

Name of research institute or organization:

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**Physikalisches Institut, Universität Bern**

Title of project:

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SONTEL - Solar Neutron Telescope for the identification and the study of high-energy neutrons produced in energetic eruptions at the Sun

Project leader and team:

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Dr. Rolf Bütikofer

Project description:

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The solar neutron telescope (SONTEL) at Gornergrat, Switzerland, has been in continuous operation since 1998 as the European cornerstone of a worldwide network for the study of high-energy neutrons produced in energetic processes at the Sun (Flückiger et al., 1998). The network consists of seven solar neutron telescopes that are located at high altitudes and at low to mid-latitudes (short path through atmosphere) as well as at different longitudes (24 hour readiness to observe): Mt. Norikura (Japan), Yanbajing (Tibet), Mt. Aragats (Armenia), Gornergrat (Switzerland), Mt. Chacaltaya (Bolivia), Sierra Negra (Mexico) and Mauna Kea (USA).

SONTEL Gornergrat was in continuous operation during 2012, with only some short data gaps caused by electrical power outages. Some rivets, which fix aluminium plates at the lab container, have been broken by the wind over the years and as a consequence the aluminium plates broke off, see Figure 1. This damage had no effect on the measurements of SONTEL. In September 2012 new plates were fixed by the workshop of the Physikalisches Institut, University of Bern.

Four years after the beginning of solar spot cycle 24 the activity of the Sun was still low. On 17 May 2012 a solar cosmic ray event was observed by the worldwide network of neutron monitors (see the activity report of the neutron monitors at Jungfrauoch in this volume). The onset of the count rate increase of the neutron monitors was at about 0150 UT, i.e. at night-time in Europe. As the neutrons travel on a straight line like the photons from the Sun to the Earth, it would not have been possible to observe solar neutrons at Gornergrat during this event. The solar neutron telescope at Mt. Norikura (36.1°N, 137.5°E) was the station that had the most suitable position to observe solar neutrons during this event. However, the solar neutron telescope at Mt. Norikura did not show an increase in the counting rate that could be attributed to solar neutrons.

In 2012 the radioactivity measurement with a GammaTracer device inside the detector housing of SONTEL was continued.



*Figure 1: Defective roof of SONTEL lab container.*

Key words:

Astrophysics, cosmic rays, solar neutrons

Internet data bases:

<http://cosray.unibe.ch>

<http://www.stelab.nagoya-u.ac.jp/ste-www1/div3/CR/Neutron/index.html>

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