

AOPC Report GCOS SC

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Helsinki, Finland



- Organisation
- AOPC23 Actions
- IP Actions
- Atmospheric ECV
- Task Teams
- Expectations for the Joint panel meeting 2019
- Other

- AOPC23: Darmstadt, EUMETSAT 6 – 9 March 2018
- IP rapporteurs
- ECV stewards
- Frequent inter-sessional webex meetings
 - Regular teleconferences with Chairs and Secretariat (ca every 2 weeks)
 - Full panel webex meetings every three months
 - Webex with small group of panel members as needed

Darmstadt (Germany) – 6-9 March 2018

● Actions

Main topics at AOPC23 – Activities for AOPC

● Implementation Plan

● Network updates

- BSRN, WRMC, GSN, GUAN, GCM, GRUAN

● ECV

- ECV definition/requirements (OSCAR)
- Fact Sheets

● Task Teams

- GCOS Surface Reference Network
- Lightning
- Radar
- GUAN

AOPC-23

STATUS OF ACTIONS

Actions from the AOPC-23 meeting

- 16 Actions
 - 8 completed
 - 5 Started and ongoing
 - 3 Not started yet
- 4 on ECVs and requirements
 - ECV(air-sea fluxes), OSCAR
 - ECV Fact sheets, Urban ECV
- 5 on networks
 - GSRN, GRUAN, GUAN
- 3 on IP
 - Develop a better formulation of the IP actions (in progress)
 - IP A31: Validation of satellite remote-sensing
 - Response of Space Agencies to GCOS IP
- 4 Various
 - GCOS-WIGOS, GCOS Secr

- 40 Actions:
 - 30 Started and ongoing
 - 10 Not started yet or with very little progress

- IP rapporteurs within AOPC have been identified
 - Better formulation of the IP actions
 - Regularly updates description of the status of the action itself.

- Progress of the 4 Task Teams established to address IP actions

- Agree on definition of ECV products
 - ECV Fact Sheets
 - OSCAR requirements
 - Progress of the 4 Task Teams established to address IP actions

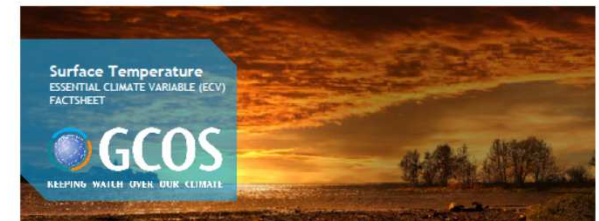
- Updated Terms Of Reference Approved
- New Co-chair Junhong (June) Wang
- More involvement from the GCOS Secretariat:
 - Political aspect of network expansion
 - Implementation Coordination Meeting: Organization of annual ICM (agenda, meeting report..) and monitoring of actions

ATMOSPHERIC ECVs

Each ECV has one or more ECV steward:

Definition of ECV products now completed and sent for discussion to WMO for OSCAR/Requirements. Meeting in Geneva 3-4 December to finalize.

All ECV fact Sheets reviewed and ready for publishing



ECV IN BRIEF

Domain: Atmosphere
 Subdomain: Surface
 Scientific Area: Energy and Temperature
 ECV Stewards: Philipp Jones, Elizabeth Kent
 Products: Temperature

Surface Temperature

Surface air temperature has profound and widespread impacts on both natural systems and on human lives and activities. It affects health, agriculture, energy demand and much more. Extremes of surface air temperature, both heat waves and extreme cold periods, are particularly important for human health. Surface air temperature provides a key indicator of climate change, contributing to the "global surface temperature record". A goal of limiting changes in global surface temperature provides the measure for the Paris climate agreement.

ECV Product¹

PRODUCT	REQUIREMENTS				
	FREQUENCY	RESOLUTION	REQUIRED MEASUREMENT UNCERTAINTY	STABILITY	REFERENCES
TEMPERATURE	Hourly; Daily T _a /T _n	Site	0.1K	0.02K/decade	AOPC

Data Sources²

Gridded In Situ Data:

- Berkeley Earth Surface Temperature www.berkeleyearth.org
- Climatic Research Unit (CRU) land surface air temperature data set (CRUTEM4) <https://www.metoffice.gov.uk/hadobs/crutem4/>
- GISS Surface Temperature Analysis (GISTEMP)

¹ Current Products and Requirements as in the Implementation Plan 2016 (GCOS-200). GCOS is aiming to review and update the requirements as part of their contribution to the UNFCCC global stocktake. More information on: climatedata.wmo.int.

² This list provides sources for openly accessible data sets with worldwide coverage for which metadata is available. It is curated by the respective GCOS ECV Steward(s) and reflects the status as of 28/05/2018. The list does not claim to be complete. Anyone with a suitable dataset who wishes it to be added to this list should contact GCOS.

● Satellite ECVs

- Activities now fully coordinated by the CGMS/CEOS Joint Working Group on Climate (WGClimate)
- ECV inventory performed
 - 913 record covering 30/37 possible ECVs
- First gap analysis performed and endorsed by CEOS and CGMS
- Second gap analysis to be completed in 2019
- WGClimate response to GCOS IP as a technical supplement to GCOS IP
- WGClimate performs the task of the Space Rapporteur to AOPC

Ground-based ECVs

- C3S (and the links to NCEI) are strongly supported
- It is global and not only Europe and North America
- Need to find a way to get Russia and China (and others) onboard?
 - Should be possible as they are sending data in real time.
- What really needs to happen is for these others to do what C3S and NCEI have done – which is to get countries to send their digitized datasets to a central location – for C3S this is the currently the University in Maynooth in Ireland.
- Eventually it will be the Climate Data Store of C3S.

GAIA-CLIM

- Key Objectives
 - Improve the utility of non-space component to characterize the satellite component of EO
 - Develop tools and techniques
 - Provide advice on what next steps are required
- Direct response to A31
 - Gaining better understanding of where missing non-satellite observations are limiting
 - Improved the understanding of co-location effects
 - Better quantification of the role of data assimilation

Noted

- A need to explore urban observations (contact Copernicus UrbanSIS)
- Parallel observation collection and analysis pursued by WIGOS
- Importance of collaboration between GCOS and WCRP

Establish a co-writing team with OOPC for air-sea fluxes

- First teleconf held in 12 September 2018

Discussed networks

- BSRN, GSN, GCM, GRUAN
- GUAN and GSRN see Task team slides

GRUAN

- Updated Terms Of Reference Approved
- New Co-chair Junhong (June) Wang

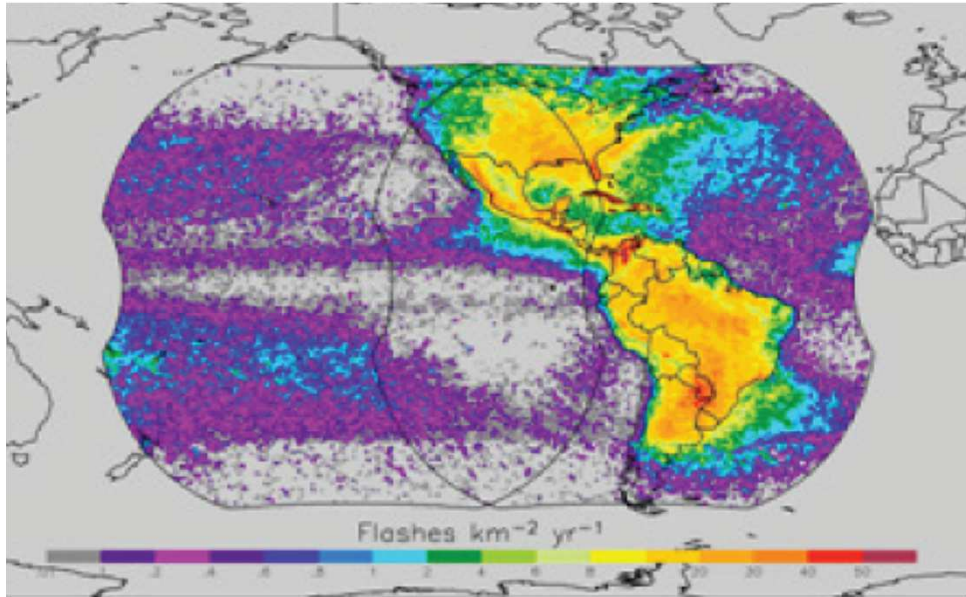
OSCAR

- Review the requirements wrt Vision 2040
- Provide inputs for Climate Monitoring Applications

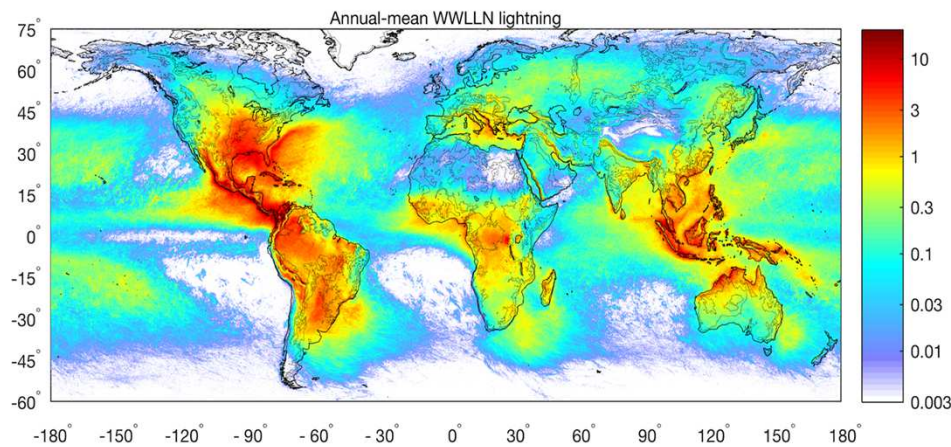
Four Task Teams on:

- Lightning Observations for Climate Applications
- The use of Weather Radar for Climate Studies
- The instigation of a GCOS Surface Reference Network
- The GCOS Upper Air Network (GUAN)

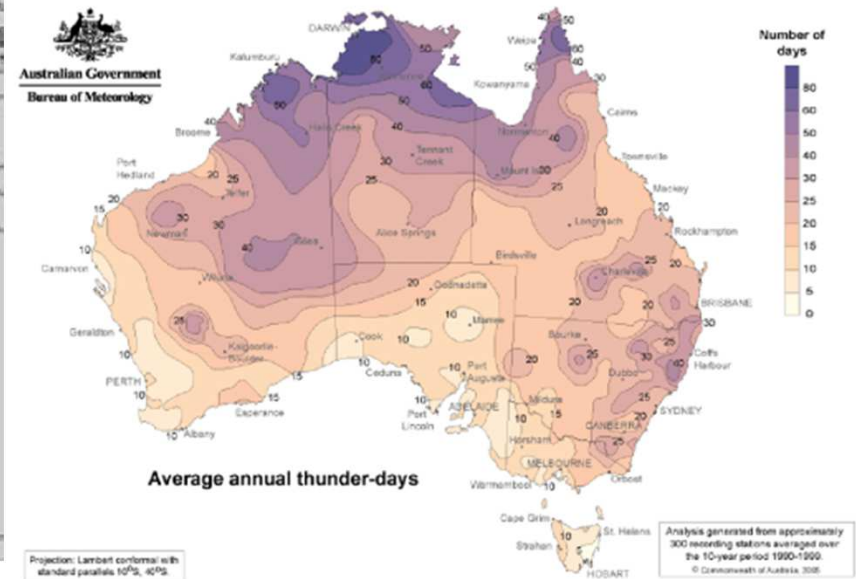
Satellite



Groundbased RF networks

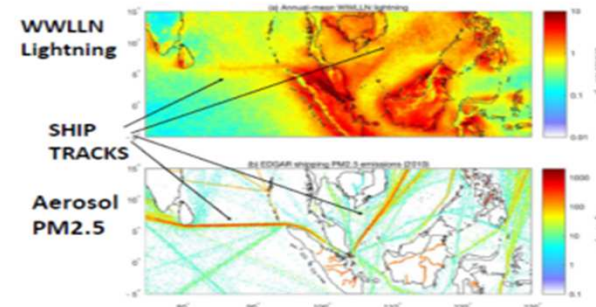


Thunder days



Other Relevant Data sets: (for Lightning Studies)

- Global Aerosol data (e.g. EDGAR PM2.5)**
- Sea Surface Salinity**
- Global Wind, Temperature, Water Vapor**
- Global Electric Circuit data**



Lightning Observations for Climate Applications

- ⦿ Lightning TT next steps:
- ⦿ Initial tasks accomplished and report ready, but final recommendations still under discussion
 - Coordination with WMO needed for potential follow-up
- ⦿ For global circuit measurements a field study using GRUAN is progress
- ⦿ NOAA agreed to host repository for thunder day data, next step to start survey to locate existing data

TASK TEAM ON THE USE OF WEATHER RADAR FOR CLIMATE STUDIES

Initial tasks accomplished.

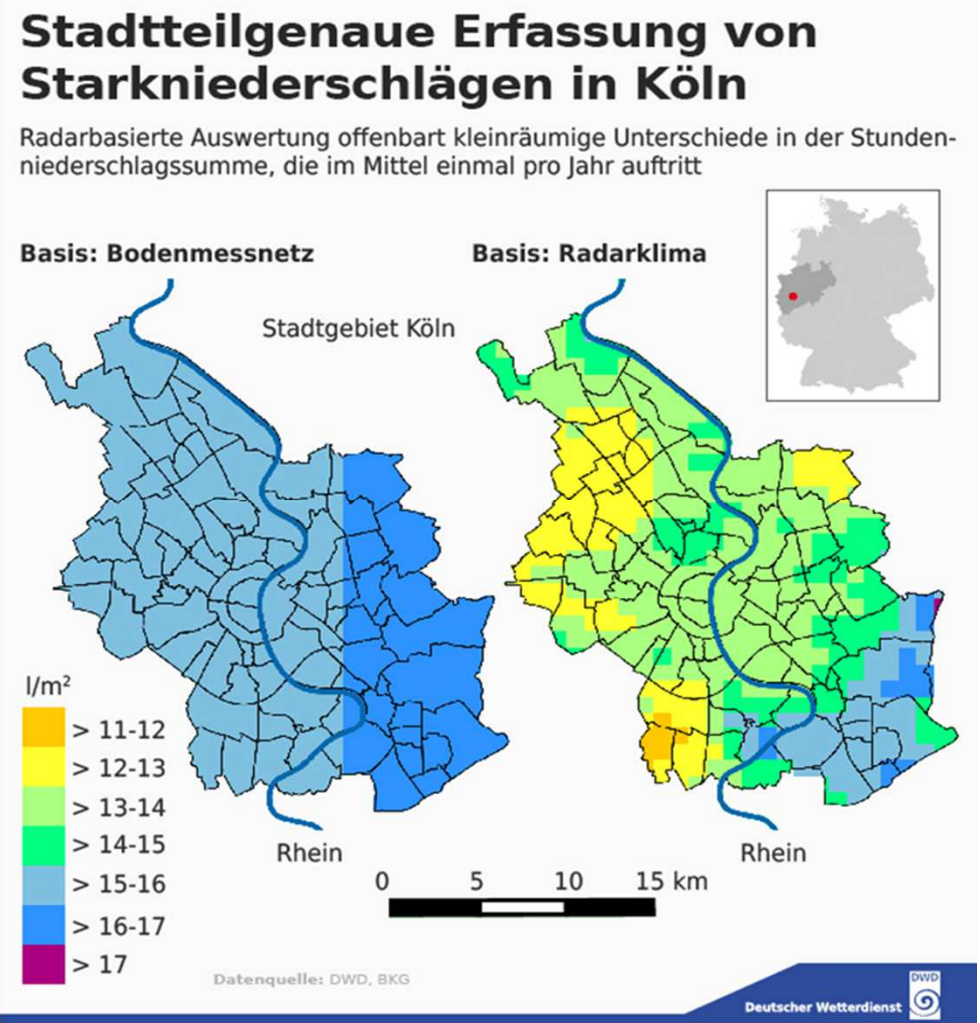
- Report ready to be published. Includes:
 - Weather radar data requirements for climate monitoring, define relevant metadata, and define best practices.
 - Assess the status of existing international and national archives, including their accessibility, extent and quality.
 - Provide guidance how to organize proper and standardized storage and user interface of local radar data and metadata for eventual reprocessing at a later stage to support climate monitoring.
 - Suggest procedures for handling historical data.
- BAMS paper in progress: Radars ready for Climate

Follow-up of this TT:

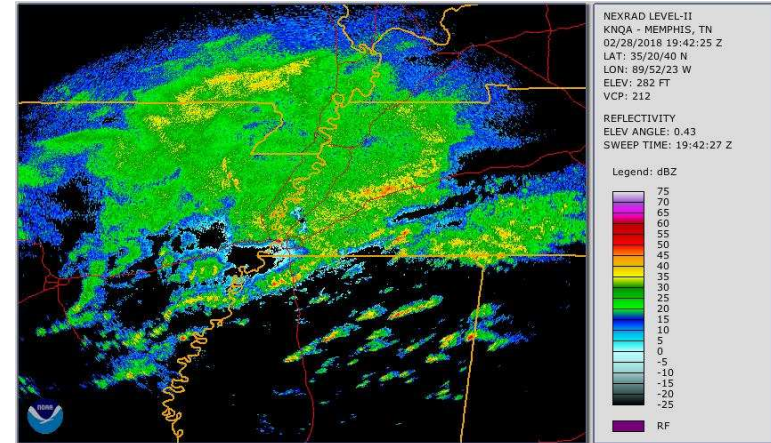
- Coordination with WMO to decide responsibilities to implement recommendations of this TT.
- Proposal for a portal for climate radar data.

TASK TEAM ON THE USE OF WEATHER RADAR FOR CLIMATE STUDIES

- During the last decade activities took place to use RADAR to build climatologies (e.g. in Germany)
- The WMO CCI TT URSDCM prepared an overview of existing climatologies
- Upgrades of RADAR systems itself allow now for much more applications than before



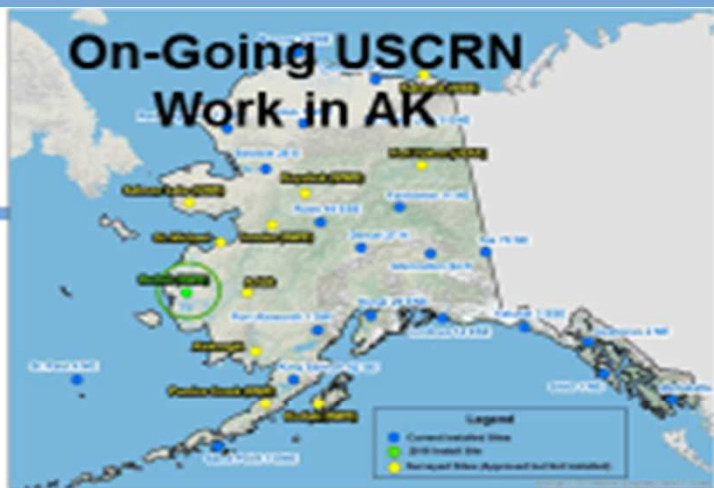
- Key parameters for Climate applications are:
 - **Horizontal Reflectivity (ZH)**
 - **Radial Velocity (VRAD)**
 - Spectrum Width (WRAD)
 - Differential Reflectivity (ZDR)
 - Correlation Coefficient (RhoHV)
 - Differential phase (PhiDP)
- Survey:
 - 23 institutes have data since 2005
 - 20 institutes have data even earlier



GCOS AOPC-23

TASK TEAM ON THE INSTIGATION OF A GCOS SURFACE REFERENCE NETWORK

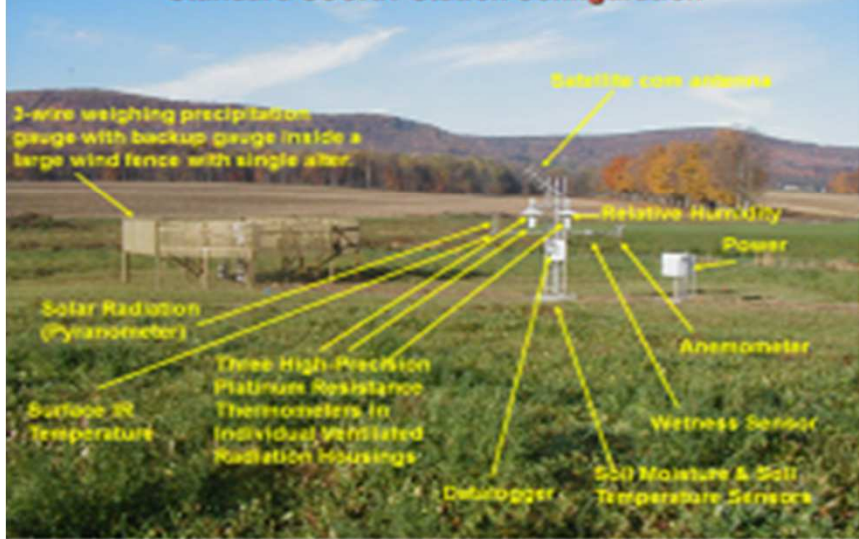
CONUS – Done 2008 **Station Coverage**



21 stations installed in AK as of Aug 2017 (blue dots)

- 1 new station for FY18 (green dot)
- 7 more stations to be installed from FY19-22 (yellow dots)

Standard USCRN Station Configuration



Typical soil sensor installation



TASK TEAM ON THE INSTIGATION OF A GCOS SURFACE REFERENCE NETWORK

- Main focus of the TT now is to prepare a document with a coherent vision for a network. It outlines the scientific rationale, the benefits, the metrological understanding, siting and instrumentation and describes the need of active management.
 - Document is progressing and a writing team will meet in Geneva at the end of November to produce a final version (to be reviewed by AOPC).
- The success of such a network depends on the existence of a Lead Centre. The Lead Centre monitors day-to-day operations and maintenance, data and metadata processing, documentation etc.
- If this is achieved, the TT will move forward in consultation with key stakeholders and the LC to work on a Potential Implementation Plan

Next step: Lead Centre - identify a possible LC.

TASK TEAM ON THE GCOS UPPER AIR NETWORK (GUAN)

- The task Team was formed and met. It looked at the benefits of the GUAN and agreed on a work plan.

ANNEX 4: SWOT ANALYSIS FOR GUAN (SUMMARY FROM MEETING)

<p style="text-align: center;"><u>Strengths</u></p> <p>GUAN is a well known brand. It is regarded as high-quality Radiosonde observations. (even if this is only a perception) Common practices and an underpinning standard. Has documented governance through WMO technical regulations and GCOS documents.</p>	<p style="text-align: center;"><u>Weaknesses</u></p> <p>The aims, requirements and user needs of GUAN are not known and/or have just been forgotten. No NMHS 'buy-in'. Passive not Active management (i.e. poor performance is not addressed) Little difference between GUAN and the Comprehensive network No auditing of GUAN and little outreach between GUAN operators Requirements and guidance has not been updated to reflect the change in technology and user needs</p>
<p style="text-align: center;"><u>Opportunities</u></p> <p>GUAN best practices and outreach can support the comprehensive network Utilised improved tools for Quality Management & Visualisation Healthy competition in industry for the prestige of supplying GUAN stations Better alignment of GRAUN and GUAN, for example GRUAN products from GUAN stations.</p>	<p style="text-align: center;"><u>Threats</u></p> <p>Budget cuts and resource priorities are often targeted at radiosonde system consumables The pollution aspect of radiosondes Lack of clarity on the difference between GRUAN and GUAN might cause competition for resources</p>

TASK TEAM ON THE GCOS UPPER AIR NETWORK (GUAN)

- There is no clear leadership and it lacks resources to take the TT forward (mostly time).
- However, the work done by this TT is going to feed into GBON.

- **Continuing under its current requirements is not an option**
- New focus on a guaranteed quality of observational data, according to updated requirements
- A subset of the comprehensive network based on quality assurance rather than a fixed network of stations. Adopting a tiered-network approach (Comprehensive-GUAN-GRUAN), as described by GAIA-CLIM
- Actively managed through a lead-centre, with a certification process, real-time monitoring and validated station list for the user community
- Process to identify gaps in global/regional networks, both in data sparse areas and least develop countries, to allow targeted support projects, using relevant cooperation and funding mechanisms (i.e. GCM, GCF, national bi-lateral programmes).

EXPECTATIONS FOR THE JOINT PANEL MEETING 2019

- Cross panel tasks:
 - GSRN
 - Air-sea fluxes: establish a co-writing team with OOPC for air-sea fluxes (teleconference held in 12 September and 10 October 2018)

- Requirements: agreement on a common strategy to update requirements

- Anything we need to add?

 Thank you