

SID Monitoring in Slovakia

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Abstract

This contribution presents the Slovak SID monitoring network. Two SuperSID monitors were kindly provided by the Stanford University in the frame of the ISWI SID monitor network, one is installed in the Slovak Central Observatory in Hurbanovo and other is being installed in the Astronomical Observatory in Rimavska Sobota. Moreover, there are several SID monitors constructed by R. Slošiar (Bojnice) and J. Karlovsky (Hlohovec) operated in Bojnice, Hlohovec, Hurbanovo, Partizánske, and Roztoky. Results on registration of solar flares are presented as well.

1. INTRODUCTION

Introduction and detailed information to SID (Sudden Ionospheric Disturbances) Monitor can be found e.g. at Stanford Solar Center (<http://solar-center.stanford.edu/SID/sidmonitor/>) or at AAVSO website (<http://www.aavso.org/solar-sids>).

2. SID MONITORING NETWORK IN SLOVAKIA

SID Monitoring is an indirect detection of solar flares. J. Karlovský (Hlohovec) a R. Slošiar (Bojnice) constructed their own SID monitors, which are installed in Bojnice and in the Astronomical Observatories Hlohovec, Hurbanovo, and Partizánske. J. Karlovský constructed also one SuperSID monitor.



SID monitoring – real-time data:

- **Bojnice** <http://195.160.182.241/page/rudy/>
- **Hlohovec** <http://karlovsky.info/sid/temphtml.htm>
- **Hurbanovo** <http://www.suh.sk/skypipedata.htm>
- **Partizánske** <http://195.160.182.241/page/>
- **Roztoky** no real-time data available, yet.

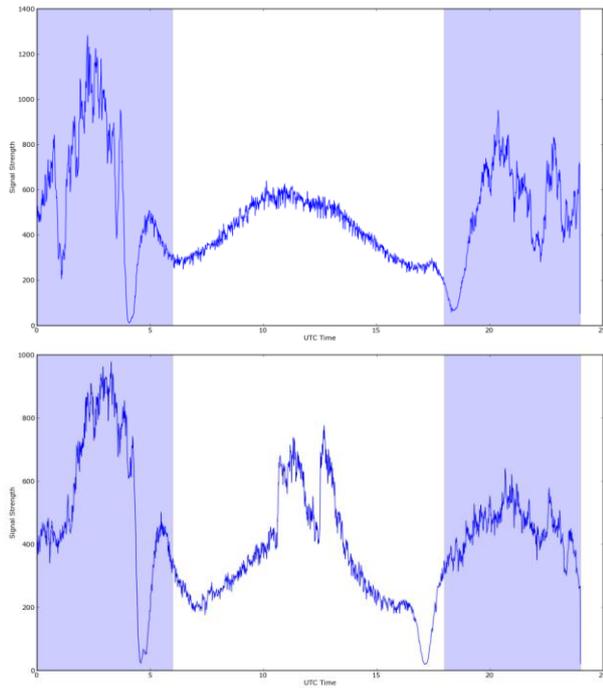


SuperSID monitoring:

In the Slovak Central Observatory (SCO) Hurbanovo are installed also other SID monitors and one SuperSID monitor (this one in the frame of the ISWI program) – real-time data will be available soon. Another SuperSID monitor is being installed in the Astronomical Observatory in Rimavská Sobota.



Figure 1. Antenna of the SuperSID monitor in Hurbanovo (top panel) and in Rimavská Sobota (bottom panel).



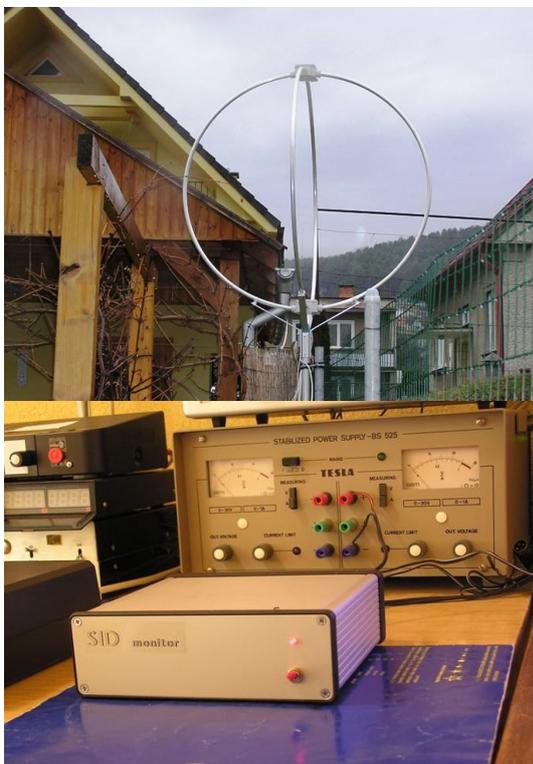
5 October 2011, HWU 20.9 kHz

Figure 2. Typical ionospheric behaviour – a day without solar flare activity (top panel) versus solar flare activity day behaviour – 5 October 2011 (bottom panel).

3. ANTENNAS AND SID MONITORS



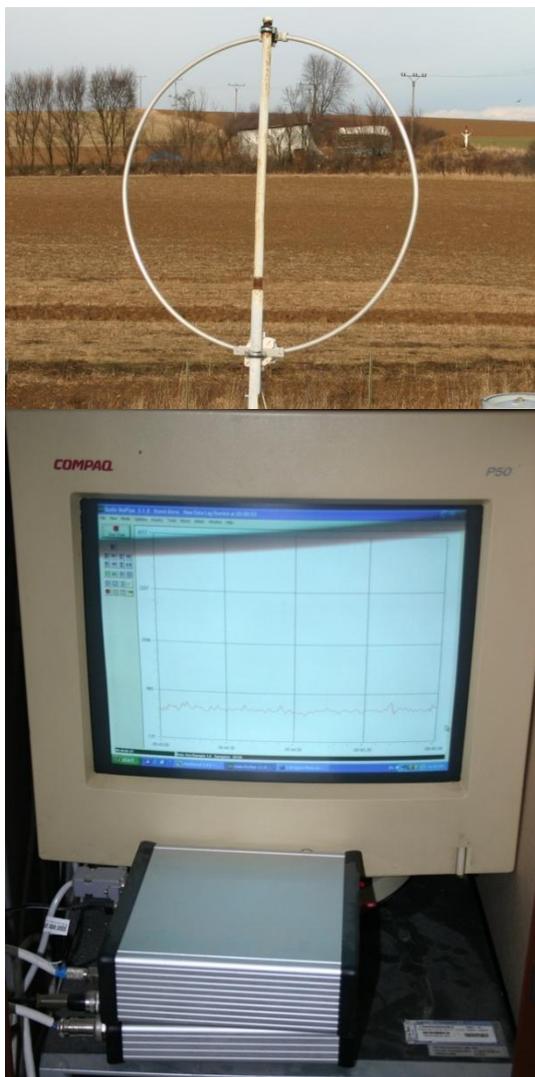
Hlohovec



Bojnice



Hurbanovo



Partizánske



Roztoky

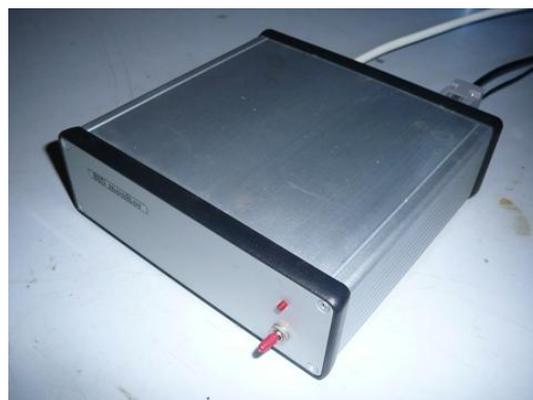
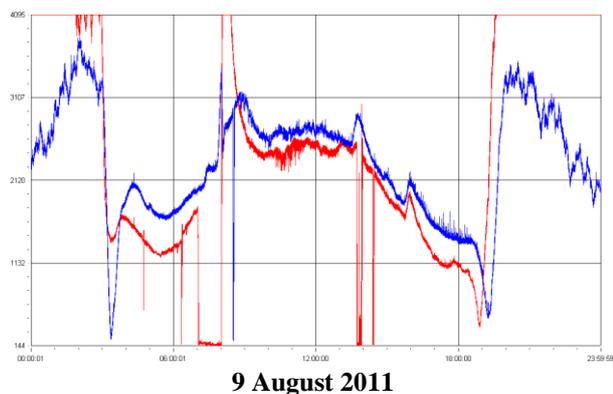
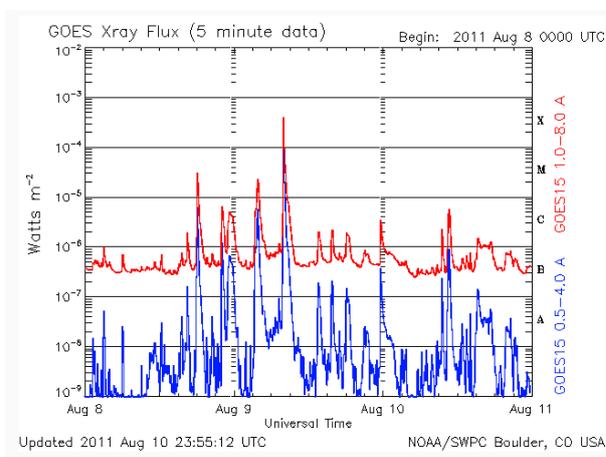


Figure 3. Antennas and SID monitors at individual observing sites.

4. DETECTION OF SOLAR FLARES



9 August 2011



GOES X-ray data.

Figure 4. Record of the SID Monitor – SCO Hurbanovo (left panel) and the GOES X-ray data for comparison (right panel).

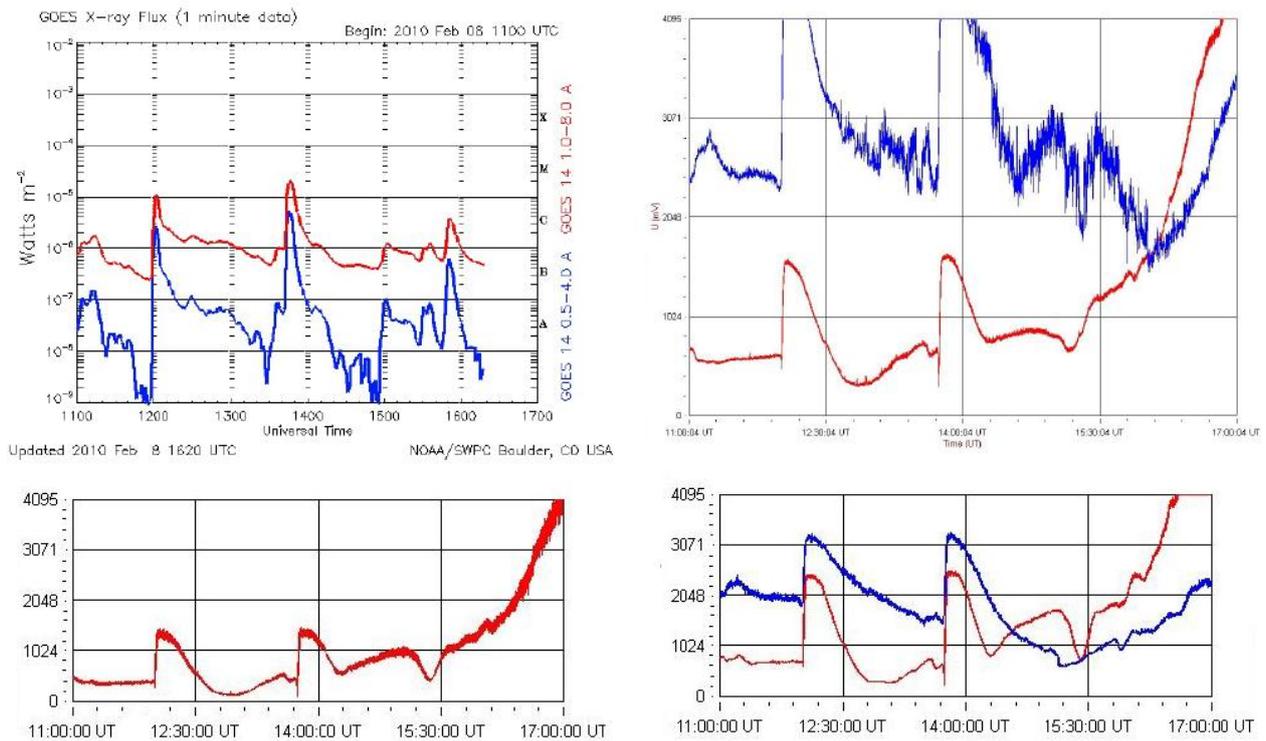


Figure 5. Three SID monitors from observatories Hlohovec (top-right), Partizánske (bottom-left) and Bojnice (bottom-right) detected the M class solar flare on 8 February 2010; GOES X-ray data for comparison (top-left).

5. DETECTION OF GAMMA RAY BURSTS

SID monitor is sensitive enough to detect such faint ionospheric events like Gamma Ray Bursts (GRBs). SID monitor network can eliminate noise coming from different sources mostly relatively close to SIDmonitor antenna, like close factories, electronics devices or for example neon light tubes. Three SID monitors (Partizánske, Hlohovec, Rudy BASE Bojnice) detected small disturbance in the middle of a solar flare ionospheric response on 12 February 2010. The detection shown in Fig. 6. clearly shows how important is SID monitor network and how sensitive it can be.

We already have four SID monitor sites in Slovakia, other SID monitors are installed in the Czech Republic (Brno, Ondřejov). Detailed information on detection of GRBs was published by Hudec et al. (2010) and Slošiar et al. (2011). Another example of GRB detection can be found in Kocka et al. (2011).

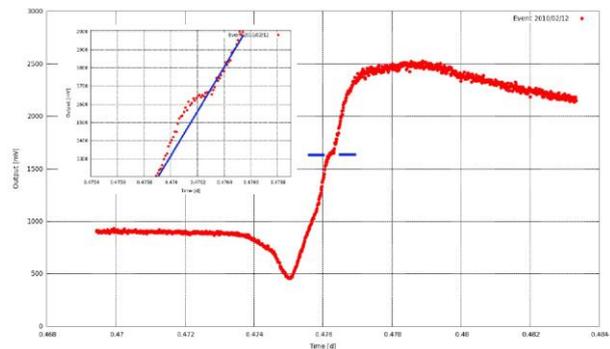


Figure 6. Detection of Gamma Ray Burst (GRB) on 12 February 2010.

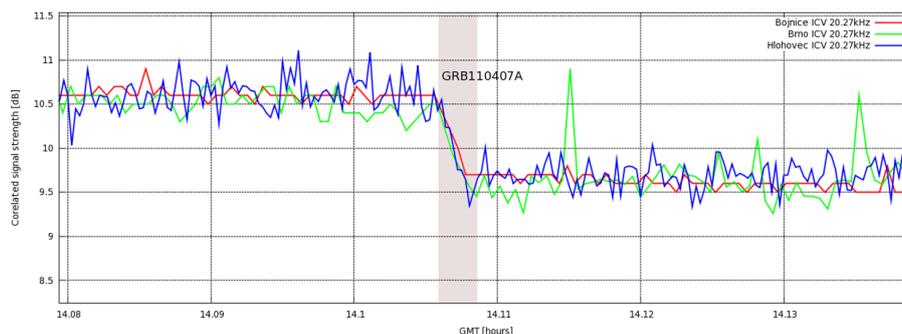


Figure 7. Detection of GRB published by Kocka et al. (2011).

Acknowledgements

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