Heliophysics and Chronobiology Update

May 27th, 2013 • 8:42 AM
by Benjamin Deniston

How did you feel Friday night and into Saturday morning? Starting around 6AM (UT) Friday morning, a geomagnetic station in Alaska recorded increasing geomagnetic activity, which reached the level of a "geomagnetic storm" at noon. By 6 PM stations around the world began to register a geomagnetic storm that has continued off and on into Sunday morning. Have you been affected?

Some might dismiss such a question as silly, but a 2003 research paper noted, "A large body of psychological research has shown that geomagnetic storms have a profound effect on people's moods, and, in turn, people's moods have been found to be related to human behavior." Was this an obscure scientific study from some students in need of a graduate thesis? Turns out this is a working paper for the Federal Reserve Bank of Atlanta, entitled, "Playing the Field: Geomagnetic Storms and the Stock Market." There are already so many studies showing the effects of geomagnetic storms on human moods and behavior (many are in Russian) that these authors decided to look for the effects of these geomagnetic-induced mood shifts on the markets. They conclude, "The authors find strong empirical support in favor of a geomagnetic-storm effect in stock returns after controlling for market seasonals and other environmental and behavioral factors. Unusually high levels of geomagnetic activity have a negative, statistically and economically significant effect on the following week's stock returns for all U.S. stock market indices. Finally, this paper provides evidence of substantially higher returns around the world during periods of quiet geomagnetic activity."

So, how was your Friday night? Certain scientists believe the study of solar activity on living organisms should be a field of study, some calling it chronobiology.

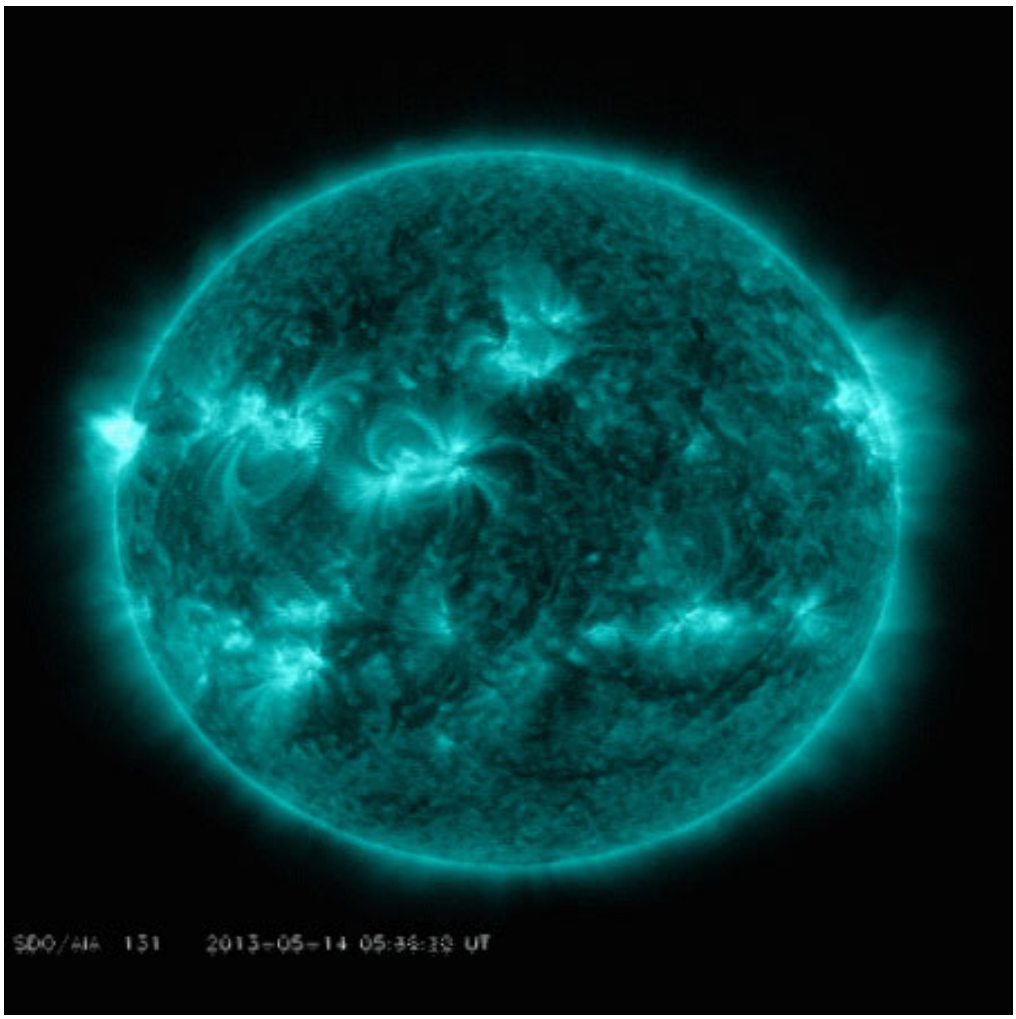
Geophysics or Heliophysics?

Friday morning also saw the largest earthquake in over a year, an 8.3 off the Pacific coast of Russia, in the Sea of Okhotsk. Being in a remote region, no damage has been reported, but at a depth of 380

miles, it was also one of the deepest on record, and felt 4,000 miles away in Moscow. There have only been three other 8+ quakes since the devastating 9.0 off the coast of Japan in March 2011 — two back-to-back on April 11, 2012, in Sumatra (8.2 and 8.6), and an 8.0 north-east of Australia on February 5, 2013.

Interestingly, Friday's 8.3 quake comes within two weeks of intense earthquake and solar activity.

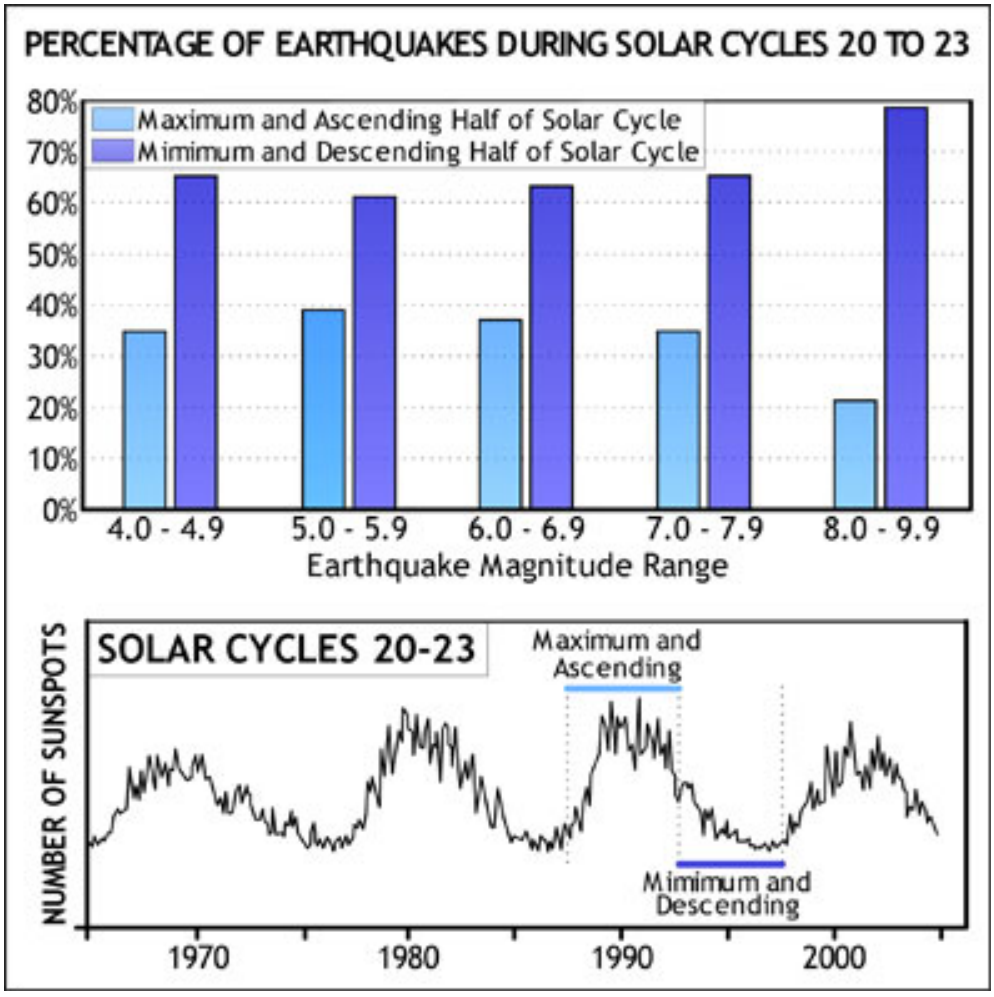
On the solar side, we've seen two geomagnetic storms (on the 18th and on the 24th) and 13 decent-sized solar flares, with four of them being the larger X-class flares. These were the first X-class flares since October of 2012, and the X2.8 and X3.2 flares on the 13th and 14th were the largest in over a year (since March, 2012), and the third and forth largest of the entire solar cycle so far (starting in January, 2008)



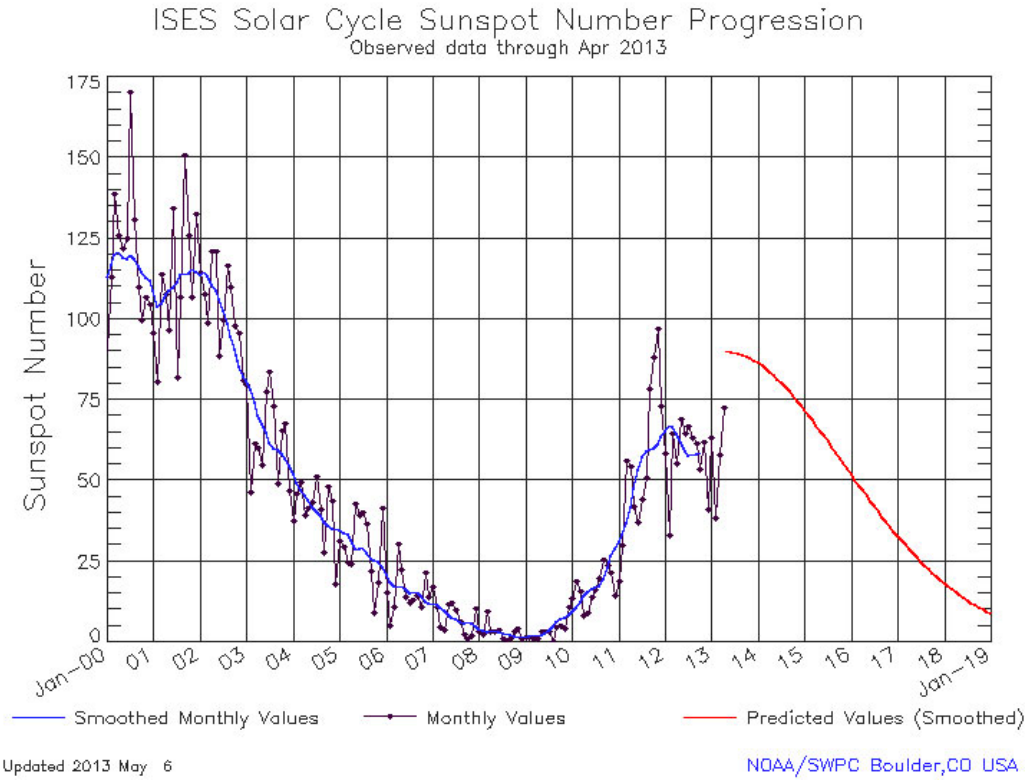
The previous 30 days only had half the number of flares.

For the earthquakes, there have been 34 quakes magnitude 5.5 and larger over the same two week interval (five of them being larger than 6.5). This is about the same number of quakes as during the prior five weeks.

It is well known that the direct, one-to-one, relationship between solar activity and earthquake activity is notoriously hard to predict. However, stepping back and viewing the larger picture, the evidence certainly points to some general relationship. For example, recent studies have shown that the period of the descending half and minimum of the 11 year solar cycle appears to bring significantly more earthquakes than the ascending half and maximum of the solar cycle. The discrepancy is greatest for large earthquakes (see "Possible Correlation between Solar Activity and Global Seismicity," by J. Huzaimy and K. Yumoto, 2011).



This is now a practical matter, as we are currently rounding the peak of the present solar cycle (number 24), and soon to be entering the descending phase. What will the next years bring for solar activity and earthquakes? This would be the time to put some serious support into non-seismic earthquake forecasting programs (such Sergey Pulinets' work), which hold promise for saving lives but have been blocked for political and ideological reasons. An international SDE would also expand our understanding of the Earth-Solar System relationship, and increase our forecasting abilities.



For now — until we can dump Obama and his anti-science policies — there are also some large "coronal holes" on the Sun currently rotating towards us. Coronal holes release intense jets of plasma called "high speed solar wind streams" (HSS), which can do a good job at generating geomagnetic storms. So, starting early this week you may want to watch for a shaky mood, and a shaky ground!