Sparkling Geomagnetic Field – Students Peek into the Eye of the Storm

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With the maximum of the solar cycle approaching, an opportunity to study space weather and its effects on our planet arises. Three geomagnetic stations were set up across Austria with the help of local schools. The stations, measuring the direction and strength of the magnetic field with a high frequency, map the process of geomagnetic storms across Austria.

The solar maximum, which is the point at which the Sun reaches the end of its cycle and reverses the polarity of its magnetic field, occurs every 11 years. During this time clouds of energetic particles are thrown out from the Sun's surface and traverse the interplanetary void towards the top of Earth's atmosphere.

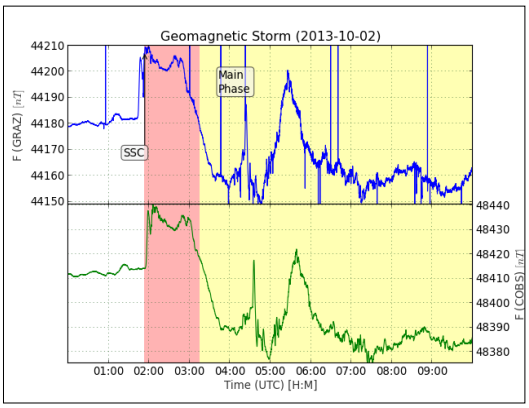

Figure 1: A storm onset measured by a station in Graz (above) and the Conrad Observatory (below).

The arrival of a particle cloud on our magnetosphere triggers a geomagnetic storm (Fig. 1). Strong geomagnetic storms have various effects noticeable by the general populace such as aurorae (northern lights), power failures and radio disruptions. Generally storms are only strong enough in far northern and southern latitudes (e.g. Norway, Australia) to cause disruptions, however during the strongest of storms aurorae have been visible in Norway, Austria, and as far down as Egypt.

The solar activity should be peaking in late 2013/early 2014, making this an ideal time to study the effects of geomagnetic storms in Austria. Through the Sparkling Science programme (BMWFW), which pairs research institutions with Austrian schools to promote science in a school setting, a collaboration between the ZAMG was set up. Three schools across Austria (situated in Graz, Tamsweg and Innsbruck) signed up. Each school received one station for the measurement of geomagnetic field variations in the variables F (field strength) and x, y, and z (the three field direction components).

The students carried out investigations into the best location for the setup of the stations after an introductory meeting where the basics of the project were explained. After choosing a few possible locations, the stations were investigated by a research team composed of students and ZAMG researchers (Fig. 2) and the best was chosen. The students then set up the stations themselves.

Figure 2: Students and ZAMG colleagues check a suggested area for magnetic disturbances.

The stations are currently running and measuring the geomagnetic field conditions continuously. Two stations have already recorded a geomagnetic storm “sudden commencement” (Fig. 1).

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For more project information and updates: www.fb.com/SparklingGeomagneticField

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