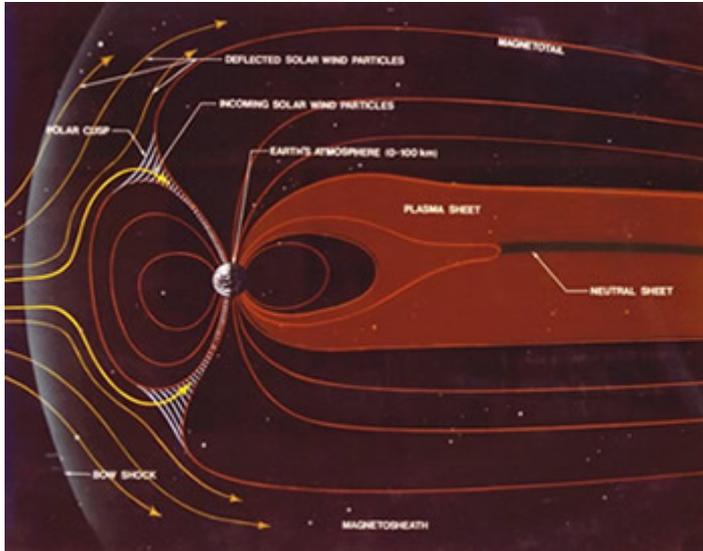


## Space Weather



## Space Weather and the Aurora Borealis

### Spring and Solar Energy

The Vernal, or Spring Equinox falls on the 20th or 21st of March depending on the year. In 2013 it is on the 20th March.

Around this time of year there is an increase in the number of occurrences of Aurora Borealis, or the Northern Lights. These are manifestations of extreme conditions and are caused by solar energy. Solar energy enters the earth's magnetic atmosphere and causes disruption of the earth's magnetic field, see the image on the right (Courtesy NASA).

The Aurora Borealis, seen below, can appear as green curtains of light across the sky. They are more frequent in Spring. But how does the sun know that Spring has arrived on earth? NASA has launched THEMIS [1], a mission with a team of five space craft, to study auroras. One geomagnetic storm that NASA observed had a total energy of five hundred thousand billion ( $5 \times 10^{14}$ ) Joules. UCLA physicist Vassilis Angelopoulos pointed out that is nearly the same as an earthquake of 5.5 magnitude!

There is a lot still to be understood about Aurora (Borealis in the Northern Hemisphere and Australis in the Southern). Angelopoulos says that "Auroras sometimes erupt with little warning and surprising intensity. We call these events 'sub-storms,' and they are a big mystery."

aurora video type unknown [2]

You can watch an excellent video about the Aurora from NASA by clicking on the image to the right.

There are many mysteries still about the Aurora, these include where the energy comes from, where it is stored just before the eruption and what triggers the outbursts. Maybe the THEMIS mission will be able to answer these and other questions.

themis spacecraft

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### An artists conception of THEMIS

What has been discovered is that the magnetic connections between sun and earth are favoured in the Spring and that this is due to geometry. As the earth revolves its poles move back and forth. In Spring the orientation is best to allow solar wind energy in and create the Aurora Borealis.

aurora borealis#

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Images and information courtesy of NASA.

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**Source URL:** <http://www.accsys.rmets.org/weather-and-climate/weather/space-weather-0>

#### **Links**

[1] [http://www.nasa.gov/mission\\_pages/themis/mission/index.html](http://www.nasa.gov/mission_pages/themis/mission/index.html)

[2] [http://www.nasa.gov/multimedia/nasatv/on\\_demand\\_video.html?param=http://anon.nasa-global.edgesuite.net/anon.nasa-global/ccvideos/GSFC\\_20080305\\_Aurora.aspx&\\_id=118415&\\_title=Spring is Aurora Season&\\_tnimage=216180\\_main\\_1\\_216180mainenus\\_auroravid\\_20080305\\_100.jpg](http://www.nasa.gov/multimedia/nasatv/on_demand_video.html?param=http://anon.nasa-global.edgesuite.net/anon.nasa-global/ccvideos/GSFC_20080305_Aurora.aspx&_id=118415&_title=Spring is Aurora Season&_tnimage=216180_main_1_216180mainenus_auroravid_20080305_100.jpg)