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Report on the Status of the Baseline Surface Radiation Network

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BSRN Acknowledgements

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BSRN Background

- **GOAL:** To acquire the highest possible quality, climatically-diverse, surface-based radiation measurements for climate research
- **OBSERVATIONS:**
 - Direct and diffuse solar irradiance (global for QA)*
 - Downward infrared (terrestrial) irradiance*
 - Reflected solar & emitted infrared irradiance
 - PAR / UV / Spectral irradiance
 - Aerosol optical depth
 - Surface meteorology
 - Upper air
- **APPLICATIONS:**
 - GCM comparisons
 - Satellite validation
 - Regional climatologies
 - Global radiation budget
 - Radiation model testing

* Minimum measurement suite



Context: World Climate Research Programme

- WCRP radiation WG (now GRP) conceived, organized, promoted, and directed the establishment of BSRN.
- Dr. E. Dutton, NOAA, established as program manager in 1995 and continues to head the organization.
- Major purposes of BSRN are:
 - Support GRP satellite surface products
 - Develop instrument requirements
 - Provide high quality radiation data at global reference stations
 - Assemble and provide user access to a database of observations
- Radiation panel provides oversight and reviews the scope of BSRN and occasionally requests specific activities
- BSRN is the only GRP project with infrastructure to make observations
- BSRN operates largely independently and has broadened its interests into a wide range of climate applications beyond the WCRP GRP initial mandate.
- GRP is BSRN's link to GEWEX and WCRP

Context: Atmospheric Observation Panel For Climate / Global Climate Observing System

G GLOBAL
C CLIMATE
O OBSERVING
S SYSTEM



- AOPC recruited BSRN into GCOS after BSRN agreed to follow modified GCOS Observation principles
- BSRN makes yearly reports to AOPC, sometimes indirectly or in absentia
- AOPC advocated for a smooth and timely transition of BSRN archive
- AOPC has used its international support structure (Thigpen) to assist at least one troubled BSRN site to date
- GCOS provided meeting travel support in 2008

GCOS Climate Monitoring Principles

- Assess impact of new systems prior to implementation ✓ ✓
- Ensure suitable overlap period for new and old systems ✓
- Document station history and other metadata ✓ ✓
- Routinely assess data quality ✓ ✓
- Consider needs of climate assessments in design
- Maintain operation of long-record stations ✓ ✓
- Focus new sites on data poor areas ½ ✓
- Include long-term needs in initial design ✓ ✓
- Transition from research to operations carefully
- Maintain effective data management facilities ✓



From Progress Report on the Implementation of the Global Observing System for Climate in Support of the UNFCCC 2004 – 2008 (Draft closed June 20, 2009)

Action A14 Global high-quality measurements of surface radiation

Good-Moderate Progress

Action: Expand the BSRN network to obtain global coverage and establish formal analysis infrastructure.

Who: Parties' national services and research programmes operating BSRN sites in cooperation with AOPC and the WCRP/GEWEX Radiation Panel.

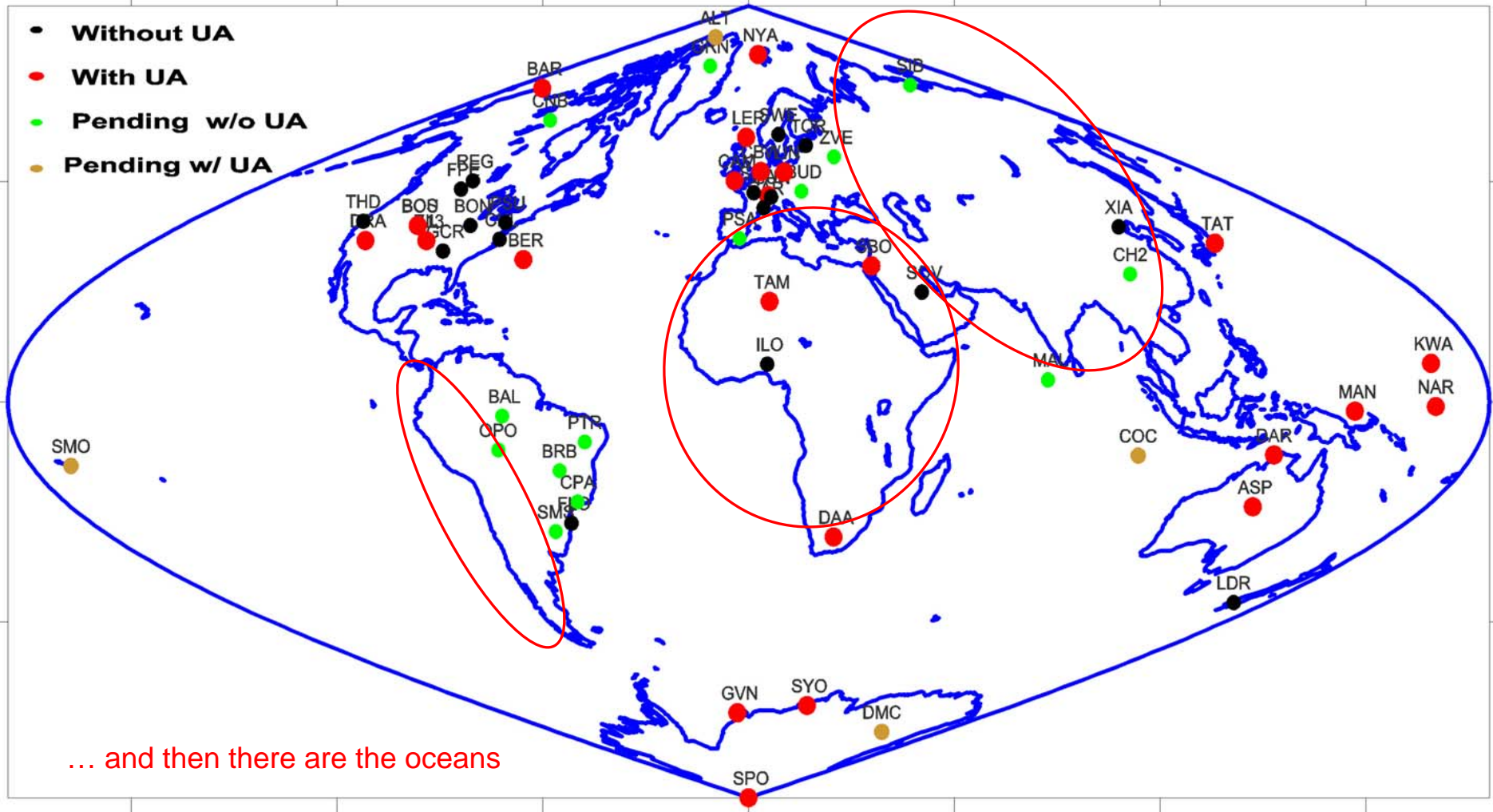
Time-Frame: Plan completed 2004, BSRN fully operational by 2009.

Performance Indicator: Published plan and the number of BSRN stations submitting data to International Data Centres.

There has been reasonable progress through the continued development of the Baseline Surface Radiation Network (BSRN). In 2008, the BSRN archive was re-established at the Alfred Wegener Institute (AWI) in Bremerhaven, Germany, following a period of uncertainty after 15 years of operation at ETH Zurich, Switzerland. In April 2008, there were 40 BSRN stations in operation (compared to 35 in 2004) and more sites are expected to join the network thereby improving geographical coverage, although some gaps remain. In a GCOS-WCRP agreement in 2004, BSRN was recognized as the GCOS Baseline Network for Surface Radiation.



International Baseline Surface Radiation Network (BSRN) with and without nearby Upper Air launch sites



BSRN Network Status (1 Nov 2008)

- New data archive on line July 2008, AWI Germany www.bsrn.awi.de
- 4387 months of data from 43 sites archived
- Newly submitting sites (in 2008)
 - Brazil (4)
- Newly proposed sites (July this year)
 - Spain (2)
 - Portugal
 - Eureka, Canada
 - Kenya
 - Egypt
- Pending sites (previously approved but archive is awaiting data)
 - Alert, Canada
 - Cocos Isles, Australia
 - Tiksi, Russia
 - Maldives
 - Dome Concordia, Antarctica
 - Summit, Greenland
- Primarily recruiting globally-remote, regionally-representative, well-supported sites



BSRN Most Pressing Issues (1 Nov 2008)

- **Sites in Serious Jeopardy:**
 - Solar Village, Saudi Arabia (loss of communication and external funding)
 - De Aar, S. Africa (local personnel hardship)
 - Ilorin, Nigeria (minimal local funding, receiving some attention from GCOS)
- **Reduction in WCRP financial support.**
- **Reduction in support for radiation observations in many NMHIs**
- **Support for international measurement reference standards for radiation** (currently pursued in Davos, Switzerland with CIMO endorsement)
- **U.S. Specific** -- NASA Radiation Sciences has provided complete support for premium Kwajalein and Bermuda sites as well as the Project Manager administrative activities, but now expecting NOAA to take over role.
- **BSRN internal issues/needs:**
 - More oceanic, central Asia, and African sites (considering all offers)
 - Slow data submissions (should improve with AWI as new archive)
 - Data summary products for users (new job for archive)
 - Completion of data uncertainty assessment (a GRP project)
 - Aerosol optical depth – observations available, but no central processing and archival



Major Achievements 2008 - Present

- Move and invigoration of BSRN data archive – World Radiation Monitoring Center – Baseline Surface Radiation Network
 - Moved from ETH Zurich to AWI, Bremerhaven
 - New website with increased options for data downloads
<http://www.bsrn.awi.de/en/home/>
 - PANGAEA-derived data sets become available (Publishing Network for Geoscientific and Environmental Data)
 - New up-to-date station data is now available following the slowdown of data ingest at ETH Zurich during 2007 – 08
- Applications for multiple new stations, most of which are in data sparse areas – Arctic, Brazil, Kenya, Egypt
- Increased collaborations with AERONET & other sunphotometer networks
- 10th Biennial BSRN Experts Group Meeting, KNMI, Netherlands, July 2008

Recommendations to IRC

1. Recognize the efforts of Dr. E. Dutton, NOAA and Dr. G. Köning-Langlo, AWI as Manager of the BSRN and Manager of the BSRN Data Archive respectively.
2. Encourage the use of data from the BSRN archive, while noting the need to acknowledge and cite the use of this data ([BSRN - World Radiation Monitoring Center Details](#)).
3. Recognize GCOS for its recognition of the quality of BSRN data and its contribution to BSRN observations in data-sparse regions.
4. Recommend the need for more BSRN observations in Africa, Asia and Western South America and all oceanic regions.
5. Encourage governments and NGOs to support national / international BSRN installations under WCRP and GCOS, including providing long-term support of high-quality radiation observations.