Space weather
Product catalogue
Interactive digital guide
## Space weather products

Inform your planning by keeping abreast of solar activity over the next few days using our easily digestible, multiple format forecast products.

### Forecasts

<table>
<thead>
<tr>
<th>Product</th>
<th>Overview</th>
<th>What’s it for?</th>
<th>Benefits</th>
</tr>
</thead>
</table>
| **Web Forecast** (plain language)| • Space weather headline  
• Analysis of previous 24 hrs  
• 4 day forecast summary  
• Live notifications (watches, warnings, alerts and summaries)  
• Aurora Forecast  
• Plus solar imagery/movie loops | **GENERAL INFORMATION**  
Public web page on the Met Office website enabling users to have a general oversight of current and forecast conditions and take any mitigating actions. | Straight forward and easily understandable non-scientific language.  
Easily accessible web pages with links to explanations of types of event and possible impacts. |
| **Email Forecast** (plain language)| • Space weather headline  
• Analysis of previous 24 hrs  
• 4 day forecast summary  
• Includes probabilities* | **GENERAL INFORMATION**  
Email issued to registered users to provide a general oversight of current and forecast conditions and take any mitigating actions. | Straight forward and easily understandable non-scientific language.  
*Probabilities included on geomagnetic storms, radio blackouts and solar radiation storms (proton). |
| **Email Forecast** (technical language)| • As email above plus  
• High energy electron radiation storms  
• Solar synoptic map  
• Observations and model output (Enlil, D-RAP, REFM, Aurora Forecast) as appropriate | **FORECAST**  
Email issued to registed users to provide a detailed view of space weather conditions and to mitigate in the event of warnings and alerts. | Provides additional data and technical information over and above the plain language forecast. |
| **Sector-Specific Web Forecast** (technical language)| • As technical email  
• Observations and model output (Enlil, D-RAP, REFM, Aurora Forecast)  
- constantly updated | **GENERAL INFORMATION**  
Restricted access web pages that provide specific industries with the information that they need to make operational decisions. | Distills information to provide users with information on the space weather events that impact industries such as:  
Energy, Satellite Operators, Communications, Aviation, Rail, Marine, and Research. |

### Quick key:

- **Webpage**  
  Updated every 1 minute  
  Forecast text updated twice a day
- **Email**  
  Twice a day  
  00.30 and 12.30 UTC
- **Event**  
  Twice a day  
  00.30 and 12.30 UTC
- **Update rate**  
  1 min  
  2 pd
- **Models**  
  Updated every 1 minute  
  Model output and imagery update rates vary
<table>
<thead>
<tr>
<th>Product</th>
<th>Overview</th>
<th>What’s it for?</th>
<th>Benefits</th>
<th>Frequency</th>
</tr>
</thead>
</table>
| **Terrestrial Comms Forecast**    | • Includes space weather impact on terrestrial communications  
• Assessment and recently observed space weather activity  
• Covers major solar events including geomagnetic storms, solar radiation storms and radio blackouts | FORECAST  
Email issued to users to help them plan and mitigate against any impacts on ground based communications systems.                                                                                           | Provides customers with a 72 hr view of potential disruption to terrestrial communications systems, enabling them to plan accordingly.                                                                 | Once a day at 02:00 UTC |
| **Satellite Comms Forecast**      | • Includes space weather impact on satellite communications  
• Assessment and recently observed space weather activity  
• Covers major solar events, including geomagnetic storms, solar radiation storms and radio blackouts | FORECAST  
Email issued to users to help them plan and mitigate against any impacts on satellite based communications systems.                                                                                     | Provides customers with a 72 hr view of potential disruption to satellite communications systems, enabling them to plan accordingly.                                                                  | Once a day at 02:00 UTC |
| **1 Day Geomagnetic Forecast**    | • Kp levels  
• 24 hr forecast via email indicating auroral activity | FORECAST  
Email issued to users enabling action to be taken in event of high levels of geomagnetic activity.                                                                                                     | Short term forecast of general geomagnetic activity - enables users to take mitigating action.                                                                                                             | Every 3 hrs |
| **3 Day Geomagnetic Forecast**    | • Kp levels  
• 3 day forecast via email indicating auroral activity | FORECAST  
Email issued to users enabling action to be taken in event of high levels of geomagnetic activity.                                                                                                     | 3 day forecast of general geomagnetic activity - enables users to take mitigating action.                                                                                                              | Once a day by 15:00 UTC |
These notifications provide immediate advice about current space weather activity and could enable your organisation to design operational responses to significant space weather events.

### Notifications

<table>
<thead>
<tr>
<th>Product</th>
<th>Overview</th>
<th>What’s it for?</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Radio Blackout Alerts &amp; Summaries</strong></td>
<td>• Confirming and summarising key thresholds (R2-5) being exceeded and the expected level of impact</td>
<td><strong>ALERT</strong> Email enabling users to take action when a radio blackout is reported.</td>
<td>Provides notification that radio blackout is in progress and then summary confirms the event of that scale is over.</td>
</tr>
<tr>
<td><strong>Geomagnetic Watches, Warnings &amp; Alerts</strong></td>
<td>• Predicting, confirming, summarising key geomagnetic measures • Kp Warnings (G3-5) and Geomagnetic Alerts (G1-5)</td>
<td><strong>WATCH, WARNING &amp; ALERT</strong> Email enabling users to take action based on latest information.</td>
<td>Provides notification that geomagnetic storm is predicted and in progress and the expected level of impact.</td>
</tr>
<tr>
<td><strong>Proton Flux Warnings, Alerts &amp; Summaries</strong></td>
<td>• Predicting, confirming and summarising key proton thresholds being exceeded and the expected level of impact • 10Mev Proton Flux Warning, Alert and Summaries • 100Mev Proton Flux Warning, Alert and Summaries</td>
<td><strong>WARNING &amp; ALERT</strong> Email enabling users to take action once thresholds have been breached.</td>
<td>Provides notification that proton storm is predicted, in progress and then summary confirms the event of that scale is over.</td>
</tr>
<tr>
<td><strong>Electron Flux Warnings, Alerts &amp; Summaries</strong></td>
<td>• Predicting, confirming and summarising key 2Mev Electron Flux thresholds being exceeded and the expected level of impact • Electron Fluence Warning • 2Mev Electron Flux Alert and Summaries</td>
<td><strong>WARNING &amp; ALERT</strong> Email enabling users to take action once thresholds have been breached.</td>
<td>Provides notification that electron storm is predicted, in progress and then summary confirms the event is over.</td>
</tr>
</tbody>
</table>
Our analysis provides information about what is happening on the visible face of the Sun and how this can result in space weather impacts here on Earth.

**Quick key:**
- Webpage
- Email
- Event
- Update rate
- Models

### Analysis

**Product**

**Solar Synoptic Map**
- Provides a synopsis of current activity on the visible solar disc.

**Overview**
- Forecaster analysis of the visible solar disc highlighting active regions, coronal holes and other features including magnetic polarity

**What's it for?**
- **GENERAL INFORMATION**
  - Email providing general information for users and visual representation of solar activity. To be used in conjunction with warnings and forecasts.

**Benefits**
- Provides a visual at a glance view of active regions and potential for space weather events.

**Frequency**
- Twice a day by 00:00 & 12:00 UTC

**Solar Region Summary & Flare Forecast**
- Provides a synopsis of current activity on the visible solar disc.

**Overview**
- Forecaster analysis of the observed active solar region summary complete with flare forecast

**What's it for?**
- **GENERAL INFORMATION**
  - Email enabling users to monitor actual solar activity. Can be used to modify any mitigating action taken as a result of predicted activity.

**Benefits**
- Provides a synopsis of current solar activity.

**Frequency**
- Email every 6 hrs by: 03:00, 09:00, 15:00, 21:00 UTC

---

If you have any questions about the products described or can't find the product you need please email us on: spaceweather@metoffice.gov.uk
## Forecasting tools

Models provide a visual representation of predicted conditions relating to space weather. Forecaster commentary offers an insight into how forecast conditions may develop.

### Models

<table>
<thead>
<tr>
<th>Product</th>
<th>Overview</th>
<th>What’s it for?</th>
<th>Benefits</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Solar Wind &amp; CME Model Movie</strong></td>
<td>• WSA-Enlil model of the heliosphere is played in a movie loop, illustrating the solar wind structure and any Earth-directed coronal mass ejections (CMEs)</td>
<td><strong>GENERAL INFORMATION</strong> Web page movie to be as a visual indicator of solar wind and any earth bound CMEs.</td>
<td>Provides user with a graphical display of forecast solar wind and CME arrival time. Used to help plan and mitigate space weather events.</td>
<td>Updated every 1 minute Model runs every 2 hrs</td>
</tr>
<tr>
<td><strong>HF Radio Comms Degradation Map</strong></td>
<td>• Global map produced from the D-Region Absorption model plotting areas where HF communications are either degraded or lost completely</td>
<td><strong>GENERAL INFORMATION</strong> Enabling a map view of areas of observed and forecast impacts on HF communications. Used in conjunction with alerts and warnings to support planning and mitigation during major events.</td>
<td>Provides user with a graphical display of forecast communication degradation and possible recovery times.</td>
<td>Updated every 1 minute Model runs constantly</td>
</tr>
<tr>
<td><strong>Electron Fluence Graphs</strong></td>
<td>• Graphical representation of data produced by the REFM model</td>
<td><strong>GENERAL INFORMATION</strong> Providing a graphical view of electron fluence. Used in conjunction with alerts and warnings to support planning and mitigation during major events.</td>
<td>Provides user with a graphical display of forecast electron fluence conditions.</td>
<td>Updated every 1 minute Model run every 3 hrs</td>
</tr>
<tr>
<td><strong>Total Electron Content Maps</strong></td>
<td>• Map view - • one European • one global with colour coded scale</td>
<td><strong>GENERAL INFORMATION</strong> Providing a graphical view of TEC.</td>
<td>Easy reference to levels of TEC.</td>
<td>Maps updated every hr Maps updated every hr</td>
</tr>
<tr>
<td><strong>Aurora Forecast</strong></td>
<td>• Map view - • Northern hemisphere • Southern hemisphere with colour coded probability scale</td>
<td><strong>GENERAL INFORMATION</strong> Provides a 30 minute forecast of the probability of seeing the aurora in the Northern and Southern hemispheres.</td>
<td>Notifies users when the aurora may be visible if there are clear skies.</td>
<td>Updated every 1 minute Model runs constantly</td>
</tr>
</tbody>
</table>