

*Parallel experiences with the development of  
BSRN as they may relate to GRUAN*

*and*

*Ongoing GRUAN / BSRN synergy*

*(Note: Not specifically intended to promote BSRN or its involvement in GRUAN)*

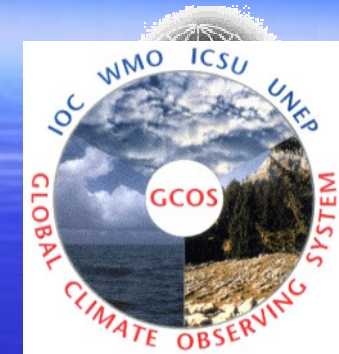
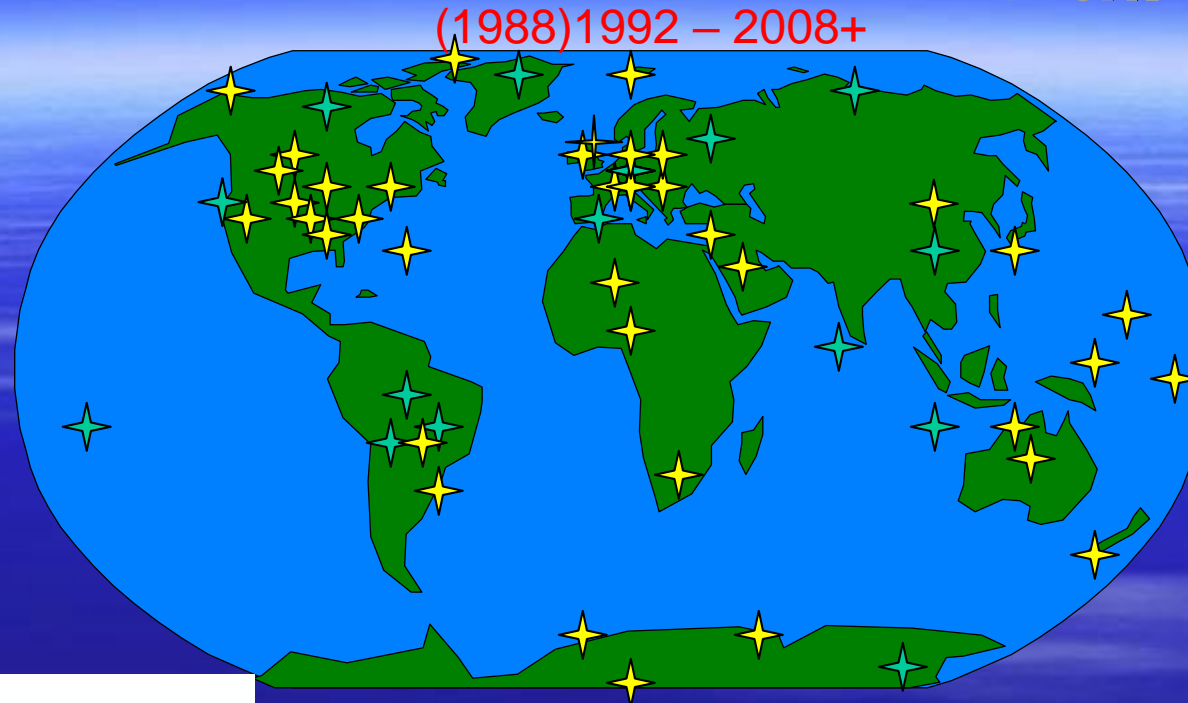
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IOC



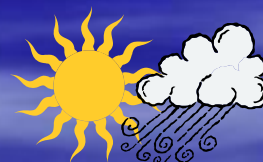
WMO

## Measurements

- Direct & diffuse solar\*
- Downward infrared \*
- Upwelling irradiance
- PAR & UV
- Aerosol optical depth
- Surface meteorology\*
- Upper air met.
- Sky imagery, cloud height

\* all sites

★ Archiving    ★ Provisional



Regions

Oceanic Tropics Desert  
 Polar Coastal Rain forest  
 Agricultural Prairie

## Data Applications

- GCM comparisons
- Satellite prod. validation
- Regional climatologies
- Radiation budget apps.
- Radiation model testing

## *BSRN development requirements or conditions* *(1988-mid1990s) that parallel GRUAN's*

- International response to a recognized scientific need (current generally available meas. not good enough)
- Applications include satellite and model comparisons/validations as well as climate record establishment
- Standardize worldwide distributed observations
- Centralize data collection and dissemination
- Meet new requirements in near future
- Financially and logistically primarily dependent on voluntary national contributions (invite/solicit participation)
- Scientifically dependent on contributions of individual scientists
- Sustainability in the long-term
- Considerable interest from commercial vendors



*What worked well in the development of BSRN that  
that may or may not be helpful to GRUAN*  
*(Things BSRN did)*

- Captured the attention of a international group of focused observational scientists
- Early development of expert-consensus measurement requirements and either specifications or plans to meet them
- Held several intensive instrument intercomparisons
- Prepared comprehensive field & archive operations manuals
- Developed viable synergy with manufactures
- Substantial research interests by participants
- Regular network-wide meetings (~biennial)
- Collected and distributed a lot of useful data
- Designated site scientists responsible their sites and data
- Maintained the stature of as truly international

## *What worked well in the development of BSRN that may or may not be useful to GRUAN (con't)*

*(Things done for (or to) BSRN)*

- Attained national commitments through WMO Permanent Representative
- Two substantial benefactors came forward early, one to support/operate a central archive and one to support the network administration – sites supported independently
- Built on related existing international and national observational program structures
- Minimal but forceful oversight by prestigious WCRP Radiation Panel (now also AOPC) – otherwise left alone to pursue the goals
- Pseudo “Lead Center” emerged, at least initially
- Gained a reputation as a vanguard state-of-the-art program – data relatively widely used/published

*What didn't work so well in the development of BSRN  
that may or may not be useful to GRUAN now*

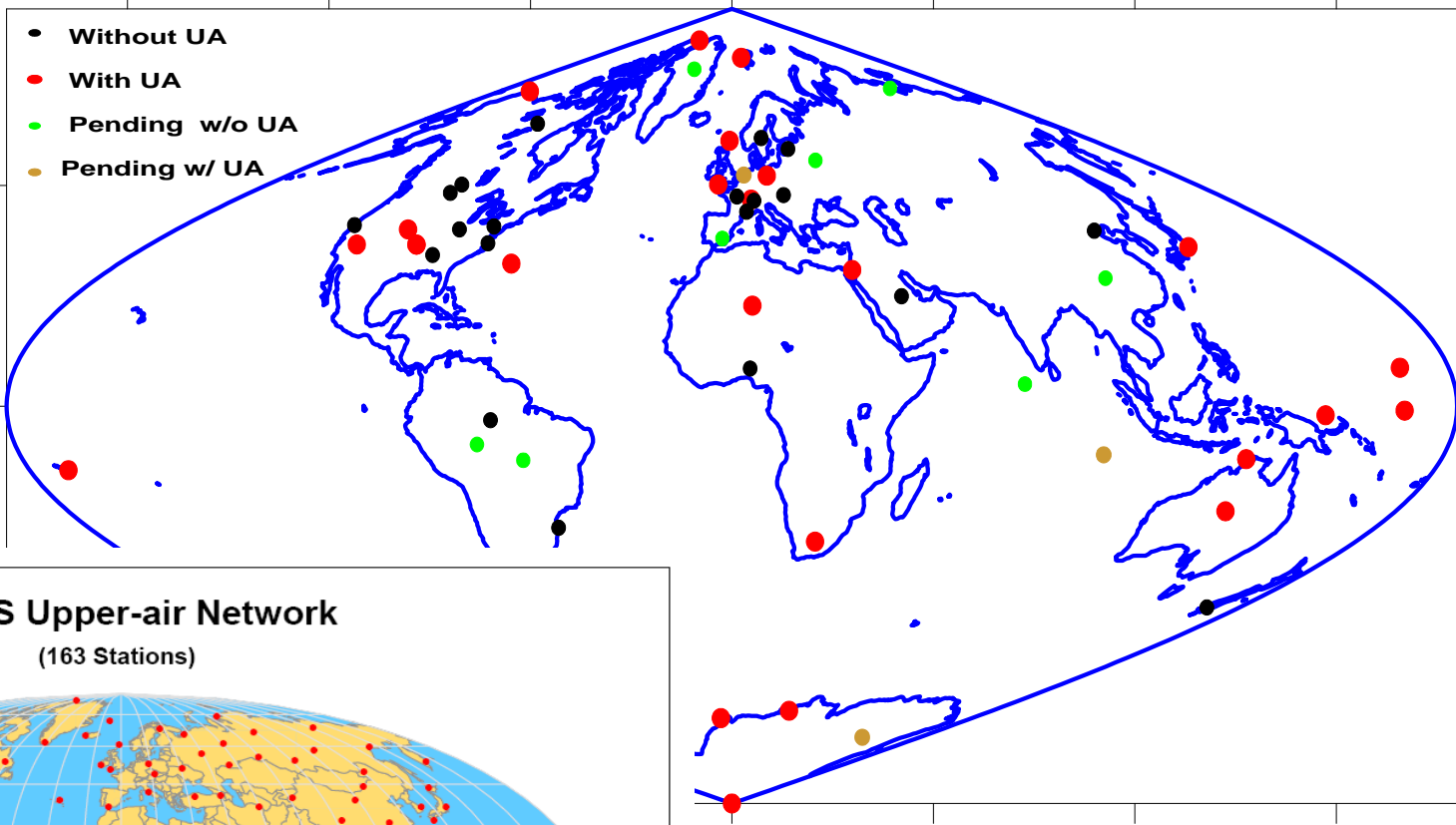
- Long (1-2 years) data latency built in
- No requirement for centralized data products
- Lack of absolute calibration reference standards
- Inflexible data archive database structure
- Only loose system audits

*Continuing issues*

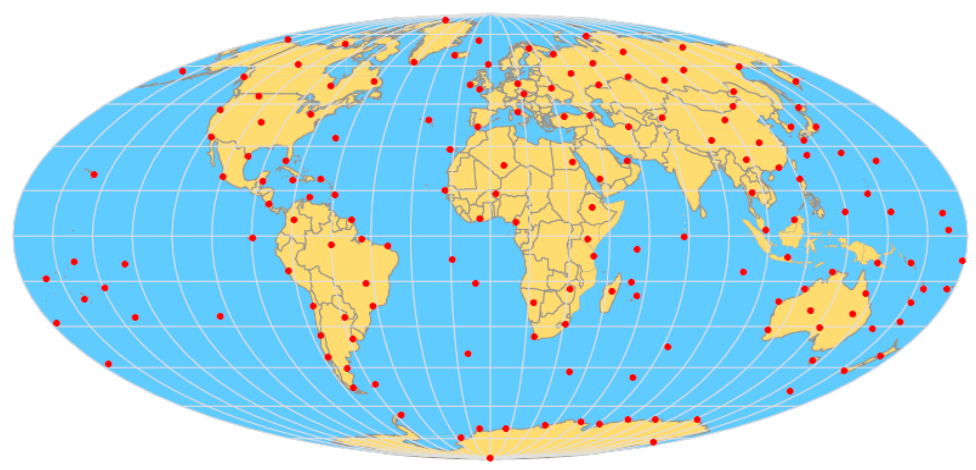
- Sustainability after the energy of a new project wears off
- Provisions for updated and improved data flow
- Instrument upgrades and replacements
- Firm establishment of true consensus ref standards
- Assessing merits of new sites



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



## GCOS Upper-air Network (163 Stations)



GCOS Secretariat, 1 January 2006

## **Strategic Considerations for Synergetic BSRN and GRUAN activities**

- Both BSRN and GRUAN are higher-level worldwide networks of GCOS
- Both are ground-based and intended to be climatological sub-samples globally complete
- Many BSRN applications need high quality UA data
- BSRN-like data provide GRUAN priority 2 obs
- Combined operations at remote field sites can be more efficient and economical, plus at many current and potential sites many additional national resources exist



## Existing Collocated GUAN & BSRN Sites

- Tamanrasset, Algeria
- Tateno, Japan
- Bermuda
- Barrow, Alaska
- Darwin, Aus. (ARM)
- Cocos Is, Aus.
- American Samoa
- Lindenberg, Germany
- Lerwick, UK
- Camborne , UK
- von Neumayer, Antarc. (Germany)
- Syowa, Antarc. (Japan)
- Amundsen-Scott, Antarc. (US)

## Existing Collocated Non- GUAN-U/A & BSRN Sites

- Kwajalein, M.I.
- Dome C, Antarc.
- Desert Rock, Nev
- Ny Ålesund, Spitsberg
- Sede Boqer, Israel
- De Aar, S. Africa
- Alice Springs, Aus.
- “Denver, Colo.”
- American Samoa
- Nauru (ARM)
- Manus (ARM)
- SGP (ARM)

BSRN & Proposed GRUAN but not GUAN - Lauder, NZ

# Summary & Conclusions

- GRUAN can learn from BSRN successes and mistakes
- There are obvious scientific & operational synergies between BSRN and GRUAN
- There are logistic/funding advantages to collocating field sites with substantial other national resources, e.g. Barrow, Lindenberg, Lauder, SGP(ARM), Chesapeake Lighthouse, Cabauw, Cambourne
- Internationally there are currently 13 collocated BSRN – GUAN sites and 12 more BSRN sites with UA obs. Siting requirements would preclude some GUAN sites from being BSRN sites, although adequate proximity might be possible for GRUAN – more study.
- BSRN is providing cutting-edge high-quality surface irradiance observations to the atmospheric community and can contribute to GCOS GRUAN surf. irradiance (priority 2) requirements

# Notes

- Does not address technical details of GUAN needs
- Not intended to promote BSRN meas as an integral part of GRUAN
- 2 decades ago
- Some ongoing interrelationships but see pt 1
- Loose data possessing procedures