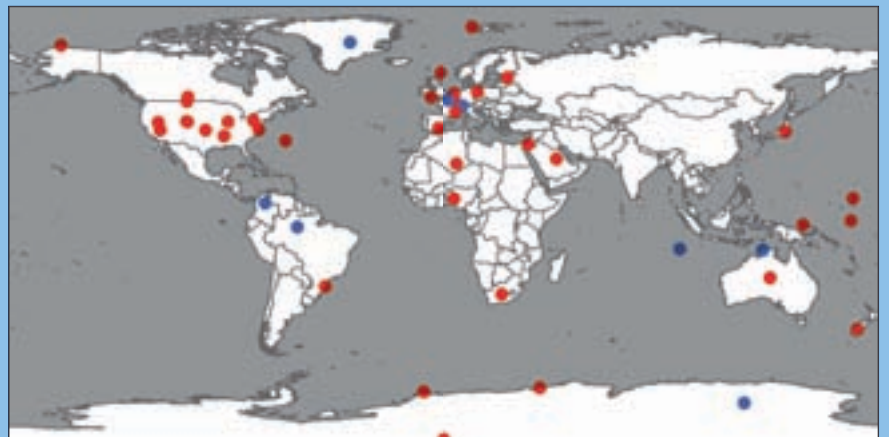


4.2 BSRN

The Baseline Surface Radiation Network (BSRN) is the global baseline network for monitoring the radiation field at the Earth's surface. Global changes in radiation fluxes can only be reliably determined on the basis of consistent, long-term, high-quality observations – hence the importance of systematic archiving of data.



Global measurements



Baseline Surface Radiation Network (BSRN) monitoring sites. Red: operational BSRN stations; blue: planned BSRN stations.

At 38 BSRN stations distributed across all climatic zones, at latitudes between 80° N and 90° S, all the components of solar and atmospheric radiation are measured. These measurements are carried out with instruments and methods providing the greatest possible accu-

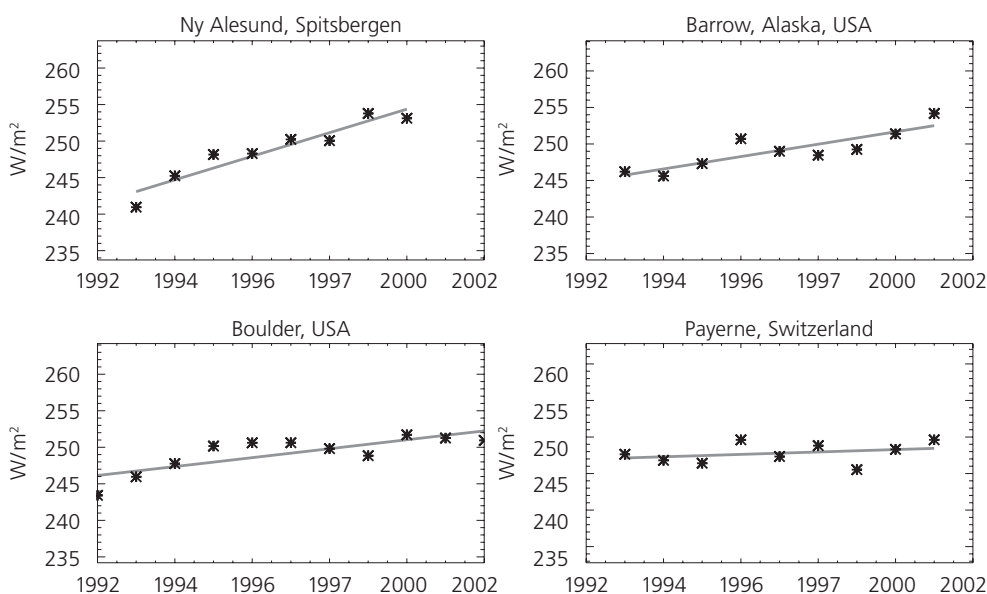
Importance for GCOS

The combination of global operational observations and continuous quality control and archiving offers a unique potential for studying climate-related questions. These global datasets can be used for calibration and validation of satellite products (e.g. for surface radiation fluxes, → 2.5 Radiation) and of global climate model simulations. In addition, local measurements can be used in the derivation of regional

radiation climatology. The BSRN permits continuous recording of changes in the radiation budget caused by natural and human factors. Since the BSRN has been designated as a GCOS baseline network, efforts are being made to ensure that the GCOS monitoring principles are increasingly applied (e.g. establishment of new BSRN stations in underrepresented regions of the world).

Solar radiation at four BSRN stations 1992 – 2002

Annual means in W/m^2



Changes in solar radiation observed at selected BSRN stations over the period 1992–2002. Analysis indicates that the reversal in the surface solar radiation trend observed since the mid-1980s (global brightening) is confirmed by BSRN measurements carried out worldwide since the early 1990s. Studies at 19 BSRN stations show an increase of $0.47 W/m^2$ per year for the period 1992–2004. This reversal may be attributable not only to changes in cloud cover but in particular to widespread improvements in air quality (Wild et al., 2005).

accuracy, so that data can be collected with a temporal resolution of one minute.

The global BSRN measurements are stored at the World Radiation Monitoring Center (WRMC), which is based at the Institute for Atmospheric and Climate Science (IAC) of the ETH Zurich. Before being integrated into the archive, the data undergo a variety of quality control procedures. As well as radiation data, other surface and upper air observations (varying from station to station) are stored in the database. At present, users can access data from 38 stations, with more than 3400 monthly data files available (as of the end of 2006).

In addition, a number of sites not currently participating in the BSRN are candidates for future inclusion.

Responsibility

The BSRN is a project of the World Climate Research Programme (WCRP) aimed at detecting global changes in the Earth's radiation field. The WCRP is sponsored by the World Meteorological Organization (WMO), UNESCO and the International Council for Science (ICSU). The BSRN is part of the WCRP subprogramme Global Energy and Water Cycle Experiment

(GEWEX). The GEWEX programme is run by a Scientific Steering Group, which is responsible for research planning and thus significantly influences the development of the BSRN. The Institute for Atmospheric and Climate Science (IAC) at the ETH Zurich is responsible for archiving of the global BSRN data.

Resources required

From 2008, continued operation of the BSRN archive at the Institute for Atmospheric and Climate Science (IAC) at the ETH Zurich is no longer assured. Funding to ensure the conti-

nunity of this GCOS reference archive should be provided as far as possible through the Swiss GCOS Office.