa.int/web/guest/gfz-kp-federated>

G.108 Most recent definitive Kp index

Description

This product, the so-called musical diagram, shows a plot of the 3-hourly definitive Kp index of global geomagnetic activity during approximately 5 recent solar rotations. A key at the bottom of the plot provides an explanation on how to read it and solar rotation numbers as well as UTC days are indicated in the plot. The definitive Kp is calculated from K values provided by the contributing observatories. This figure is typically produced with a lag time of one to four weeks, as K values from contributing observatories become available. The contributing observatories report these K values in half-monthly intervals with typical delay times of one or two weeks after each half-monthly interval.

Provider

Helmholtz-centre Potsdam (GFZ)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/gfz-kp-federated>

G.109 Kp and Ap index in tabular form

Description

This product shows a table of the nowcast Kp, ap and Ap index of global geomagnetic activity for the present day and the preceding 14 days. Kp and ap are 3-hourly indices, whereas Ap is a daily index. The index values are given in one line per day. Non-existing values are indicated by 'nan'. Below the table, there are links to two downloadable ASCII-files representing the same information. One file gives Kp (in steps of 0.3 or 0.4 from 0 to 9), ap, and Ap and indicates missing values as 'nan'. The other file gives Kp*10 (in steps of 3 or 4 from 0 to 90), ap and Ap and has 99 and 999 as missing data indicator. ap values are derived from Kp. Ap is the daily average of ap. The nowcast Kp values are calculated at GFZ from near real-time geomagnetic observatory data provided by the contributing observatories. Nowcast values of Kp are typically made available at the end of the measurement interval.

Provider

Helmholtz-centre Potsdam (GFZ)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/gfz-kp-federated>

G.110 Kp/Ap archive

Description

In this product yearly files of the definitive Kp, ap and Ap index are given back to 1932. The index values are given in one line per day. Non-existing values are indicated by 'nan'. Next to the

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table, there are links to two downloadable ASCII-files representing the same information. One file gives Kp (in steps of 0.3 or 0.4 from 0 to 9), ap, and Ap and indicates missing values as 'nan'. The other file gives Kp*10 (in steps of 3 or 4 from 0 to 90), ap and Ap and has 99 and 999 as missing data indicator. ap values are derived from Kp. Ap is the daily average of ap. The definitive Kp is calculated from K values provided by the contributing observatories. The files are typically updated with a lag time of one to four weeks, as K values from contributing observatories become available. The contributing observatories report these K values in half-monthly intervals with typical delay times of one or two weeks after each half-monthly interval.

Provider

Helmholtz-centre Potsdam (GFZ)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/gfz-kp-federated>

G.111 Maps for power and pipeline operators

Description

The electric field on the ground and geomagnetically induced currents are modelled taking geomagnetic records as inputs. GIC are shown for the Finnish and Norwegian power grids.

Provider

Finnish Meteorological Institute (FMI)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/fmi-federated>

G.112 Table of modelled GIC

Description

Text files of the modelled GIC in the Finnish and Norwegian power grids during the latest 24 hours, and similarly for the Finnish natural gas pipeline.

Provider

Finnish Meteorological Institute (FMI)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/fmi-federated>

G.113 Forecast of dB/dt

Description

Forecast of the maximum |dB/dt| for the coming 30 minutes.

Provider



Swedish Institute of Space Physics (IRF)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/irf-federated>

G.114 PSP difference

Description

Measured and modelled GIC in the Finnish natural gas pipeline.

Provider

Finnish Meteorological Institute (FMI)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/fmi-federated>

G.117 Day global forecast issued every 24 hours

Description

Next 27-day forecast of the Ap index, produced with ARIMA algorithm.

Provider

Tromsø Geophysical Observatory (TGO)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/tgo-federated>

G.118 Short term (1 hour) Kp forecast

Description

Predicted hourly Kp values for last 24 hours and next ~1 hour

Provider

Tromsø Geophysical Observatory (TGO)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/tgo-federated>

G.119 Short term (1 hour) local geomagnetic forecast

Description

Local geomagnetic forecasts and overview for Ny-Ålesund, Tromsø and Dombås for Horizontal component, Inclination, Declination and total field.

Provider

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Tromsø Geophysical Observatory (TGO)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/tgo-federated>

G.120 Real-time and historic geomagnetic activity plots and data files for geomagnetic surveying (Total field)

G.121 Real-time and historic geomagnetic activity plots and data files for directional drilling (Total field, declination and inclination)

G.122 E-mail alerts for geomagnetic disturbances

Description

Real-time and historic geomagnetic activity plots and data files for geomagnetic surveying (Total field, declination and inclination) based on data from selected stations in Norwegian magnetometer network. Ionospheric conditions plots including 2D Maps of ROTI, TEC, S4 and Sigma_Phi. Time series of ROTI for a selection of sites.

Provider

Tromsø Geophysical Observatory (TGO)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/resoss-federated>

G.123 Swarm Polar Electrojets (PEJ)

Description

The location of the Polar Electrojet (PEJ) is determined from magnetic measurements by the Swarm satellites. This product gives the possibility for studying the evolution of PEJ during geomagnetic quiet times and geomagnetic storms, in particular their migration from high- to mid-latitudes.

Provider

Helmholtz-centre Potsdam (GFZ)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/potsdam-federated>

G.124 Swarm Field-Aligned Current (FAC)

Description

Swarm satellites provide the Field-Aligned Currents (FACs), which play an important role in magnetosphere-ionosphere interactions. They are the main mechanism of energy coupling from solar wind into high-latitude upper atmosphere. As FAC acts as connector between the



magnetosphere and ionosphere at high latitudes, exact information and FACs can help to give constraints on many physical parameters: e.g., ionospheric conductivity.

Provider

Helmholtz-centre Potsdam (GFZ)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/potsdam-federated>

G.125 Swarm Vector Magnetic Field (MAG)

Description

Swarm satellites provide vector measurements of the magnetic field and the magnetic field intensity. Swarm MAG is provided as Level 1b (L1b) data product with a 1Hz cadence by ESA's Earth's Observation program. The data are provided in daily files in CDF format (Swarm L1b product format). The product names are MAGx_LR_1B, with x=A, B, C for the 3 satellites respectively.

Provider

Helmholtz-centre Potsdam (GFZ)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/potsdam-federated>



2 Heliospheric weather products

ESC Coordinator

Chris Perry, STFC-RAL Space

Expert groups

UK Met Office (MET)

H.101a Solar Wind Near-Earth Forecasts

H.102a Near Real Time Solar Wind

H.103a CME Near-Earth Arrival Forecast

H.105a Near Real Time Near-Earth Energetic Particles

H.106a Near-Earth Space Weather Alerts

H.107a Solar wind Tailored Heliospheric

H.108a CME Tailored Heliospheric arrival predictions

H.110a Tailored Heliospheric Space Weather Alerts

Technical University of Denmark (DTU)

H.106b Automated Near-Earth NRT Alerts (AWARE)

Centre de Données de la Physique des Plasmas (CDPP)

H.114a AMDA

RAL Space (STFC)

H.112a Archive Product Assessment Report (HPARC-PAR)

H.113a Archive Product Browser (HPARC-PB)

University of Graz (UNIGRAZ), Institute of Physics

H.101b Forecast of solar wind high-speed streams (ESWF)

H.103b CME near-Earth arrival time predictions (Drag Based Model Tool)



H.101a Solar Wind Near-Earth Forecasts

Description

The Solar Wind Near-Earth forecasts are produced by Met Office Space Weather Operations Centre (MOSWOC) forecasters using the WSA-Enlil Model and SOHO LASCO coronagraph images. Displayed is an mp4 movie of the WSA-Enlil model output for Earth, any forecaster derived CME parameters that are active during the WSA-Enlil run period (two days prior and five days subsequent to the model run time) and a forecaster commentary. The WSA-Enlil movie presents output for forecast solar wind number density (top row) and velocity (bottom row).

Provider

UK Met Office (MET)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/metoffice-selwe-federated>

H.101b Forecast of solar wind high-speed streams (ESWF)

Description

The ESWF is based on an empirical relation linking the area of coronal holes observed in remote sensing EUV data and high speed streams measured at Earth after about 4 days (see Vršnak, Temmer, Veronig, 2007). The service provides the extracted areas from EUV (NASA SDO/AIA 193 A) image data, as well as a graphical output of the forecasted solar wind speed at L1 for three different time-ranges. The service product is updated automatically every hour, with a delay of 2 hours to real-time, and compared to actual L1 in-situ measurements (ACE/DSCOVR).

Provider

University of Graz (UNIGRAZ), Institute of Physics

Portal Entry point

<http://swe.ssa.esa.int/web/guest/graz-eswf-federated>

H.102a Near Real Time Solar Wind

Description

This product is a graphical near real time representation of the observational data available from the DSCOVR (previously ACE) satellite. This includes: * Bulk Wind Speed; * Proton Density; * Proton Temperature; * IMF Bx, By, Bz, Bt.

Provider

UK Met Office (MET)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/metoffice-selwe-federated>



H.103a CME Near-Earth Arrival Forecast

Description

Based on the forecaster analysis of the WSA-Enlil Model the CME arrival time will be referenced within the forecaster commentary. The role of the forecaster commentary is to condense the complex input data sources, current and forecast environmental conditions into a succinct expert analysis of solar wind conditions including any forecast CMEs, which is delivered in clear and understandable language tailored to Met Office customer needs. Notifications will also appear at the top of the web page at different stages of the CME's transit to Earth.

Provider

UK Met Office (MET)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/metoffice-selwe-federated>

H.103b CME near-Earth arrival time predictions (Drag Based Model Tool)

Description

The drag-based model (DBM) tool provides predictions of the interplanetary coronal mass ejection (ICME) travel and its arrival at an arbitrary ecliptic-plane location or at already listed planets and satellites in ecliptic-plane orbits. Calculations are based on the assumption that the dominant force in the heliospheric dynamics of ICMEs is the magnetohydrodynamical (MHD) equivalent of the aerodynamic drag (see Vršnak et al., 2013, and references therein). The background solar wind is based on the assumption to be quasi-stationary, isotropic, and having a constant speed w (Vršnak and Žic, 2007). From these approximations follows that the drag-parameter γ is constant as well. Basically, for a given set of input parameters the model provides the ICME Sun-'target' transit time, the arrival time, and the impact speed (Vršnak and Žic, 2007).

Provider

University of Graz (UNIGRAZ), Institute of Physics

Portal Entry point

<http://swe.ssa.esa.int/web/guest/graz-dbm-federated>

H.105a Near Real Time Near-Earth Energetic Particles

Description

This product is a graphical representation of the observational data available from the NOAA GOES satellites. Latest available proton flux data, in three cumulative bands, >10 MeV, >50 MeV and >100 MeV and electron flux data in two bands, >0.8 MeV and >2 MeV from GOES 13 and 15 is displayed and updated every minute.

Provider

UK Met Office (MET)

**Portal Entry point**

<http://swe.ssa.esa.int/web/guest/metoffice-selwe-federated>

H.106a Near-Earth Space Weather Alerts**Description**

This product is generated by Met Office Space Weather Operations Centre (MOSWOC) forecaster based on all available data and model output. It describes all notifications (alerts, watches, and warnings) issued including: * Radio Blackout Alerts; * Geomagnetic Watches, * Warnings & Alerts; * Proton Flux Warnings, * Alerts; Electron Flux Warnings, Alerts.

Provider

UK Met Office (MET)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/metoffice-selwe-federated>

H.106b Automated Near-Earth NRT Alerts (AWARE)**Description**

The Near-Earth Near-Real-Time alert service (AWARE) product provides an automated detection and subsequent classification of solar wind disturbances arriving at the L1 point. Focus is on disturbances with a potential for creating geomagnetic storms. The service requires solar wind in situ plasma and magnetic field observations. These are currently provided in NRT directly from NOAA/NASA from the ACE SWEPAM and MAG instruments. Periods of significantly enhanced magnetic field are identified and classified according to their most likely cause, being either propagating ICMEs or high speed streams creating SIRs (including CIRs). In addition, significant interplanetary shocks are identified. Independently Kp is predicted 1-2h ahead based on the latest solar wind measurements.

Provider

Technical University of Denmark (DTU)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/dtu-aware-federated>

H.107a Solar wind Tailored Heliospheric**Description**

The Heliospheric forecasts are produced by Met Office Space Weather Operations Centre (MOSWOC) forecasters using the WSA-Enlil Model and SOHO LASCO coronagraph images. Displayed is an mp4 movie of the WSA-Enlil model output for the selected targets, any forecaster derived CME parameters that are active during the WSA-Enlil run period (two days prior and five days subsequent to the model run time) and a forecaster commentary. The WSA-Enlil movie presents output for forecast solar wind number density (top row) and speed (bottom row).

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Provider

UK Met Office (MET)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/metoffice-helswe-federated>

H.108a CME Tailored Heliospheric arrival predictions

Description

The expected arrival time of any target directed CMEs are reported in the forecaster commentary displayed below the H.107a model output and CME input list.

Provider

UK Met Office (MET)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/metoffice-helswe-federated>

H.110a Tailored Heliospheric Space Weather Alerts

Description

Space weather alerts (notifications) are provided as part of the forecaster commentary section (i.e. in conjunction with H.108a). Notifications are currently limited to assessment of high speed streams based on the H.107a heliospheric model output.

Provider

UK Met Office (MET)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/metoffice-helswe-federated>

H.112a Archive Product Assessment Report (HPARC-PAR)

Description

The H-ESC Product Assessment Report provides a monthly overview of the events identified during the interval and the accuracy with which they could be determined. Initially this activity is focused on CME arrival and solar wind speed forecasts.

Provider

RAL Space (STFC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/ral-federated>

H.113a Archive Product Browser (HPARC-PB)

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**Description**

The H-ESC Archive Product Browser provides access to a sub-set of the forecast, NRT and alert products made available by the Expert Groups within the H-ESC consortium. The main purpose is to provide access to historical information in support of event analysis, case studies, design work and the development of operational procedures based on realistic product timelines.

Provider

RAL Space (STFC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/ral-federated>

H.114a AMDA**Description**

The Automated Multi Dataset Analysis tool provides in-situ plasma data obtained in planetary environments by spacecraft measurements and modeled / simulated data. Advanced functionalities such as visualization, data mining and statistics are also offered together with interoperability with other data centres.

Provider

Centre de Données de la Physique des Plasmas (CDPP)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/cdpp-amda-federated>



3 Ionospheric weather products

ESC Coordinator

Claudia Borries, DLR

Expert groups

Space Research Centre (SRC)

I.125a Past values of solar activity indices relevant to drag calculation R - sunspot number.

I.125b Past values of solar activity indices relevant to drag calculation F10.7 -10.7 -cm radio flux proxy for solar EUV in solar flux units.

I.125c Past values of solar activity indices relevant to drag calculation S10.7 index.

I.125d Past values of solar activity indices relevant to drag calculation M10.7 proxy.

I.125e Past values of solar activity indices relevant to drag calculation Y10.7 Index.

I.125f Past values of solar activity indices relevant to drag calculation F30 flux.

I.126a Past values of geomagnetic activity indices relevant to drag calculation. Ap - planetary daily magnetic index.

I.126b Past values of geomagnetic activity indices relevant to drag calculation. Kp - planetary three-hour magnetic index.

I.126c Past values of geomagnetic activity indices relevant to drag calculation. Dst - Disturbance Storm Time Index.

I.126d Past values of geomagnetic activity indices relevant to drag calculation. IG12 - 12-month-running mean of the ionospheric IG index.

I.126e Past values of geomagnetic activity indices relevant to drag calculation. IMF - Interplanetary Magnetic field.

I.126f Past values of geomagnetic activity indices relevant to drag calculation - Aa_daily index

National Observatory of Athens (NOA)

I.114 foF2 long term prediction maps - Real Time

I.115 foF2 nowcasting maps - Real time

I.116 foF2 forecasts - Maps - Real Time

I.117 Integrated Electron Density Maps - Near real time

I.118 Ionospheric Alert

I.119 Current Ionospheric Conditions - Real time

I.120 foF2 forecasts - plots over stations - Real Time

Hosted by the SWE Data Centre

I.121 IONMON TEC maps (native to SWE Data Centre)

Collecte Localisation Satellites (CLS)

I.122 ISM ionospheric scintillation monitoring

Ionosphere Monitoring and Prediction Center (IMPC)

I.101 TEC Maps (Europe), current

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I.102 TEC Map (Europe), 1 hr forecast
I.103 TEC Map (Global), current
I.104 TEC Map (Global), 1 hr forecast
I.105a Equivalent Slab Thickness, Juliusruh
I.105b Equivalent Slab Thickness, Pruhonice
I.106a Local Scintillation Measurements, Kiruna
I.106b Local Scintillation Measurements, Neustrelitz
I.106c Local Scintillation Measurements, Svalbard
I.106d Local Scintillation Measurements, Tenerife
I.106e Local Scintillation Measurements, Toulouse
I.124 Mean ROTI for Europe

Helmholtz-centre Potsdam (GFZ)

I.128 Swarm Rate Of change of TEC (ROT)
I.129 Swarm Total Electron Content (TEC)
I.130 Swarm Electron Density (Ne)
I.131 Swarm Ionospheric Bubble Index (IBI)

Norwegian Mapping Authority (NMA)

I.107 VTEC maps (Northern Europe)
I.108 GIVE maps (Northern Europe)
I.109 ROTI maps (Norway)
I.110 S4 and $\sigma\phi$ maps (Northern Europe)
I.111 Ionospheric disturbances (plots and data files)
I.112 S4 and $\sigma\phi$ maps (plots and data files based on 50Hz receivers)
I.113 $\sigma\phi$ maps (plots and data files based on 1Hz receivers)
I.127 ROTI at ground time series (Selected locations in northern Europe)

Finnish Meteorological Institute (FMI)

I.123a Sunlit Ionosphere Sudden TEC Enhancement Detector (SISTED)
I.123b GNSS Solar Flare Indicator (GSFLAI)



I.101 TEC Maps (Europe), current

Description

Near real-time map of the Total Electron Content (TEC) for the European region. It is generated from GNSS data streams which are assimilated into the Neustrelitz TEC Model NTCM-EU, which is a regional TEC model for Europe.

Provider

Ionosphere Monitoring and Prediction Center (IMPC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/swaci-federated>

I.102 TEC Map (Europe), 1 hr forecast

Description

1 hour forecast of the Total Electron Content (TEC) for the European region. This forecast is derived from the near real-time TEC maps.

Provider

Ionosphere Monitoring and Prediction Center (IMPC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/swaci-federated>

I.103 TEC Map (Global), current

Description

Near real-time map of the Total Electron Content (TEC) for the world. It is generated from GNSS data streams which are assimilated into the Neustrelitz TEC Model NTCM-GL, which is a global TEC model.

Provider

Ionosphere Monitoring and Prediction Center (IMPC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/swaci-federated>

I.104 TEC Map (Global), 1 hr forecast

Description

1 hour forecast of the Total Electron Content (TEC) worldwide. This forecast is derived from the near real-time TEC maps.

Provider

Ionosphere Monitoring and Prediction Center (IMPC)

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**Portal Entry point**

<http://swe.ssa.esa.int/web/guest/swaci-federated>

I.105a Equivalent Slab Thickness, Juliusruh**Description**

The equivalent slab thickness is a measure of the width of the shape of the vertical electron density profile of the ionosphere. The equivalent slab thickness is defined by the ratio of the total electron content (TEC) and the peak electron density of the local ionosphere. To compute the peak electron density, vertical sounding data from the Juliusruh ionosonde stations is used. The corresponding TEC data are extracted from the TEC maps.

Provider

Ionosphere Monitoring and Prediction Center (IMPC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/swaci-federated>

I.105b Equivalent Slab Thickness, Pruhonice**Description**

The equivalent slab thickness is a measure of the width of the shape of the vertical electron density profile of the ionosphere. The equivalent slab thickness is defined by the ratio of the total electron content (TEC) and the peak electron density of the local ionosphere. To compute the peak electron density, vertical sounding data from the Pruhonice ionosonde stations is used. The corresponding TEC data are extracted from the TEC maps.

Provider

Ionosphere Monitoring and Prediction Center (IMPC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/swaci-federated>

I.106a Local Scintillation Measurements, Kiruna**Description**

Local Scintillation indices S4 and $\sigma\phi$ for Kiruna (Sweden)

Provider

Ionosphere Monitoring and Prediction Center (IMPC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/swaci-federated>



I.106b Local Scintillation Measurements, Neustrelitz

Description

Local Scintillation indices S4 and $\sigma\phi$ for Neustrelitz (Germany)

Provider

Ionosphere Monitoring and Prediction Center (IMPC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/swaci-federated>

I.106c Local Scintillation Measurements, Svalbard

Description

Local Scintillation indices S4 and $\sigma\phi$ for Svalbard (Norway)

Provider

Ionosphere Monitoring and Prediction Center (IMPC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/swaci-federated>

I.106d Local Scintillation Measurements, Tenerife

Description

Local Scintillation indices S4 and $\sigma\phi$ for Tenerife (Spain)

Provider

Ionosphere Monitoring and Prediction Center (IMPC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/swaci-federated>

I.106e Local Scintillation Measurements, Toulouse

Description

Local Scintillation indices S4 and $\sigma\phi$ for Toulouse (France)

Provider

Ionosphere Monitoring and Prediction Center (IMPC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/swaci-federated>

I.107 VTEC maps (Northern Europe)

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I.108 GIVE maps (Northern Europe)

I.109 ROTI maps (Norway)

I.110 S4 and $\sigma\phi$ maps (Northern Europe)

I.111 Ionospheric disturbances (plots and data files)

I.112 S4 and $\sigma\phi$ maps (plots and data files based on 50Hz receivers)

I.113 $\sigma\phi$ maps (plots and data files based on 1Hz receivers)

Description

The following plots (related to the last five minutes) are shown: Error margin in the plasma content (GIVE), Ionospheric turbulence (ROTI), Disturbances on the ground, Plasma content of the ionosphere (VTEC), Scintillation (S4) and Scintillation (Sigma_Phi) and Scintillation (Sigma Phi 1Hz data). In the 'Preview' Page, it is possible to display plots from the past. In this page, two different types of plots are shown. On the top, a 24 hour time series of ROTI at ground is shown for the day specified in the selection criteria frame and for three main areas: Southern, middle and north of Norway.

Provider

Norwegian Mapping Authority (NMA)

Portal Entry point

<http://swe.ssa.esa.int/web/rtim-federated>

I.114 foF2 long term prediction maps - Real Time

Description

The long term prediction map of foF2 for the whole European region for the current and the following 2 months, developed with data from 10 ionospheric stations, based on the SIRM/CCIR mapping routine.

Provider

National Observatory of Athens (NOA)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/dias-federated>

I.115 foF2 nowcasting maps - Real time

Description

The real time map of foF2 for the whole European region, developed with data from 10 ionospheric stations, based on the SIRMUP mapping routine. The map is made available with a latency of 20 min every hour in both ASCII and PNG formats.

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**Provider**

National Observatory of Athens (NOA)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/dias-federated>

I.116 foF2 forecasts - Maps - Real Time**Description**

The maps over Europe (latitude from 34 to 80 deg) of the foF2 parameter, for the next 24 hours, calculated with the SWIF forecast model and mapped using the real-time updated SIRMUP method with background models the SIRM (for mid latitudes) and the CCIR (for the high latitudes). The maps are made available with a latency of 20 min every hour in both ASCII and PNG formats.

Provider

National Observatory of Athens (NOA)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/dias-federated>

I.117 Integrated Electron Density Maps - Near real time**Description**

Four different maps are produced for the European region each 15 min of the hour: the map of the integrated electron density from 90km to hmF2 (bottomside TEC), the map of the integrated electron density from hmF2 to the transition height (topside TEC), the map of the integrated electron density from the transition height to 20,000km (Plasmaspheric TEC) and the map of the integrated electron density from 90 km to 20,000 km (TEC). The mapped area extends from -10 W to 40 E in longitude and from 34 N to 60 N in latitude, and the spatial resolution of the maps is 1x1. The product is based on the 3D electron density grids that are calculated using TaD model (Belehaki et al., 2012; Kutiev et al., 2012) in DIAS system. The maps are made available with a latency of 30 min in both ASCII and PNG formats.

Provider

National Observatory of Athens (NOA)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/dias-federated>

I.118 Ionospheric Alert**Description**

**Provider**

National Observatory of Athens (NOA)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/dias-federated>

I.119 Current Ionospheric Conditions - Real time**Description**

A map of Europe that presents the current level of ionospheric activity, expressed as the deviation of the observed foF2 parameter in respect to the running 30 days median. The color code (green-orange-red) corresponds to the ionospheric disturbance level (quiet - disturbed - extremely disturbed). The maps are made available with a latency of 15 min in both ASCII and PNG formats.

Provider

National Observatory of Athens (NOA)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/dias-federated>

I.120 foF2 forecasts - plots over stations - Real Time**Description**

Time plot of the foF2 for the next 24 hours at each station location. The forecasted foF2 is calculated with the SWIF model. The 30-days running median foF2 values are overplotted to provide the expected reference level and give to the user an estimation of the expected disturbance. The plots are made available with a latency of 20 min every hour in both ASCII and PNG formats.

Provider

National Observatory of Athens (NOA)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/dias-federated>

I.121 IONMON TEC maps**Description**

The IONMON model (ESA/ESOC Ionosphere Monitoring Facility, v2) uses an analytic function approach to describe ionospheric structures by means of vertical profile functions combined with horizontal surface functions. TEC data derived from dual-frequency GNSS data are processed in combination with observed electron density profiles obtained from radio occultation measurements.

**Provider**

Hosted by the SWE Data Centre

Portal Entry point

<http://swe.ssa.esa.int/web/guest/ionmon>

I.122 ISM ionospheric scintillation monitoring**Description**

Ionospheric Scintillation Monitoring (ISM) service enables to present a nowcast or forecast worldwide and regional map of ionospheric scintillations level, to provide a nowcast or forecast status of ionospheric scintillations level at a given location on Earth, to send an alert via email if the scintillation level nowcast exceeds or the forecast is expected to exceed a defined threshold at a given location and to evaluate the scintillation level for regions where no data is available.

Provider

Collecte Localisation Satellites (CLS)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/ism-public>

I.123a Sunlit Ionosphere Sudden TEC Enhancement Detector (SISTED)**Description**

SISTED is monitoring simultaneous sudden enhancements in the ionospheric Total Electron Content (TEC) using the drift rate (second time derivative) of the ionospheric carrier phase product (LI) which can be derived from the GNSS signal. Sudden TEC enhancements can be associated with Solar Flare activity.

Provider

Finnish Meteorological Institute (FMI)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/upc-fmi-federated>

I.123b GNSS Solar Flare Indicator (GSFLAI)**Description**

GSFLAI provides a proxy of solar EUV rate measurements based on VTEC dependency on the solar zenith angle as derived from very precise dual-frequency GPS signals.

Provider

Finnish Meteorological Institute (FMI)

Portal Entry point



<http://swe.ssa.esa.int/web/guest/upc-fmi-federated>

I.124 Mean ROTI for Europe

Description

The Rate of change of TEC index (ROTI) can be used as a measure to detect disturbances in the ionosphere. We calculate the ROTI from real-time data streams and associate the calculated values to the ionospheric pierce points. The world map is overlaid with a grid and the averaged ROTI values falling in a certain tile are shown.

Provider

Ionosphere Monitoring and Prediction Center (IMPC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/swaci-federated>

I.125a Past values of solar activity indices relevant to drag calculation R - sunspot number.

Description

Daily total sunspot number derived by the formula: $R = N_s + 10 * N_g$, with N_s the number of spots and N_g the number of groups counted over the entire solar disk.

Provider

Space Research Centre (SRC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/src-federated>

I.125b Past values of solar activity indices relevant to drag calculation F10.7 -10.7 - cm radio flux proxy for solar EUV in solar flux units.

Description

The 10.7cm Solar Flux is a measurement of the integrated emission at 10.7cm wavelength from all sources present on the disk.

Provider

Space Research Centre (SRC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/src-federated>

I.125c Past values of solar activity indices relevant to drag calculation S10.7 index.

**Description**

S10.7 index is an activity indicator of the integrated 26-34 nm solar irradiance measured by the Solar Extreme-ultraviolet Monitor (SEM) instrument on the NASA/ESA Solar and Heliospheric Observatory (SOHO) satellite.

Provider

Space Research Centre (SRC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/src-federated>

I.125d Past values of solar activity indices relevant to drag calculation M10.7 proxy.**Description**

The M10.7 index is derived from the Mg II core-to-wing ratio that originated from the NOAA series operational satellites, e.g., NOAA-16,-17,-18, which host the Solar Backscatter Ultraviolet (SBUV) spectrometer.

Provider

Space Research Centre (SRC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/src-federated>

I.125e Past values of solar activity indices relevant to drag calculation Y10.7 Index.**Description**

A composite solar index of the Xb10 index, Lyman- α emission and 81-day centered smoothed F10.7. Xb10 index and is used to represent the daily energy that is deposited into the mesosphere and lower thermosphere.

Provider

Space Research Centre (SRC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/src-federated>

I.125f Past values of solar activity indices relevant to drag calculation F30 flux.**Description**

The F30 is the Solar Flux measured by the Nobeyama Radio Observatory, which performs daily measurements of the 30 cm radio flux on an operational 7/365 basis.

Provider

Space Research Centre (SRC)



Portal Entry point

<http://swe.ssa.esa.int/web/guest/src-federated>

I.126a Past values of geomagnetic activity indices relevant to drag calculation. Ap - planetary daily magnetic index.

Description

The geomagnetic Ap index is derived from the Kp index by averaging the eight values of ap for each day.

Provider

Space Research Centre (SRC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/src-federated>

I.126b Past values of geomagnetic activity indices relevant to drag calculation. Kp - planetary three-hour magnetic index.

Description

The global Kp index is obtained as the mean value of the disturbance levels in the two horizontal field components, observed at 13 selected, subauroral stations.

Provider

Space Research Centre (SRC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/src-federated>

I.126c Past values of geomagnetic activity indices relevant to drag calculation. Dst - Disturbance Storm Time Index.

Description

The Dst index is an index of magnetic activity derived from a network of near-equatorial geomagnetic observatories that measure the intensity of the globally symmetrical equatorial electrojet.

Provider

Space Research Centre (SRC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/src-federated>



I.126d Past values of geomagnetic activity indices relevant to drag calculation. IG12 - 12-month-running mean of the ionospheric IG index.

Description

The IG index of solar activity are derived from the monthly median noon foF2 data available from the following thirteen ionospheric observatories. IG12 is 12-month-running mean of the ionospheric IG index.

Provider

Space Research Centre (SRC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/src-federated>

I.126e Past values of geomagnetic activity indices relevant to drag calculation. IMF - Interplanetary Magnetic field.

Description

The magnetic field carried with the solar wind.

Provider

Space Research Centre (SRC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/src-federated>

I.126f Past values of geomagnetic activity indices relevant to drag calculation - Aa_daily index

Description

The daily Aa index is the daily average of eight aa values. Index aa is derived from the K indices measured at two antipodal observatories.

Provider

Space Research Centre (SRC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/src-federated>

I.127 ROTI at ground time series (Selected locations in northern Europe)

Description

Ionospheric conditions plots including 2D Maps of ROTI, TEC, S4 and Sigma_Phi. Time series of ROTI for a selection of sites. They are measures of the general level of ionospheric disturbance that is affecting a receiver station.

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**Provider**

Norwegian Mapping Authority (NMA)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/resoss-federated>

I.128 Swarm Rate Of change of TEC (ROT)**Description**

The Rate Of change of TEC (ROT) is used to monitor small-scale variability. It is known that large fluctuations in electron content can seriously affect GNSS and create radio wave scintillations that degrade significantly solutions for positioning and navigation.

Provider

Helmholtz-centre Potsdam (GFZ)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/gfz-sua-federated>

I.129 Swarm Total Electron Content (TEC)**Description**

Swarm Total Electron Content (TEC) provides integrated electron density along the line of sight of a GPS signal received at the Swarm satellite. Swarm satellites can receive signals from up to 8 GPS satellites simultaneously; therefore, multiple TEC observations at the same universal time (UTC) are possible.

Provider

Helmholtz-centre Potsdam (GFZ)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/gfz-sua-federated>

I.130 Swarm Electron Density (Ne)**Description**

Swarm plasma density (Ne) is provided as Level 1b (L1b) data product with a 2Hz cadence by ESA's Earth's Observation program. The data are provided in daily files in CDF format (Swarm L1b product format). The product names are EFIX_PL_1B, with x=A, B, C for the 3 satellites respectively.

Provider

Helmholtz-centre Potsdam (GFZ)

Portal Entry point



<http://swe.ssa.esa.int/web/guest/gfz-sua-federated>

I.131 Swarm Ionospheric Bubble Index (IBI)

Description

Swarm Ionospheric Bubble Index (IBI) provides information on bubble climatology itself as well as on disturbance level of magnetic field data by combining electron density and magnetic field observations. Bubbles (low-latitude post sunset plasma irregularities) are an intrinsic regular phenomenon in the F-region ionosphere that leave severe plasma density gradients, magnetic field variations and can cause GPS signal scintillations.

Provider

Helmholtz-centre Potsdam (GFZ)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/gfz-sua-federated>

4 Space radiation products

ESC Coordinator

Norma Crosby, BIRA-IASB

Expert groups

Athens Neutron Monitor Station (ANeMoS), NKU Athens

R.102 Ground Level Enhancement (GLE) Alert service

R.108 Multi-station Neutron Monitor data

Mullard Space Science Laboratory (UCL)

R.131 Electron Population Model (GEO)

R.132 Electron Population Model (MEO)

Seibersdorf Laboratories

R.101 Radiation exposure estimation at aircraft altitude (AVIDOS 2.0)

Hosted by the SWE Data Centre

R.104 Space Environment Data System (SEDAT)

R.106 Space Environment System for Mission Operations (SEISOP) [UNDER MAINTENANCE]

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BIRA-IASB Space Weather Services

R.103 Space Environment Information System (SPENVIS)

R.134 The COMESEP Alert System



R.101 Radiation exposure estimation at aircraft altitude (AVIDOS 2.0)

Description

AVIDOS is an informational and educational software for the assessment of the radiation dose exposure caused by galactic and solar cosmic rays during flights. AVIDOS can assess radiation dose due to solar cosmic rays that are produced at or near the Sun during solar storms. It assumes a pessimistic and an optimistic scenarios resulting in a range of route doses for a flight performed during a solar storm. The code employs a multiparameter model built upon simulations of cosmic radiation exposure done using the FLUKA Monte Carlo code. It calculates both ambient dose equivalent $H^*(10)$ and effective dose E for flight routes over the whole world at typically used altitudes and for the full range of solar activity. The dose assessment procedure using AVIDOS is accredited by the Austrian office for accreditation according to European regulations and is valid in the whole Europe. AVIDOS took part in an international comparison of different codes assessing radiation exposure of aircraft crew where a fully satisfactory agreement between codes has been found.

Provider

Seibersdorf Laboratories

Portal Entry point

<http://swe.ssa.esa.int/web/guest/avidos-federated>

R.102 Ground Level Enhancement (GLE) Alert service

Description

High resolution real time data from the Neutron Monitor Database (NMDB) are being used as seeders of the GLE Alert Plus. When large Solar Energetic Particle (SEP) events with sufficient energy (>500 MeV) and intensity hit the Earth's atmosphere, a ground-based neutron monitor (NM) records an intensity increase of secondary neutrons, resulting in a ground level enhancement (GLE) event. Given the high energy that is necessary for the detection of a GLE by a NM, it is evident that NM stations will register extreme SEP (GLE) events rather promptly. GLE observations by NM stations make it possible to establish a warning signal on the arrival of lower and mid energy charged particles that can damage satellite's electronics and also pose a radiation threat to astronauts and air crews. The early detection of an Earth-directed solar cosmic ray event (GLE) by NM stations provides a good chance of preventive SEP-flux monitoring, leading to an Alert with a very low probability of false alarm. GLE Alert Plus monitors the recordings of each NM station providing data to NMDB. For every minute, it calculates the moving average of the previous hour and the threshold that represents the upper limit for which the NM station is considered to be at 'Quiet' mode, for every NM. If three consecutive 1-min measurements exceed this threshold, the particular NM station is considered to be at a 'Station Alert' mode and an elapsed time window of 15 min is being triggered. In case three NM stations, independently of each other enter the 'Station Alert' mode within the aforementioned time window a General 'GLE Alert' is being marked and an Alert is issued.

Provider

Athens Neutron Monitor Station (ANeMoS), NKU Athens

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**Portal Entry point**

<http://swe.ssa.esa.int/web/guest/anemos-federated>

R.103 Space Environment Information System (SPENVIS)**Description**

SPENVIS (Space Environment Information System) is a web-based interface for assessing the space environment and its effects on spacecraft systems and crews. The system is used for mission analysis and planning. SPENVIS includes several empirical models of the space environment covering mainly cosmic rays, solar energetic particles, the natural radiation belts, magnetic fields, space plasmas and the upper atmosphere. A range of engineering models are also available to help assess the effects of the space environment on spacecraft such as surface and internal charging, energy deposition, solar cell damage and SEU rates. Usually these later models take their inputs from the empirical models present in SPENVIS. The system also includes extensive background information on the space environment, the environment models and the related standards.

Provider

BIRA-IASB Space Weather Services

Portal Entry point

https://spenvis.ssa-swe.eu/ssa_intro_first.php

R.104 Space Environment Data System (SEDAT)**Description**

SEDAT is a tool for the engineering analysis of spacecraft charged particle environments. The facility provides access to the ODI database containing a large and comprehensive set of data about that environment as measured in-situ by a number of space missions. The user can select a set of space environment data appropriate to the engineering problem under study. SEDAT also offers a set of software tools, which can operate on the data retrieved from the database. These tools allow the user to carry out a wide range of engineering analyses. SEDAT is using a GUI written in Java.

Provider

Hosted by the SWE Data Centre

Portal Entry point

<http://ssa-be-vm-fe-05p.ssa.esa.int/sedat/sedatsystem.php>

R.106 Space Environment System for Mission Operations (SEISOP) [UNDER MAINTENANCE]**Description**

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SSA Space Weather Network Service Product Summary

Issue Date 11/08/2016 Ref SSA-SWE-SSCC-TN-0013



The SEISOP system provides an interface tailored towards spacecraft operators allowing comparison of space environment information with spacecraft housekeeping data. The combination of these different data types enables advanced correlation and analysis, for a better understanding of how Space Weather effects impact the status and health of the operator's spacecraft. In addition to presenting data originating from diverse external data providers, SEISOP provides several built-in Space Weather models for near-real-time forecasting of Space Weather events and alerting.

Provider

Hosted by the SWE Data Centre

Portal Entry point

R.107 European Debris Impact Database (EDID)

Description

EDID provides automated data processing and dissemination functions for measurements retrieved from European debris and meteoroids impact detectors. It covers impacts from the DEBIE-1, DEBIE-2 and GORID detectors. Users can access more than 3,000,000 debris and micro-meteoroid event records plus sensor and spacecraft housekeeping data via a user-friendly web interface. Filters can be defined for each available parameter and be used for regular data retrieval.

Provider

Hosted by the SWE Data Centre

Portal Entry point

https://ssa-be-vm-fe-01p.ssa.esa.int/edid/member/debie1_query_sci.php

R.108 Multi-station Neutron Monitor data

Description

A Web interface providing access to neutron monitor data from multiple stations has been implemented. The data can be depicted in plot, ascii and csv file format while the user can select the desired time resolution of the output. The interface has been developed in HTML and PHP in a modular manner in order to be easily maintained and extended in the future. It also uses CSS, AJAX techniques, javascripts, and has a dependence on the jQuery library. The interface connects to the NMDB slave server located at the Athens Neutron Monitor Station (A.Ne.Mo.S.)

Provider

Athens Neutron Monitor Station (ANeMoS), NKU Athens

Portal Entry point

<http://swe.ssa.esa.int/web/guest/anemos-federated>



The multiple stations are hosted by:

Almaty NM, Kazakhstan (AATB); Armenian NMs; Athens NM; Greece (ATHN); Bartol (University of Delaware) NMs; Doi Inthanon, Thailand (PSNM); Dourbes NM, Belgium (DRBS); ESOI-TAU, Israel (ESOI); Guadalajara, Spain (CALM); Kerguelen (KERG) and Terre Adelie (TERA) stations, France; Kiel, Germany (KIEL, KIEL2); Koldewey Station, Spitzbergen; Lomnický štít, Slovakia (LMKS); Oulu, Finland (OULU); Plateau de Bure NM, France (BURE); RUSSIAN NMs; Rome, Italy (ROME); Swiss NMs; Zugspitze, Germany

R.109 PROBA-V/EPT electron flux spectra time series

Description

Time series of electron flux spectra in the energy range 0.5-8 MeV as measured by the Energetic Particle Telescope (EPT) on board PROBA-V.

Provider

Center for Space Radiations (CSR)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/csr-ept-federated>

R.110 PROBA-V/EPT proton flux spectra time series

Description

Time series of proton flux spectra in the energy range 10-248 MeV as measured by the Energetic Particle Telescope (EPT) on board PROBA-V.

Provider

Center for Space Radiations (CSR)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/csr-ept-federated>

R.111 PROBA-V/EPT helium flux spectra time series

Description

Time series of helium flux spectra in the energy range 38-980 MeV as measured by the Energetic Particle Telescope (EPT) on board PROBA-V.

Provider

Center for Space Radiations (CSR)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/csr-ept-federated>



R.112 PROBA-V/EPT electron flux geographical maps

Description

The weekly averaged electron flux in each energy channel in the energy range 0.5-8 MeV as measured by the Energetic Particle Telescope (EPT) on board PROBA-V are provided as a function of geographical position.

Provider

Center for Space Radiations (CSR)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/csr-ept-federated>

R.113 PROBA-V/EPT proton flux geographical maps

Description

The weekly averaged proton flux in each energy channel in the energy range 9-300 MeV as measured by the Energetic Particle Telescope (EPT) on board PROBA-V are provided as a function of geographical position.

Provider

Center for Space Radiations (CSR)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/csr-ept-federated>

R.114 PROBA-V/EPT helium flux geographical maps

Description

The weekly averaged helium flux in each energy channel in the energy range 38-980 MeV as measured by the Energetic Particle Telescope (EPT) on board PROBA-V are provided as a function of geographical position.

Provider

Center for Space Radiations (CSR)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/csr-ept-federated>

R.115 PROBA-V/EPT auroral electron energy spectrum characterization

Description

Energy spectrum characterization of the auroral electrons in the energy range 0.5-8 MeV based on PROBA-V/EPT measurements. Auroral electrons are selected based on geographic



coordinates (southern hemisphere vs northern hemisphere) and on L coordinates ($L > 3$) and the resulting fluxes averaged over a time interval of a week.

Provider

Center for Space Radiations (CSR)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/csr-ept-federated>

R.116 PROBA-V/EPT SAA proton energy spectrum characterization

Description

Energy spectrum characterization of the South Atlantic Anomaly (SAA) protons in the energy range 10-248 MeV based on PROBA-V/EPT measurements.). For a predefined grid covering the SAA the proton spectra are averaged over a time interval of a week. They are subdivided into two categories: night data when EPT is looking eastwards and day data when EPT is looking eastwards.

Provider

Center for Space Radiations (CSR)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/csr-ept-federated>

R.117 PROBA-V/EPT SAA helium energy spectrum characterization

Description

Energy spectrum characterization of the South Atlantic Anomaly (SAA) helium in the energy range 38-980 MeV based on PROBA-V/EPT measurements.). For a predefined grid covering the SAA the helium spectra are averaged over a time interval of a week.

Provider

Center for Space Radiations (CSR)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/csr-ept-federated>

R.118 PROBA-1/SREM radiation rates

Description

Daily radiation situation reports based on data from the PROBA-1/SREM instrument

Provider

Paul Buehler

Portal Entry point

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<http://swe.ssa.esa.int/web/guest/pb-srem-federated>

R.119 Integral/SREM radiation rates

Description

Daily radiation situation reports based on data from the Integral/SREM instrument

Provider

Paul Buehler

Portal Entry point

<http://swe.ssa.esa.int/web/guest/pb-srem-federated>

R.120 Rosetta/SREM radiation rates

Description

Daily radiation situation reports based on data from the Rosetta/SREM instrument

Provider

Paul Buehler

Portal Entry point

<http://swe.ssa.esa.int/web/guest/pb-srem-federated>

R.121 Herschel/SREM radiation rates

Description

Daily radiation situation reports based on data from the Herschel/SREM instrument

Provider

Paul Buehler

Portal Entry point

<http://swe.ssa.esa.int/web/guest/pb-srem-federated>

R.122 Planck/SREM radiation rates

Description

Daily radiation situation reports based on data from the Planck/SREM instrument

Provider

Paul Buehler

Portal Entry point



<http://swe.ssa.esa.int/web/guest/pb-srem-federated>

R.128 Very high-energy Solar Energetic Particle environment mission specification: proton fluence

Description

The very high-energy proton fluence in the near-Earth interplanetary space integrated over the mission for a user-specified mission length (0.5-7 years) and confidence level (e.g., 90, 95, 99%).

Provider

Space Research Laboratory, Department of Physics and Astronomy, University of Turku

Portal Entry point

<http://swe.ssa.esa.int/web/guest/utu-srl-federated>

R.129 Very high-energy Solar Energetic Particle environment mission specification: proton peak flux

Description

The very high-energy proton peak flux in the near-Earth interplanetary space integrated over the mission for a user-specified mission length (0.5-7 years) and confidence level (e.g., 90, 95, 99%).

Provider

Space Research Laboratory, Department of Physics and Astronomy, University of Turku

Portal Entry point

<http://swe.ssa.esa.int/web/guest/utu-srl-federated>

R.130 Solar Energetic Particle event catalogue: high-energy solar proton events

Description

A catalogue of high-energy solar proton events based on the observations in the 55-80 MeV energy channel of the SOHO/ERNE instrument.

Provider

Space Research Laboratory, Department of Physics and Astronomy, University of Turku

Portal Entry point

<http://swe.ssa.esa.int/web/guest/utu-srl-federated>

R.131 Electron Population Model (GEO)

Description

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Empirical model of the electron number flux of the 10 eV to 40 keV electrons at L=6-7 for different levels of solar wind velocity or geomagnetic activity. Number flux is provided in four local time sectors: 21-03 (night), 03-09 (dawn), 09-15 (day), 15-21 (dusk). Empirical model is based on the ESA Cluster II PEACE data.

Provider

Mullard Space Science Laboratory (UCL)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/mssl-federated>

R.132 Electron Population Model (MEO)

Description

Empirical model of the electron number flux of the 10 eV to 40 keV electrons at L=4-6 for different levels of solar wind velocity or geomagnetic activity. Number flux is provided in four local time sectors: 21-03 (night), 03-09 (dawn), 09-15 (day), 15-21 (dusk). Empirical model is based on the ESA Cluster II PEACE data.

Provider

Mullard Space Science Laboratory (UCL)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/mssl-federated>

R.134 The COMESEP Alert System

Description

The COMESEP (COronal Mass Ejections and Solar Energetic Particles: forecasting the space weather impact) project developed tools for forecasting geomagnetic storms and solar energetic particle (SEP) radiation storms, which were validated and implemented into an operational space weather alert system that runs without human intervention. When a solar flare or CME is automatically detected, the different modules of the system communicate in order to exchange information. The system displays alerts online and provides notifications for the space weather community.

Provider

BIRA-IASB Space Weather Services

Portal Entry point

<http://swe.ssa.esa.int/web/guest/bira-comesep-federated>

5 Solar weather products

ESC Coordinator

Jesse Andries, ROB

Expert groups

Solar Influences Data analysis Center (SIDC)

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- S.101c Proba2/SWAP active region annotated image*
- S.102 PROBA2/LYRA*
- S.103 SIDC/USET Halpha Solar images*
- S.104 SIDC/USET White light Solar images*
- S.105a SIDC Humain Callisto Solar Radio Spectrograms*
- S.105c SIDC automated Solar radio burst detections*
- S.106 SDO/AIA Solar EUV images*
- S.108 SIDC/SILSO International Sunspot Number*
- S.109a SIDC Solar F10.7 radio flux forecast*
- S.109b SIDC solar flare forecast*
- S.110 SIDC Daily Space Weather Bulletin*
- S.111 SIDC/CACTus Automated CME detection*
- S.112 SIDC fast alerts*
- S.112a SIDC Solar GOES-flare alert*
- S.112b SIDC/CACTus Automated halo CME alert*
- S.112z SIDC Human operator alert moderation*
- S.113 SIDC all quiet alert*

Institute of 4D-Technologies (FHNW)

- S.105b eCallisto*

Catania Astrophysical Observatory (INAF)

- S.121 Latest Catania continuum image*
- S.122 Latest Catania Halpha image*
- S.123a USSPS from Catania*

Research Center for Astronomy and Applied Mathematics (RCAAM)

- S.124 Athens Effective Solar Flare Forecasting (A-EFForT)*

Kanzelhöhe Observatory (KSO)

- S.107a KH Halpha (also containing S107b)*
- S.107c KH flare & filament detections*
- S.107d KH flare email*
- S.107e KH White light*





S.101 Proba2/SWAP images

Description

The SWAP instrument onboard the Proba2 spacecraft provides full disk solar EUV images in the 171 Angstrom bandpass. The latest level 0 quicklook image is uncalibrated and meant to monitor instrument status, while the media level image has undergone extensive calibration and image compression and enhancement processing to bring out the best of the image for Space Weather forecasting operations.

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/sidc-S101-federated>

S.101c Proba2/SWAP active region annotated image

Description

This service allows to combine sunspot group information from the Catania Observatory and active region information as distributed by NOAA (National Oceanic and Atmospheric Administration) with media level SWAP images. The service allows the user to browse back and forward in time using always the closest available observations and images.

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/sidc-S101c-federated>

S.102 PROBA2/LYRA

Description

The LYRA instrument onboard the Proba2 spacecraft registers UV and EUV irradiance using 4 different filters. Calibrated level 2 and level 3 (1 minute averaged) data is available in daily FITS-files as well as level 4 calibrated daily PNG plots. The Lyra Rescaled data provides rescaled values from the Aluminium and Zirconium channels which have been cross-calibrated with GOES X-ray data in order to provide a proxy for X-ray flare intensity. The rescaled data is available in daily TEXT files as well as daily PNG plots.

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/sidc-S102-federated>



S.103 SIDC/USET Halpha Solar images

Description

Halpna solar images are produced by the SIDC local observing facilities (Uccle Solar Equatorial Table). The CCD camera is a Qimaging Retiga 4000R. It has an inter-line transfer detector of 2048x2048 pixels. Each pixel is 7.5x7.5 micron. And the sensitive area is 15.6x15.6 mm. The H-alpha filter is made by Solar Spectrum. It has a nominal wavelength of 656.2808 nm and a bandwidth of 0.05 nm. The telescope is a Celestron 80 mm ED refractor. The images are provided in FITS files and quicklook PNGs.

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/sidc-S103-federated>

S.104 SIDC/USET White light Solar images

Description

Solar white light images are produced by the SIDC local observing facilities (Uccle Solar Equatorial Table). The CCD camera is a Qimaging Retiga 4000R. It has an inter-line transfer detector of 2048x2048 pixels. Each pixel is 7.5x7.5 micron. And the sensitive area is 15.6x15.6 mm. The telescope is a Lichtenknecker 150 mm diameter achromatic doublet refractor, equipped with full-aperture neutral-density filter with an attenuation of 100,000 (5 densities). The images are provided in FITS files and quicklook PNGs.

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/sidc-S104-federated>

S.105a SIDC Humain Callisto Solar Radio Spectrograms

Description

This page provides access to the radio spectrograms from the Callisto instrument installed in Humain (Belgium). The spectrometer is plugged to a Sun-tracking broadband antenna and is operated automatically from Brussels. The spectrum covers the band 45 - 440 MHz with 200 samples (frequencies) 4 times per second. The empty 'area' on the spectrum correspond to parts not covered intentionally to protect the instrument from high power emitters (e.g. FM band).

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point

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<http://swe.ssa.esa.int/web/guest/sidc-S105a-federated>

S.105b eCallisto

Description

The CALLISTO spectrometer is a programmable heterodyne receiver built in the framework of IHY2007 and ISWI by former Radio and Plasma Physics Group (PI Christian Monstein) at ETH Zurich, Switzerland. The main applications are observation of solar radio bursts and RFI-monitoring for astronomical science, education and outreach. This product provides access to a world-wide collection of such spectrometers, called the eCallisto network. The product includes raw data and quicklook images.

Provider

Institute of 4D-Technologies (FHNW)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/ecallisto-federated>

S.105c SIDC automated Solar radio burst detections

Description

The radio spectrograms obtained by the Callisto instrument installed in Humain (Belgium) are processed by an automated burst detection algorithm that analyses for each individual spectrum (vertical line, in time) its brightness distribution. A burst is detected when the brightness distribution varies significantly in time. The bursts are annotated on the quicklook images. Currently, the algorithm may still trigger false alerts (e.g. fast antenna motion at end and start of observations, lightning due to thunderstorms, strong interferences).

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/sidc-S105c-federated>

S.106 SDO/AIA Solar EUV images

Description

The AIA instrument onboard the SDO spacecraft provides full disk images in several different UV and EUV wavelength bands. The SIDC redistributes AIA 1024 x 1024 pixels AIA quicklook images at a 3 minute cadence in near real time; 4096 by 4096 pixels AIA and HMI images in science quality at a 1 hour cadence; and videos for the last 24 hours of AIA images in all wavelengths for forecasting purposes.

Provider

Solar Influences Data analysis Center (SIDC)

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Portal Entry point

<http://swe.ssa.esa.int/web/guest/sidc-S106-federated>

S.107a KH Halpha (also containing S107b)

Description

The webpage shows the latest H-alpha image and the latest hourly H-alpha movie, as component an archive of all images and daily movie is available.

Provider

Kanzelhöhe Observatory (KSO)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/kso-107a-federated>

S.107c KH flare & filament detections

Description

The webpage shows the latest detected flares and an archive of all detected flares including flare movies is provided.

Provider

Kanzelhöhe Observatory (KSO)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/kso-107c-federated>

S.107d KH flare email

Description

The webpage shows the latest email alert and an archive of all alert mails is provided. Subscription and unsubscription for email alerts is provided

Provider

Kanzelhöhe Observatory (KSO)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/kso-107d-federated>

S.107e KH White light

Description

The webpage shows the latest White light image, as component an archive of all images is available

**Provider**

Kanzelhöhe Observatory (KSO)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/kso-107e-federated>

S.108 SIDC/SILSO International Sunspot Number**Description**

The World Data Centre for the International Sunspot Number collects observations of sunspots from a network of about 85 observers around the world and produces the Daily International Sunspot Number and its monthly and yearly means (the time series extends back over several centuries). An Estimated Sunspot Number (EISN) is updated continuously in near real-time (5 minutes) up to the current day of the month. Provisional numbers for the past month are produced on the first day of each calendar month. A final update of the monthly provisional numbers is done after a delay of 3 months to establish the definitive Sunspot Numbers.

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/sidc-S108-federated>

S.109a SIDC Solar F10.7 radio flux forecast**Description**

The forecaster on duty at the SIDC produces each day (nominal issue-time 12:30 UT) a forecast of the F10.7 radio flux as it is expected to be observed over the next 3 days (the day of issue included). The forecast is based on a combination of statistical techniques and expert judgement on the evolution of active regions on the solar disk including regions rotating onto or off the disk.

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/sidc-S109a-federated>

S.109b SIDC solar flare forecast**Description**

The forecaster on duty at the SIDC produces each day (nominal issuetype 12:30 UT) a probabilistic forecast for the occurrence of X-ray flares over the next 24h time span. Probabilities are provided for flare classes C, M and X separately. A full disk as well as an active region specific forecast is provided where region identification schemes of both NOAA and



Catania Observatory are being considered. The forecast is based on a combination of statistical techniques based on the active region properties and expert judgement on the evolution of active regions on the solar disk including regions rotating onto or off the disk.

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/sidc-S109b-federated>

S.110 SIDC Daily Space Weather Bulletin

Description

The forecaster on duty at the SIDC produces each day (nominal issue-time 12:30UT) a daily bulletin of Solar and Space Weather. The bulletin includes a summary of the observed activity over the past 24h, as well as an outlook on the activity for the next days.

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/sidc-S110-federated>

S.111 SIDC/CACTus Automated CME detection

Description

CACTus is a software routine that autonomously detects coronal mass ejections (CMEs) in image sequences from SOHO/LASCO. The output is a list of events, similar to the classic catalogues, with principle angle, angular width and velocity estimation for each CME.

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/sidc-S111-federated>

S.112 SIDC fast alerts

Description

Halo CME detection alert from the SIDC/RWC Belgium

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point



<http://swe.ssa.esa.int/web/guest/sidc-federated>

S.112a SIDC Solar GOES-flare alert

Description

The SIDC data processing pipeline analyses incoming GOES X-ray data in near real time and reports on the occurrence of X-ray flares of Classes M5 and up.

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/sidcS112a-federated>

S.112b SIDC/CACTus Automated halo CME alert

Description

The SIDC data processing pipeline analyses the outcome of the near real time runs of the CACTus package and alerts for the occurrence of CMEs with an angular width of over 150 degrees.

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/sidc-S112b-federated>

S.112z SIDC Human operator alert moderation

Description

The forecaster on duty at the SIDC observes and processes all relevant Space Weather data, including automated feature alert processes. Based on his/her observations the forecaster on duty triggers alerts where automated processes have failed or are late and follows up and provides complementary information on the automated alerts.

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/sidc-S112z-federated>

S.113 SIDC all quiet alert

Description



Based on the Space Weather forecasts produced by the forecaster on duty at the SIDC, periods when the overall Space Weather conditions are expected to be or remain exceptionally quiet are marked as 'All Quiet'. The conditions for marking expectations as 'All Quiet', observe a time horizon of 48 hours in the future with flaring expected to remain below C level, solar wind parameters to be at nominal levels and geomagnetic conditions to be at quiet to unsettled levels ($K < 4$).

Provider

Solar Influences Data analysis Center (SIDC)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/sidc-S113-federated>

S.121 Latest Catania continuum image

Description

This product consists on the publication of the latest full-disk image of the solar photosphere acquired by INAF Catania Observatory

Provider

Catania Astrophysical Observatory (INAF)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/catania-S121-federated>

S.122 Latest Catania Halpha image

Description

This product consists on the publication of the latest full-disk image of the solar chromosphere acquired by INAF Catania Observatory

Provider

Catania Astrophysical Observatory (INAF)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/catania-S122-federated>

S.123a USSPS from Catania

Description

Ursigram describing the characteristics of the Active Regions visible at photospheric level on the solar disk every day.

Provider

Catania Astrophysical Observatory (INAF)



Portal Entry point

<http://swe.ssa.esa.int/web/guest/catania-S123a-federated>

S.124 Athens Effective Solar Flare Forecasting (A-EFForT)

Description

Probabilities and advance warning of intense solar flare activity.

Provider

Research Center for Astronomy and Applied Mathematics (RCAAM)

Portal Entry point

<http://swe.ssa.esa.int/web/guest/rcaam-federated>

Part 2: Expert groups

The second part of this document gathers contact details of the product providers.

	Geomagnetic conditions products	Heliospheric weather products	Ionospheric weather products	Solar Weather products	Space Radiation products
Athens Neutron Monitor Station (ANeMoS), NKU Athens					2
BIRA-IASB Space Weather Services					2
Catania Astrophysical Observatory (INAF)				3	
Center for Space Radiations (CSR)					9
Centre de Données de la Physique des Plasmas (CDPP)		1			
Collecte Localisation Satellites (CLS)			1		
Finnish Meteorological Institute (FMI)	5		2		
Helmholtz-centre Potsdam (GFZ)	7		4		
Hosted by the SWE Data Centre			1		3
Institute of 4D-Technologies (FHNW)				1	

	Geomagnetic conditions products	Heliospheric weather products	Ionospheric weather products	Solar Weather products	Space Radiation products
Ionosphere Monitoring and Prediction Center (IMPC)			12		
Kanzelhöhe Observatory (KSO)				4	
Mullard Space Science Laboratory (UCL)					2
National Observatory of Athens (NOA)			7		
Norwegian Mapping Authority (NMA)			8		
Paul Buehler					5
RAL Space (STFC)		2			
Research Center for Astronomy and Applied Mathematics (RCAAM)				1	
Seibersdorf Laboratories					1
Solar Influences Data analysis Center (SIDC)	1			18	
Space Research Centre (SRC)			12		

	Geomagnetic conditions products	Heliospheric weather products	Ionospheric weather products	Solar Weather products	Space Radiation products
Space Research Laboratory, Department of Physics and Astronomy, University of Turku					3
Swedish Institute of Space Physics (IRF)	1				
Technical University of Denmark (DTU)		1			
Tromsø Geophysical Observatory (TGO)	9				
UK Met Office (MET)		8			
University of Graz (UNIGRAZ), Institute of Physics		2			



1 Athens Neutron Monitor Station (ANeMoS), NKU Athens

Homepage

<http://cosray.phys.uoa.gr>

Affiliation

Panepistimiopolis
15771 Ilissia
Greece

Contribution to the SSA SWE network

Space radiation(2)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/anemos-federated>

2 BIRA-IASB Space Weather Services

Homepage

<http://www.aeronomie.be/en/services/spaceweather.htm>

Affiliation

Avenue Circulaire 3
1180 Uccle
Belgium

Contribution to the SSA SWE network

Space radiation(2)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/bira-comesep-federated>
https://spenvis.ssa-swe.eu/ssa_intro_first.php



3 Catania Astrophysical Observatory (INAF)

Homepage

<http://www.oact.inaf.it/>

Affiliation

Via S. Sofia 78
95123 Catania
Italy

Contribution to the SSA SWE network

Solar weather(3)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/catania-federated>

4 Center for Space Radiations (CSR)

Homepage

<http://web.csr.ucl.ac.be/uclelicsr/>

Affiliation

2 Chemin du Cyclotron
B-1348 Louvain-la-Neuve
Belgium

Contribution to the SSA SWE network

Space radiation(9)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/csr-ept-federated>



5 Centre de Données de la Physique des Plasmas (CDPP)

Homepage

<http://www.cdpp.eu>

Affiliation

9, avenue du Colonel Roche
31028 Toulouse Cedex 4
France

Contribution to the SSA SWE network

Heliospheric weather(1)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/cdpp-amda-federated>

6 Collecte Localisation Satellites (CLS)

Homepage

<http://www.cls.fr>

Affiliation

11, rue Hermès
31520 Ramonville Saint-Agne
France

Contribution to the SSA SWE network

Ionospheric weather(1)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/ism-public>



7 Finnish Meteorological Institute (FMI)

Homepage

<http://en.ilmatieteenlaitos.fi/>

Affiliation

Erik Palménin aukio 1
FI-00560 HELSINKI
Finland

Contribution to the SSA SWE network

Geomagnetic conditions(5)
Ionospheric weather(2)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/raf-public>

8 Helmholtz-centre Potsdam (GFZ)

Homepage

<http://www.gfz-potsdam.de/en>

Affiliation

Telegrafenberg
14473 Potsdam
Germany

Contribution to the SSA SWE network

Geomagnetic conditions(7)
Ionospheric weather(4)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/potsdam-federated>



9 Hosted by the SWE Data Centre

Homepage

<http://swe.ssa.esa.int/>

Affiliation

Robert-Bosch-Straße 5
64293 Darmstadt
Germany

Contribution to the SSA SWE network

Ionospheric weather(1)
Space radiation(3)

Portal Entry Point

<http://swe.ssa.esa.int/>

10 Institute of 4D-Technologies (FHNW)

Homepage

http://www.fhnw.ch/homepage?set_language=en

Affiliation

Oxfordshire
OX11 0QX
Switzerland

Contribution to the SSA SWE network

Solar weather(1)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/ecallisto-federated>



11 Ionosphere Monitoring and Prediction Center (IMPC)

Homepage

<http://www.dlr.de/kn/en>

Affiliation

Linder Höhe
51147 Cologne
Germany

Contribution to the SSA SWE network

Ionospheric weather(12)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/swaci-federated>

12 Kanzelhöhe Observatory (KSO)

Homepage

http://www.kso.ac.at/index_en.php

Affiliation

Universitätsplatz 3
8010 Graz
Austria

Contribution to the SSA SWE network

Solar weather(4)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/kso-federated>



13 Mullard Space Science Laboratory (UCL)

Homepage

<http://www.ucl.ac.uk/mssl>

Affiliation

Gower Street
London WC1E 6BT
United Kindom

Contribution to the SSA SWE network

Space radiation(2)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/mssl-federated>

14 National Observatory of Athens (NOA)

Homepage

<http://www.iono.noa.gr>

Affiliation

Lofos Nymfon, Thissio, P.O. Box 20048
GR-11810 Athens
Greece

Contribution to the SSA SWE network

Ionospheric weather(7)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/dias-federated>



15 Norwegian Mapping Authority (NMA)

Homepage

<http://www.kartverket.no/en/>

Affiliation

Kartverksveien 21
Hønefoss
3507 Norway

Contribution to the SSA SWE network

Ionospheric weather(8)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/rtim-federated>
<http://swe.ssa.esa.int/web/guest/resoss-federated>

16 Paul Buehler

Homepage

<https://srem.buehler-paschen.at>

Affiliation

Haspelmeistergasse 15
1140 Viena
Austria

Contribution to the SSA SWE network

Space radiation(5)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/pb-srem-federated>



17 RAL Space (STFC)

Homepage

<https://www.ralspace.stfc.ac.uk//Pages/Space-weather.aspx>

Affiliation

Oxfordshire

OX11 0QX

United Kindom

Contribution to the SSA SWE network

Heliospheric weather(2)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/ral-federated>

18 Research Center for Astronomy and Applied Mathematics (RCAAM)

Homepage

<http://astro.academyofathens.gr/>

Affiliation

Soranou Efesiou 4

GR-11527 Athens

Greece

Contribution to the SSA SWE network

Solar weather(1)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/rcaam-federated>



19 Seibersdorf Laboratories

Homepage

<http://www.seibersdorf-laboratories.at/en/>

Affiliation

Forschungszentrum
2444 Seibersdorf
Austria

Contribution to the SSA SWE network

Space radiation(1)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/avidos-federated>

20 Solar Influences Data analysis Center (SIDC)

Homepage

<http://sidc.oma.be/>

Affiliation

Avenue Circulaire – Ringlaan, 3
1180 Brussels
Belgium

Contribution to the SSA SWE network

Geomagnetic conditions(1)
Solar weather(18)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/sidc-federated>
<http://swe.ssa.esa.int/web/guest/sidc-G105-federated>



21 Space Research Centre (SRC)

Homepage

<http://rwc.cbk.waw.pl/>

Affiliation

Bartycka 18A
00-716 Warsaw
Poland

Contribution to the SSA SWE network

Ionospheric weather(12)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/src-federated>

22 Space Research Laboratory, Department of Physics and Astronomy, University of Turku

Homepage

<http://www.srl.utu.fi>

Affiliation

FI-20014 University of Turku
Finland

Contribution to the SSA SWE network

Space radiation(3)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/utu-federated>



23 Swedish Institute of Space Physics (IRF)

Homepage

<http://irf.se>

Affiliation

Box 812, SE-981 28
Kiruna
Sweden

Contribution to the SSA SWE network

Geomagnetic conditions(1)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/irf-federated>

24 Technical University of Denmark (DTU)

Homepage

<http://www.space.dtu.dk/english>

Affiliation

Elektrovej building 327+328+371 and Ørsteds Plads building 348
DK-2800 Kgs. Lyngby
Denmark

Contribution to the SSA SWE network

Heliospheric weather(1)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/dtu-aware-federated>



25 Tromsø Geophysical Observatory (TGO)

Homepage

<http://www.tgo.uit.no/>

Affiliation

N-9037 Tromsø
Norway

Contribution to the SSA SWE network

Geomagnetic conditions(9)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/tgo-federated>

26 UK Met Office (MET)

Homepage

<http://www.metoffice.gov.uk>

Affiliation

FitzRoy Road
Exeter
United Kindom

Contribution to the SSA SWE network

Heliospheric weather(8)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/metoffice-selwe-federated>

<http://swe.ssa.esa.int/web/guest/metoffice-helswe-federated>



27 University of Graz (UNIGRAZ), Institute of Physics

Homepage

<https://www.uni-graz.at/en/>

Affiliation

Universitätsplatz 3

8010 Graz

Austria

Contribution to the SSA SWE network

Heliospheric weather(2)

Portal Entry Point

<http://swe.ssa.esa.int/web/guest/graz-eswf-federated>

<http://swe.ssa.esa.int/web/guest/graz-dbm-federated>