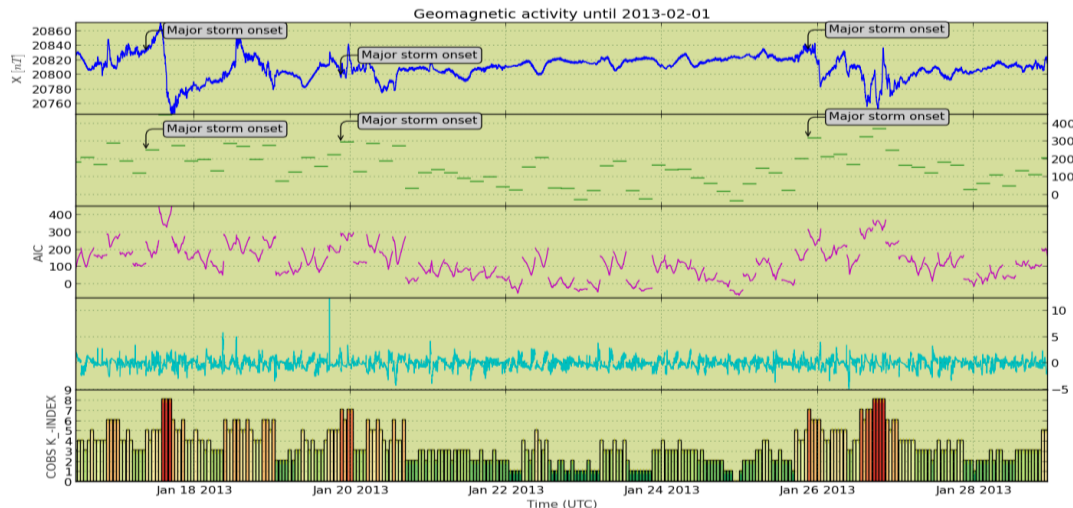


## The real time recording and detection of geomagnetic storms

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Geomagnetically induced currents are at the end of a space weather chain that originates at the Sun. During a geomagnetic storm, intense currents are produced in the magnetosphere and ionosphere creating time-dependent magnetic fields. At the Earth's surface these fields induce geomagnetic currents in powerlines. As a consequence, lots of technical disturbances have been reported. This article is about a geomagnetic storm detection software (GSDS), which filters, corrects and analyzes the data. Additionally, it targets on detecting geomagnetic storms in real-time and to automatically publish a current storm.



The Sun alternates between quiet and very active phases in a period of  $\sim 11$  years. During so-called coronal mass ejections (CME) charged particles are ejected in form of plasma clouds, which can reach the Earth after a few hours to days. If the polarisation of the plasma-cloud is opposing the polarity of the Earth's magnetic field, both magnetic fields connect. This enables electric particles to enter the Earth's atmosphere and to induce geomagnetically currents (GIC), for example in power lines.

The most famous GIC event took place in 1989 over Quebec, Canada. The current caused a major blackout. On October 30, 2003, 50,000 people were affected by power blackout in Malmö, Sweden. As a side effect wonderful auroras were visible all over Europe.

The Sun is at the maximum of its activity cycle right now. For this reason it is important to analyze GICs in order to identify eventual vulnerabilities of the power grid and, ideally, to forecast their consequences in advance to extenuate or prevent appreciable damage.

The Conrad Observatory is equipped with magnetometers that permanently detect field intensity and variations in three dimensions. The measured data is supplied to a storm detection software which supports automated data filtering, correction and analyzation. This software is capable of detecting geomagnetic storms in real time. The aim of this project is to provide information to the relevant authority on geomagnetic induced currents, which can potentially damage the infrastructure of the Austrian power grid.

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