plot the global distribution of typical time scales of changes in soil moisture, another way to express the potential soil control on evaporation variability. Together with the remote sensing based maps of Craig Ferguson, a suite of coupling products will become available that highlights different aspects of the coupling: the PBL feedback (Betts' soil moisture LCL diagram), convective triggering, soil memory (satellite soil moisture), and pathways possibly including large-scale processes (Koster's coupling coefficient).

A global map with coupling strength diagnostics needs to incorporate these various coupling mechanisms. As a start, we propose to apply a hierarchy approach where the coupling pathway may be associated with an index, which is subsequently plotted. The first level of coupling is the direct PBL feedback, which may be expressed as the degree to which evaporation is sensitive to soil moisture. A positive feedback may emerge when low evaporation/high sensible heat flux may enhance PBL growth that leads to further drying and a higher Bowen ratio. A second level would cover the formation of PBL clouds and its radiative consequences. A positive feedback here might be a case where clouds develop at high moisture contents, reducing surface radiation, surface heating, and PBL growth and allowing for a further build-up of PBL humidity. The third level is the triggering of convection, which may show positive or negative feedback via the likelihood of generating precipitation that moistens the soil, as detailed by Findell and Taylor. Finally, level four expresses an overall hydrological feedback signature that is produced by the impact of land surface on precipitation, i.e., diagnosed from the coupling coefficient detailed by Koster.

What would such a map look like? Starting from the first level coupling, areas will be highlighted where changes in soil moisture do have a pronounced effect on the daytime PBL. For instance, the ratio between the surface and entrainment Bowen ratio diagnosed from Santanello's framework changes significantly for small soil moisture perturbations. Where this is not the case, a strong impact of land surface on the atmospheric state cannot be expected, and further analysis is not necessary. For areas where index 1 is significant, the second and third feedback via cloud formation or convective triggering can be tested. Likewise, a small soil moisture perturbation leads to cloud formation which is either shallow without rain (index 2) or deeper with possible rainfall (index 3). The formation of rainfall will at the end be labeled as index 4. If somewhere in the chain this feedback appears weak or even negative, a strong impact of (local) land state on (local) precipitation is not expected.

This framework is still maturing; a proof of concept will be examined using the NASA LIS coupled to the Weather Research Foundation atmospheric model featuring a suite of land, PBL and convection parameterization schemes. For a number of different climate regimes, a set of snapshot experiments will be set up and perturbation experiments applied to determine the hierarchy of coupling indices. If this setup is successful, we will extend it to the multi-year global scale. For more information, visit *http://www.knmi.nl/~hurkvd/LoCo_workshop_2008.html.*

References

Findell, K. L., and E. A. B. Eltahir, 2003. Atmospheric control on soil moisture-boundary layer interactions; Part I: Framework development. *J. Hydromet.* 4, 552–569.

10th BSRN Scientific Review and Workshop

De Bilt, The Netherlands
7–11 July 2008

Ellsworth Dutton[1] and Dawn Erlich[2]
[1]National Oceanic and Atmospheric Administration, Boulder, CO, USA; [2]International GEWEX Project Office, Silver Spring, MD, USA

More than 50 scientific talks and 20 posters were given at the tenth biennial Baseline Surface Radiation Network (BSRN) Scientific Review and Workshop, held at the Royal Netherlands Meteorological Institute (KNMI). Over 60 BSRN station managers, data users and experts in the field of surface radiation measurements attended.

Dr. Reinout Boers, KNMI, gave the first presentation, an overview of the observations and research activities at the Cabauw Experimental Site for Atmospheric Research (CESAR). In addition to its monitoring activities for BSRN, CESAR participates in other projects such as the GEWEX Coordinated Energy and Water Cycle Observations Project and the World Meteorological Organization (WMO) Global Atmosphere Watch Programme.

Gert König-Langlo of the Alfred Wegener Institute (AWI), reported on the progress of the relocation of the World Radiation Monitoring Center (WMRC), housing the BSRN data archive, from the Federal Institute of Technology Zurich to the Alfred Wegener Institute (AWI) in Bremerhaven, Germany. In June 2008, full responsibility for the operation of WRMC was transferred to AWI. Currently, the archive holds 4,032 station-months from 43 stations. Data can be accessed at *http://www.bsrn.awi.de.*

Four new BSRN sites are now operational in Brazil (Rolim de Moura, Brasília, Petrolina, and São Martinho da Serra), along with the two existing sites in Florianopolis and Balbina. The Florianopolis site is being moved to a new location outside the city and there is a proposal to move Balbina (now in the Amazon) to a Large-scale Biosphere Atmosphere Experiment in Amazonia site because its current location is too remote and hard to maintain. The National Renewable Energy Centre in Pamplona, Spain, and Eureka station in Nunavut, Canada, were approved as new BSRN stations.

Richard Thigpen, Global Climate Observing System (GCOS) Secretariat, reported on WMO Activities aimed at improving the operation of GCOS networks, mainly the surface (GSN) and upper air (GUAN) networks. Several upper air and surface stations have been renovated, and workshops focused on surface and upper air measurements have led to improved quality of observations. Four technical support projects have been established in developing areas to provide direct technical support to GCOS stations. Nine Commission for Basic Systems Lead Centers for GCOS have been established around the world to provide better coordination with operating stations.

The BSRN Project Manager noted that activities beyond ba-

sic data collection have been constrained during the past 2 years as a result of BSRN management focusing on the data archive transition, and also due to widespread tightening of budgets. Considerable work on other topics related to surface radiation and associated interests continues both within and outside BSRN. While there has long been an emphasis on the open publication of results obtained within the BSRN project, this meeting saw a renewed request that all substantial undertakings related to the organization—and particularly its working groups—should lead to and result in such publication or results needed to ensure that the work receives appropriate credit and will be readily available for future generations who will pursue this work.

It was noted that BSRN should consider providing a broader range of data products through its archive in order to be more responsive to its user community, and to extend the utility of the information acquired as part of the effort. Future guidance will be provided to the BSRN archive as to which products might be most useful.

Results were summarized from the International Workshop on Global Dimming and Brightening (GDB), held 10–14 February 2008 in Ein Gedi, Israel. In particular, BSRN is well positioned to address GDB issues, and was recognized as a world leader in surface radiation measurement activities. There was general agreement at the conference that longer, better spatially distributed surface radiation measurement records are needed, especially over the oceans. In addition, agreement was reached that the GDB phenomenon is real and that the next step is to determine the causes.

The Surface Radiation Budget Project has produced a continuous record of shortwave/longwave radiation data (SRB V3.0) for the top of the atmosphere as well as the Earth's surface at a 1° longitude by 1° latitude resolution for the time span of 23 years, from July 1983 to June 2006. The data are given at 3-hourly, 3-hourly-monthly, daily, and monthly means. Since these data are derived from satellite-based observations, it is important to validate the data set against ground-based measurements such as those of BSRN.

The culmination of several years' work as reported in three defining publications has resulted in a proposed reference group of pyranometers for diffuse solar irradiance. This work has established the certain accuracy uncertainty in diffuse solar irradiance observations, considering all the major known sources of uncertainty are found to be within 2–4 W/m^2. The work provides a reference through which current and future diffuse solar irradiance observations can be evaluated, although the work provides more for a methodology and set of evaluation criteria by which other independent approaches can be evaluated and related to the same level agreement.

Large uncertainties were still reported to exist in our knowledge of the Earth radiation balance and its representation in climate models. Accordingly, global mean radiation budgets simulated by climate models differ largely, particularly at the surface. BSRN data provide a unique opportunity to constrain these uncertainties. The data suggest that many models overestimate downward solar radiation and underestimate downward longwave radiation.

BSRN data also allowed the detection of widespread surface solar brightening since the early 1990s, after decades of dimming. Global climate model simulations performed at the Swiss Federal Institute of Technology (ETH) with the ECHAM5-HAM model suggest that brightening will turn back into a dimming in the coming decades, and downward longwave radiation will increase at 2–3 Wm^{-2} per decade. It will therefore be exciting to see what BSRN data will show over coming years, and whether they will support or disprove the model predictions.

Many additional focused papers were presented on the work of BSRN site scientists and other topics related to surface radiation observation and quantification. The meeting provides an excellent forum for these papers, where many of those in attendance share similar interests and often conduct related investigations. All presentations were directly related to some aspect of quantitative surface radiation determination, as well as the use and evaluation of that information. While there were too many presentations to review here, the complete agenda and most presentation materials are available on the BSRN website at *http://www.gewex.org/bsrn.html*.

As of early 2008, BSRN has 3,941 site-months of data in the archive from 39 ground sites located on all continents; the earliest data go all the way back to 1992. The measurements are made at 1-minute, 2-minute, 3-minute or 5-minute intervals. Considerable work is needed to process the BSRN data to make them comparable with the GEWEX SRB data. Additionally, the BSRN data files contain 11 quality flags for each data point. A procedure needs to be designed to appropriately use the information in order to exclude possibly erroneous data.

The exceptional hospitality of the KNMI staff, particularly Dr. Wouter Knap, in hosting the meeting and arranging for the site tour of the Cabauw Experimental Site for Atmospheric Research was greatly appreciated.

New Publication: Journal of Advances in Modelling Earth Systems (JAMES)

A new peer-reviewed international journal reporting on all aspects of Earth System Modelling is open for submissions. JAMES has sections for research articles, short topics, review articles, and a special section for articles on policy and science education related to climate science. JAMES is an open-access journal, so anyone with internet access can read and download articles at no cost.

See the JAMES web site for more details *at http://adv-model-earth-syst.org/*.