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Outreach - Activity forecasts, social media, aurora imaging



British
Geological
Survey

Daily Geomagnetic Activity Forecast

- Team of seven space weather forecasters on weekly rota
- Manual forecast based on publicly available satellite and ground data
- Forecast of geomagnetic activity (average and maximum) for next three days
- Based on NOAA G-scale levels
- Daily phone call with UK Met Office (MOSWOC)

BGS Global Geomagnetic Activity Forecast

Forecast period (noon-to-noon GMT)	Forecast Global Activity level	
	Average	Max
28 SEP-29 SEP	ACTIVE	STORM G2
29 SEP-30 SEP	QUIET	STORM G1
30 SEP-1 OCT	QUIET	ACTIVE

For more information about the forecast and activity categories see geomag.bgs.ac.uk/education/activitylevels.html

Activity during last 72 hours

Global				Local (UK)		
Date	Average	Max	At time (UT)	Average	Max	At time (UT)
25 SEP-26 SEP	ACTIVE	STORM G2	03:00-06:00	ACTIVE	STORM G1	21:00-00:00
26 SEP-27 SEP	QUIET	STORM G1	12:00-15:00	QUIET	ACTIVE	12:00-15:00
27 SEP-28 SEP	ACTIVE	STORM G1	18:00-21:00	ACTIVE	STORM G1	18:00-21:00
					STORM G1	03:00-06:00

Additional Comments

Geomagnetic conditions are still ACTIVE as the Earth remains under the influence of the high speed stream from the extension south of the Northern polar coronal hole. This is predicted to continue throughout the first forecast period with possibility of STORM G1 spells or even a STORM G2 as the solar wind stream speeds remain elevated. Activity is predicted to ease going into the second forecast period but there still remains the chance of STORM G1 intervals as coronal hole influence slowly wanes with chances of ACTIVE periods during day 3 as the coronal hole moves away from being Earth facing.



BGS Space Weather @BGSspaceWeather · Sep 28

Next 24hrs - ACTIVE. Solar wind speeds remain highly elevated due to a large coronal hole. There is the chance of occasional STORM G1 periods with the possibility of an isolated STORM G2 spell.



8

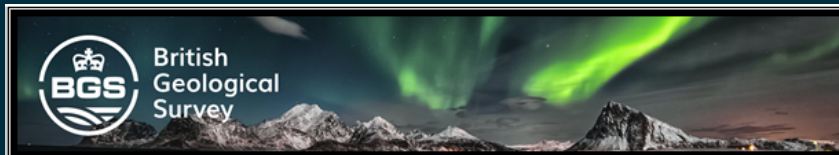


20



Space Weather Alert

- Occasional alerts sent if geomagnetic activity is forecast to be high (G2 or over)
- Chances of aurora sightings more likely at lower latitudes (typically Scotland, north England, Northern Ireland)
- ~3200 mailing list subscribers
- Almost 10k followers on Twitter



Geomagnetic Disturbance Alert

28th September 2020

British Geological Survey

The Earth is currently under the influence of high-speed solar wind from a large coronal hole in an Earth-facing position. The solar wind speed began rising yesterday (Sunday 27th) with some aurora sightings reported in the north of Scotland overnight.

Geomagnetic activity is likely to reach STORM levels within the next 24 hours. As the coronal hole is large in size, the high speed stream is likely to remain elevated for the next couple of days, with further chances of STORM periods possible.

Assuming clear, dark skies, there is a greater chance of seeing the aurora this evening and possibly tomorrow evening. Those in Scotland, northern England and Northern Ireland may have the better chance.

For more information please visit:

http://geomag.bgs.ac.uk/data_service/space_weather/alerts/alert_2020-09-28.html

For current geomagnetic activity levels please see:

http://geomag.bgs.ac.uk/data_service/space_weather/Global_activity_now.html

For more advice on viewing the Northern Lights please visit:

http://www.geomag.bgs.ac.uk/education/viewing_aurora.html

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British Geological Survey *Geomagnetism*

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Data and Services

Space Weather Alert - 28th September 2020

What Has Happened?

A large southern extension of the northern polar coronal hole reached an Earth facing position on the 26th of September 2020. Solar wind speed started to increase on the 27th September and is expected to cause geomagnetic activity to increase significantly. An earlier high-speed stream from a limb of the same coronal hole arrived on Thursday 24th of September leading to a peak of STORM G2 geomagnetic conditions (see [NOAA space weather scales](#) for more details about these storm levels).

Geomagnetic activity is likely to reach a maximum of STORM G2 within the next 24 hours as we are expecting fast solar wind speeds and are close to the autumn equinox. As the coronal hole is large in size, the high speed stream is likely to remain geoeffective for the next couple of days, with further chances of STORM G1 periods possible.

Assuming clear, dark skies, there is a greater chance of seeing the aurora over the course of the next evening. Those in Scotland, northern England and Northern Ireland have the better chance if the weather is favourable on the 28th of September.

[Tips on viewing the Northern Lights](#)

[Current UK and Planetary Activity Levels](#)

Sign-up to receive [Geomagnetic Disturbance Alert emails](#).




SDO/AIA_103_2020-09-28_03:07:29 UT

EUV image from SDO satellite showing the large southern extension of the northern polar coronal hole responsible for the anticipated storm events (black area of the Sun) Image from SDO (NASA). (click on the image to enlarge).

More alert information published on our website


British Geological Survey 28 September at 17:52 · Public

GEOMAGNETIC DISTURBANCE ALERT:

The Earth is currently under the influence of high-speed solar wind from a large coronal hole in an Earth-facing position. The solar wind speed began rising yesterday (Sunday 27th) with some aurora sightings reported in the north of Scotland overnight.

Geomagnetic activity is likely to reach STORM levels within the next 24 hours. As the coronal hole is large in size, the high speed stream is likely to remain elevated for the next couple of da... [See more](#)

Geomagnetic activity Alert



197 42 comments 155 shares

Shared on BGS Facebook



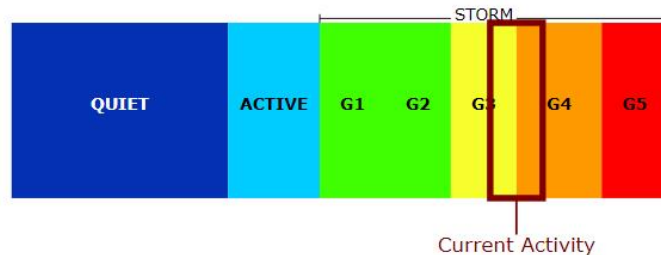
Current activity

- Resources on BGS Geomagnetism website
- Sliding scale based on NOAA G-Scale
- Global activity (Kp) for last 72 hours
- Link to SWPC Ovation model
- Magnetogram for UK observatories
- Twitter links to [@BGSpaceWeather](#) and [@BGSauroraAlert](#)

Visit:

geomag.bgs.ac.uk/data_service/space_weather/Global_activity_now.html

Current Global Geomagnetic Activity



The dark red box indicates the current level of activity, with storm periods best for being able to see the aurora. The storm ratings range from G1 to G5 and the higher the number the better that chance for aurora viewing.

Description of the categories

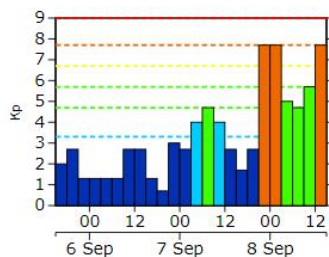
More plots of current activity

3-day forecast of geomagnetic activity

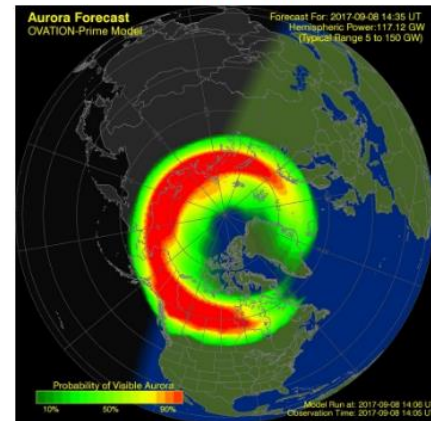
[Click here to see a twitter map showing recent sightings, cloud cover and activity at the UK observatories](#)

Global Geomagnetic activity in the last 72 hours

Last updated: Fri, 08 Sep 2017 14:10:13 GMT



Model of the current position of the aurora oval



Tweets by @BGSpaceWeather



Next 72hrs - STORM G1 with a

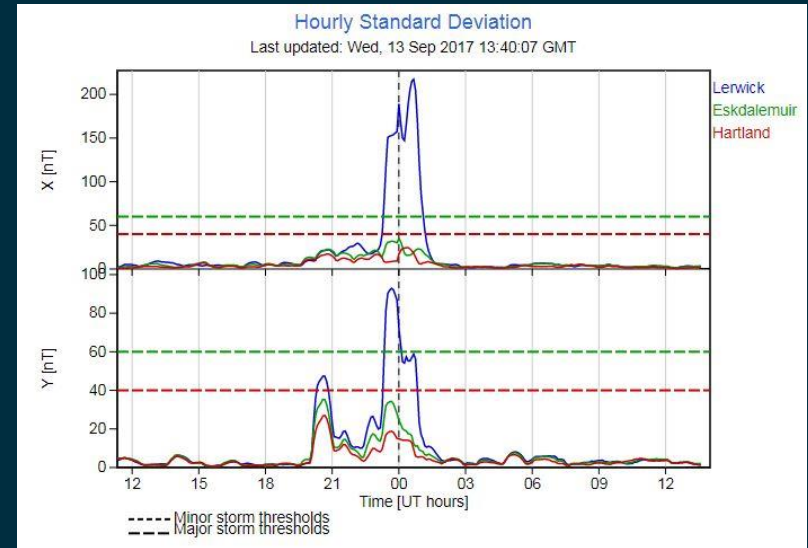
Tweets by @BGSauroraAlert



Alert! Increased chance of seeing aurora on the night of 8th

Automated alerts

- Proposed new product for G-ESC
- Format to be decided
- Example: Using HSD (hourly standard deviation for UK observatories)
- Or perhaps we'll look at Kp, dB/dt, or NOAA G-scale



GEOMAGNETIC ACTIVITY ALERT

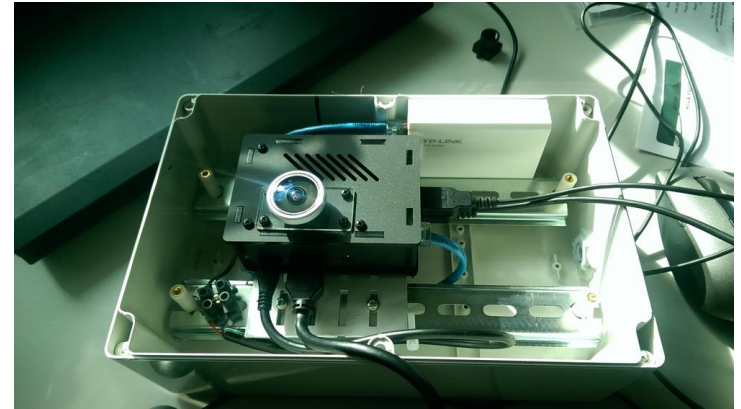
MAJOR STORM at LER
X HSD=167.4 Y HSD=63.5 at 00:05
MINOR STORM at ESK
X HSD=31.5 Y HSD=22.5 at 00:05
MINOR STORM at HAD
X HSD=21.2 Y HSD=14.5 at 00:05

Capturing the aurora



Auroral Imaging

- Experimental, low-cost (~£120)
- Raspberry Pi hardware, python software
- Cameras installed at Lerwick and Eskdalemuir magnetic observatories
- Camera triggered by geomagnetic activity thresholds



Hardware

- Raspberry Pi 3 + case
- PiCam NoIR filter (5MP)
- Off the shelf lens (2.9mm focal length, f1.6, ~100 degree FOV)
- Lens holder to mount it to the PiCam
- IP68 waterproof box
- Blown transparent Perspex dome

Product to be included in G-ESC

Example aurora captures



Lerwick Observatory 2020-08-31 01:11



Eskdalemuir Observatory 2020-09-23 20:15

Future plans for G-ESC

The current work to include:

- Lerwick aurora cam images

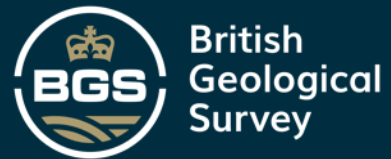
New activities to include:

- Human 3-day ahead forecasts
- Automated alerts
- Eskdalemuir aurora cam images

Additional aim

- Improvements to aurora cameras (all-sky, full-colour)





THANK YOU

Any questions?

