Status of the Arctic BSRN Site Ny-Ålesund (78.9°N, 11.9°E)

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Ny-Ålesund is located on the western fjord coastline of Svalbard, at about 79°N. Although located in the high Arctic, the local climate is affected by North Atlantic influences, both due to oceanic heat advection and the impact of cyclones following the main storm tracks, with particular significance for the atmospheric warmings in winter.

The BSRN station is operated since August 1992, providing the radiation budget components global radiation, reflected radiation, upward thermal radiation and downw ard longwave radiation, as well as direct and diffuse radiation, and some filtered bandwidth measurements to retrieve photosynthetic active radiation (PAR).

**Spring / Summer – Shortwave Radiation**

**Figure 1:** Increase in short-wave net radiation $SW_{an} = SW_{down} - SW_{up}$ for the snow-melt season May-June and the summer months July-August since 1993, due to changes in the single components $SW_{down}$ (lower left panel) and $SW_{up}$ (lower right panel), respectively.

**Figure 2:** Daily mean albedo $SW_{an}/SW_{up}$ at the Ny-Ålesund BSRN radiation sensor set-up [update of Maturilli et al., 2015].

- **shortening of the snow-cover period**
- **2018** year with earliest snow-melt observed so far

**Winter – Longwave Radiation**

**Figure 3:** First day of each year assumed to have a predominantly snow-free surface beneath the radiation sensor set-up (daily mean albedo <0.02), with linear regression +/- 1 standard deviation [update of Maturilli et al., 2015].

- **Strong winter surface warming in Svalbard region is related to winter sea ice depletion in the Barents / Kara Seas**
- **Temperature increase also observed in atmospheric column, along with increase in humidity**
- **Advection contributes to 25% of this tropospheric warming** [Dathe and Maturilli, 2017]
- **Changes in water vapour + clouds = radiative impact?**

**Auxiliary Data: Radiosondes**

With the introduction of the new radiosonde type Rs41 in April 2017, the upper-air data are no longer submitted in the station-to-archive files (as LR1100).

Instead, the radiosonde data in 1-second resolution can be retrieved via the Pangaea database with the search term “High resolution radiosonde measurements from station Ny-Ålesund”.

A direct link is also provided on the BSRN webpage http://bsrn.awi.de/data/data-retrieval/via-pangaea/

**Auxiliary Data: Ceilometer**

A description of the 25 year data set of cloud base height measurements by ceilometer in Ny-Ålesund has recently been published [Maturilli and Ebbel, 2018].

**References**


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