Status of the Polar BSRN Sites
Ny-Ålesund and Neumayer

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Introduction

The Alfred Wegener Institute for Polar and Marine Research operates two BSRN stations in the polar regions:

Ny-Ålesund in the Arctic (together with the Norwegian Polar Institute) and Neumayer in Antarctica, both equipped with identical instruments. Continuous measurements started in 1992 and 1982, respectively.

In addition to the radiation measurements, both stations provide synoptic weather observations as well as daily upper air soundings and weekly ozone soundings.

Instrumentation

The ventilated radiation sensors get inspected several times a day. Active solar trackers (ZAP SCI-TEC / Kipp & Zonen) are used to point automated photometers (Schulz & Partner, Germany) towards the sun. Additionally, the trackers shade the pyranometers (CM11, SCI-TEC/Kipp & Zonen, Canada) and a pyrgeometer (MD, Eppley, USA, modified at Davos).

Currently, minute-by-minute averaged radiation fluxes are obtained by using a data logger (CR10, Campbell Scientific, USA).

Arctic Station: Ny-Ålesund, Spitsbergen (78° 56'N, 11° 57'E)

In Ny-Ålesund, the mean annual global radiation since 1993 varies around 76.7 ± 6 Wm⁻². The observation period obviously is too short for trend analysis, and the 0.6 % decrease per decade found for the period between 1993 and 2007 is clearly not significant. Variability between the years occurs due to different meteorological conditions and the according changes in cloud amount. The year 2006 provides an evident example.

Antarctic Station: Neumayer (70° 39' S, 8° 15' W)

Due to snow accumulation the current Neumayer II station is rebuilt. The new station ‘Neumayer III’ is a construction which can adapt to the snow surface without getting buried, and has an expected lifetime of 25 years. It is planned to be operative by March 2009, relocating the meteorological observatory and BSRN program without interruption.

At Neumayer, an increase of the global radiation is found, accompanied by a reverse trend of the downward-longwave radiation and a strong increase of the annual sunshine duration. Ceilometer data imply that the total cloud amount above Neumayer is decreasing. Figure 8 shows the annual sunshine duration and mean temperature, clearly anti-correlated as a result of the well known “Antarctic radiation paradox”. Yet, the temperature does not decrease with increasing sunshine duration, probably due to compensation of the cloud effect by other factors (e.g. greenhouse gases).

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