



WCRP Data Advisory Council

41st Session of the WCRP Joint Scientific Committee

Susann Tegtmeier and Jean-Noël Thépaut

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Online

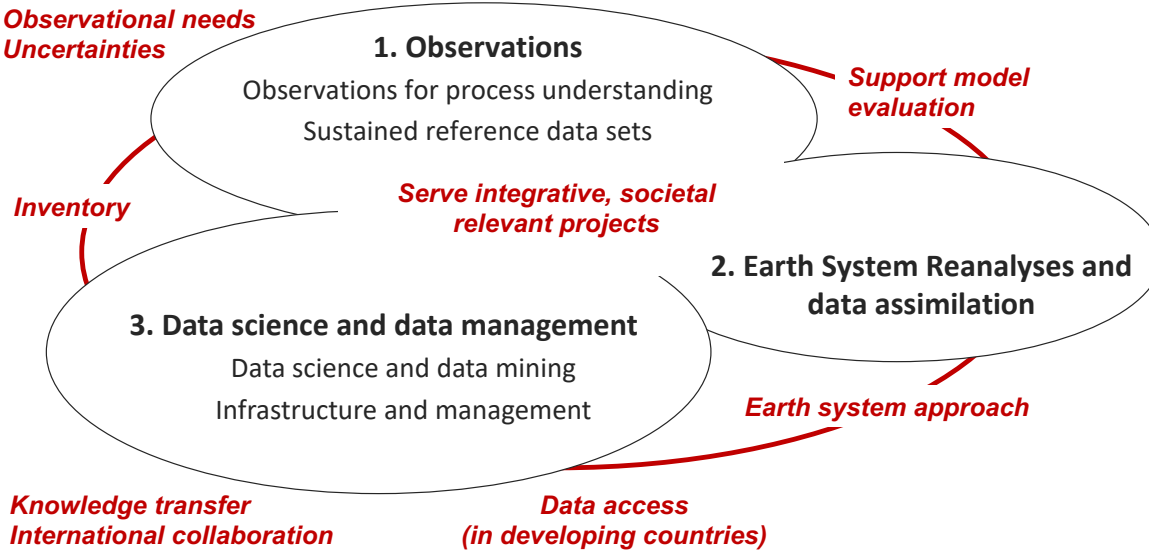


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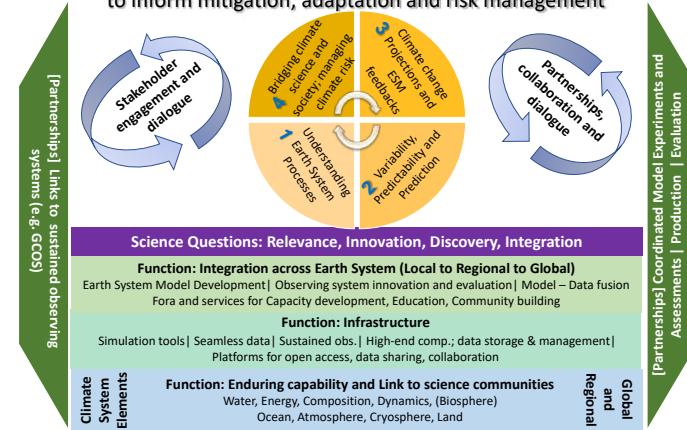


Future plans and links to the WCRP Strategic and Implementation Plans

GCOS, CEOS/CGMS WGClimete, ...



WCRP Mission: Societally-relevant knowledge and information to inform mitigation, adaptation and risk management

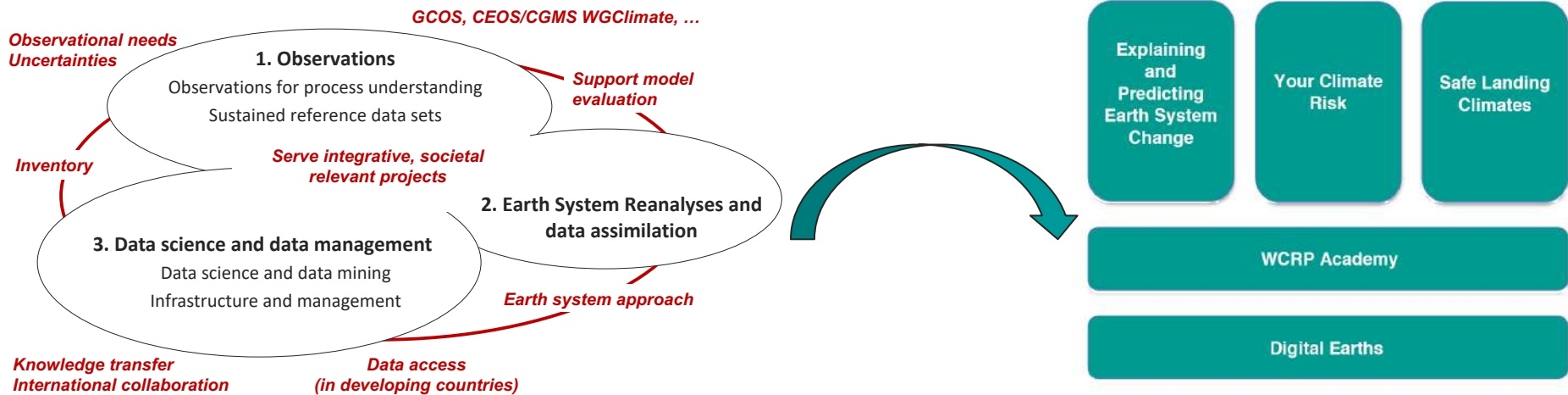


Many WDAC activities (current and future) are highly relevant to the 2019-2028 strategic plan

- Observations: infrastructure – reference datasets – OSEs – links to modelling
- Data Science and Data management: AI, data mining, data services
- Earth System: reanalyses, fluxes at the interfaces
- Liaisons and partnerships

Emerging issues

How to map the current “Data” portfolio into the new structure, in particular the light house activities?



Points to consider:

- Interface with data providers (CEOS/CGMS, GCOS, national infra): coordinated voice for WCRP?
- Connection with “cousin” communities: WWRP, GAW, ... (importance of identifying cross cutting themes – e.g. data assimilation – and build relevant efficient WGs)
- **Need for closer links between modeling and data** (obs4mips, reanalyses, AI → obvious for Digital Earth!)
- Data (and modeling) infrastructure required to deliver Research 2 Services /Research 2 Operations

Let's make sure we don't lose any limb during the envisaged surgery!

WDAC - Progress and achievements

obs4MIPS

- Documented and organized 100+ observational products according to CMIP output requirements. Strengthened liaison with ESA-CCI
- Summary of achievements and current state: *Waliser et al., 2020 - Observations for Model Intercomparison Project (Obs4MIPs): Status for CMIP6*, accepted

TIRA (Task Team for Inter-comparison of Reanalyses)

- Concept for a WCRP Earth System Reanalysis Inter-comparison and Evaluation group, proposal submitted to JSC in 2019 – vibrant community going ahead
- Planning for a joint event with WWRP-DAOS/WCRP/WIGOS in 2021 and 6th International Conference on Reanalysis, Japan 2023

Surface Flux Task Team: White Paper finalised (submitted last year to JSC)

Annual Data Prize: <https://www.wcrp-climate.org/wdac-activities> (awarded during a ceremony at the WCRP Climate Science Week @AGU)

Liaison with GCOS: on observations requirements via joint panels AOPC, OOPC and TOPC



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WDAC - Progress and achievements

obs4MIPS - Observations for Model Intercomparisons Project

Observational products documented and organized according to CMIP output requirements

- Available on ESGF via a searchable distributed system
- Specifications = technical link with the modelling community
- Positioned to have substantial impact on CMIP6

Strong interest to facilitate ESM evaluation

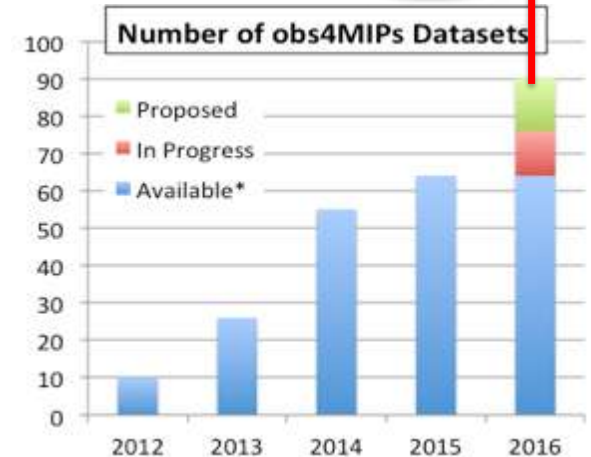
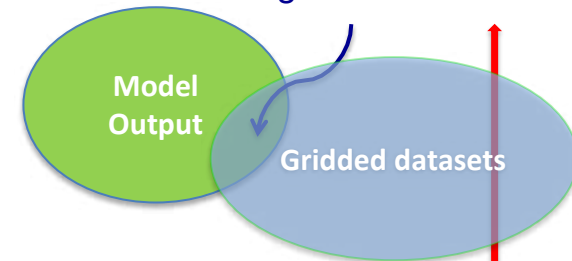
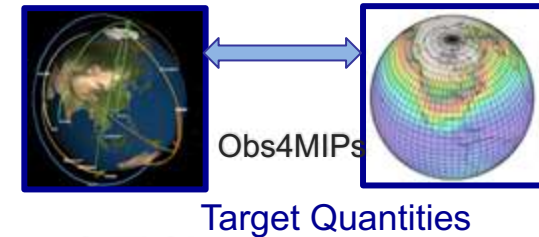
- Plea for better connections across the modelling and observational communities.

Increased interest in liaison with other initiatives

- ECV inventory (WGClimate), EAS-CCI and Copernicus

obs4MIPS task team reorganisation

- Suggestion for two separate smaller teams, one addressing scientific/strategic considerations and another to tackle technical aspects associated with preparing and publishing data



Need to assess scientific user uptake to dimension resources accordingly

WDAC - Progress and achievements

Task Team for Intercomparison of Reanalyses (TIRA)

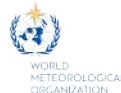
- Asked to develop a reanalysis intercomparison group for WCRP
- Develop a document that highlights best practices and terms of reference
- Develop Pilot Intercomparison Projects →

Proposal to establish a WCRP Earth System Reanalysis Intercomparison and Evaluation group (proposed to JSC in 2019)

- TIRA has continued – Telecons to organize collaborative efforts
- AGU FM2019 (oral and poster) sessions
- Update and status from developing centers (ECMWF, JMA, GMAO, NOAA, CMA as well as regional reanalyses & integrating Earth System reanalyses)
- Developing a water and energy intercomparison (collaborative)
- Collaborating with DAOS on a new intercomparison project
- Planning for the next reanalyses conferences and workshops
- If ESRIE is accepted by JSC for implementation in WCRP, as a broad collaborative project, it will supersede TIRA

- Regional Project - Precipitation
- Possible Global Topics
- [1] Surface temperature
- [2] Ocean surface fluxes
- [3] Precipitation
- [4] Radiation
- [5] Energy budget
- [6] Water cycle
- [7] Surface Winds (Wind Energy)

Need to find a home for reanalyses in new WCRP infrastructure



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WDAC - Progress and achievements

WCRP Surface Flux Task Team

1. Provide a single point-of-contact for **surface flux observations and analysis** in WCRP
2. Establish publication and use of **data, metadata, and documentation standards** for global surface flux datasets (consistent with standards in CMIP)
3. Establish **conventions for inter-comparisons and assessment** of global flux datasets
4. **Report to the WDAC and Core Projects** on activities overseen by the Task Team.

White Paper topics include:

Radiative and turbulent fluxes:

Air-sea fluxes.

Land-air fluxes.

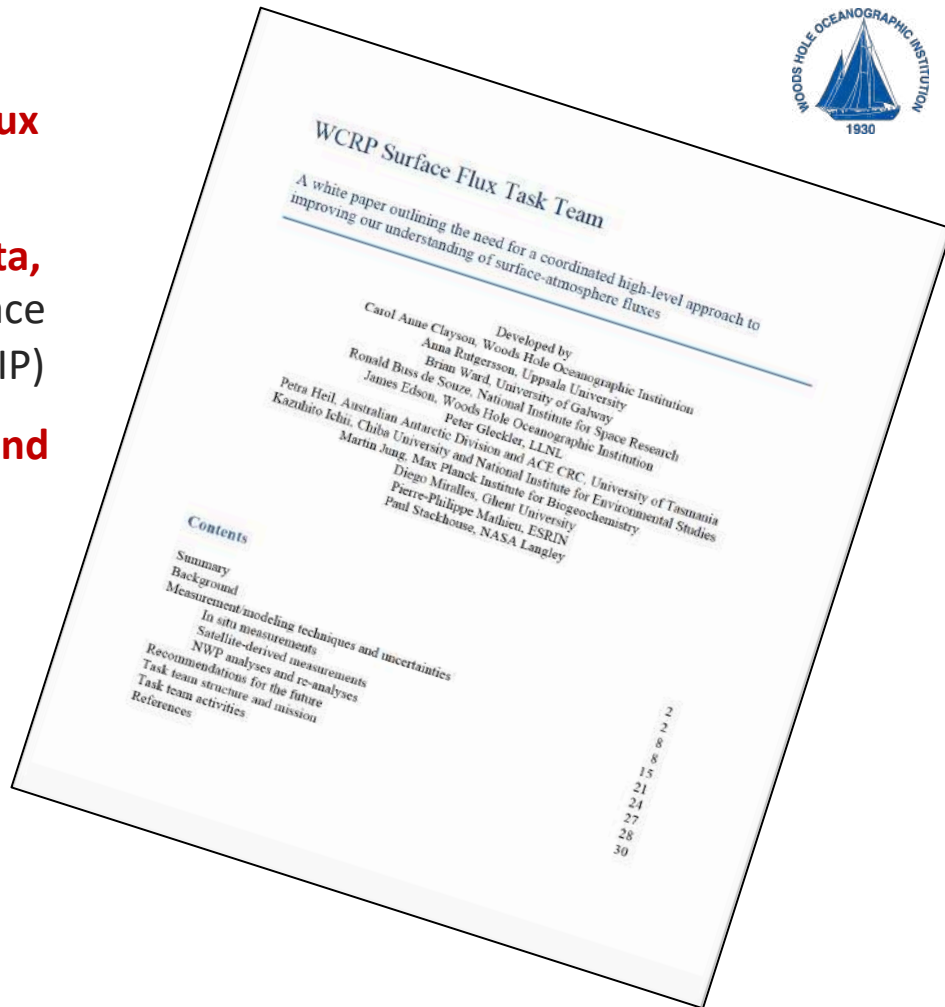
Ice-air/ocean fluxes.

Measurement/modeling techniques and uncertainties:

In situ measurements

Satellite-derived measurements

NWP analyses and re-analyses



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WDAC - Progress and achievements

WCRP Surface Flux Task Team latest developments

- **White Paper, 2019: Outlining need for a coordinated high-level approach to improve our understanding of surface-atmosphere fluxes**
- **Following the white paper, the task team has worked on:**
 - Coordinated with the air-sea flux paper for OceanObs
 - Currently working on the possibility of a GOOS/SCOR/IOOC air-sea flux observation push
 - Implemented a combined group of radiative satellite/in situ land/ocean scientists to improve surface measurements, best practices
 - Working with GOOS and others on possible ideas for UN Decade of the Ocean project
 - Task team members coordinated, proposed, and are now serving as Guest Editors for a special issue on land, ice, and ocean/air fluxes (a shortened version of white paper expected in this issue)
 - Several members of task team working on air-sea flux satellite proposal; satellite focused on planetary boundary layer team also
- **Coordination concerning surface fluxes important, and the visibility of their importance is rapidly growing**

Fluxes will be increasingly important for Earth System approach (coupling, seamless,..)



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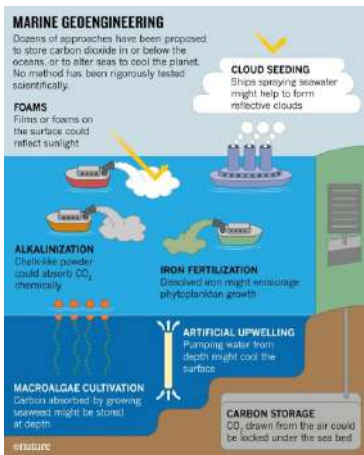
WDAC - Progress and achievements

Latest on SOLAS: Highlights and some recent foci

SOLAS Climate Intervention

Position statement on the need for research on efficacy & side effects

- Workshop in Japan, 2019
- Session planned for SRI 2020, shifted to a virtual workshop in summer



Global network of time series stations for studying air-sea interactions

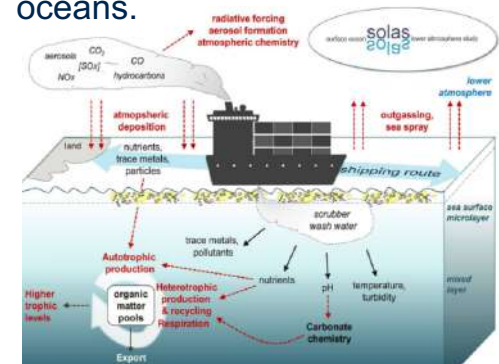
Cape Verde, UK, Korea, Italy, Canada, Bermuda, Sweden, Finland, Ireland, Iceland, Svalbard

- Discussion session at SOLAS Open Science Conference, 2019
- Formalized endorsement process in development



SOLAS-endorsed projects on ship plumes

- SEANA - Shipping Emissions in the Arctic and North Atlantic Atmosphere
- ACRUISE - Atmospheric Composition and Radiative forcing changes due to UN International Ship Emissions regulations.
- ShipTRASE-Pathways toward a sustainable and equitable use of the oceans.



Fluxes will be increasingly important for coupled and seamless approach

Endres *et al.*, 2018

Boyd & Vivian, 2019

WDAC is currently ...

What

Open data policies

Best practices for ECVs

Reanalysis inter-comparisons

Observations to support CMIP

Coordinate flux research

Review adequacy of observations

Collect requirements for climate observations

How

Cross cutting (across core projects)

Connecting to other climate research activities
e.g., SOLAS

Connecting to other data products
e.g., GLODAP/SOCAT

Connecting to international projects
e.g., GCOS, CEOS/CGMS WGClimate, Future Earth

Linking to research and operations and exploit synergies on infrastructures, protocols, standards

What is missing to serve the (new) WCRP structure?



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Future plans

Integration?

1. Observations

- Observations for process understanding
- Sustained reference data sets

Whole system approach?

2. Earth System Reanalyses and data assimilation

3. Data science and data management

- Data science and data mining
- Data infrastructure and management

Topics such as mitigation, adaptation, geoengineering?

Identify vulnerabilities?

WDAC - Future plans/IP

Already included

Future plans

1. Observations

- **Stronger connection between observations and modelling**
- **Observations for process understanding**
 - Official WCRP document on observations required for key research?
 - Characterization of bias and uncertainties
- **Sustained reference data sets**
 - Synergies/consistencies between observing systems – GCOS
 - Products for model evaluation and cross cutting research projects
 - Benefits of new sensors/micro-satellites, citizen science?
 - Observational needs, data rescue
- **Information on (and access to) datasets via inventory?**
 - Across WCRP activities (partnership: GCOS, core projects, challenges)



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WDAC - Future plans/IP

Already included

Future plans

2. Reanalyses and data assimilation

– Earth System Reanalyses

- Common framework, umbrella for Reanalysis Intercomparison Projects (RIPs)
- Highlighting scientific research topics such as cycles

– **Data assimilation**

- **Oversight of OSEs/OSSEs**
- Earth system approach
- Opportunities for coordination with WWRP/DAOS/PDEF and WGNE



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WDAC - Future plans/IP

3. Data science and data management

Already included
Future plans

– Data science and data mining

- Information and knowledge exchange across WCRP entities
- Promote transfer of knowledge from other disciplines
- Identify areas for international collaboration on big data, AI

– Data infrastructure and management

- Open data access policy
- Common data formats, metadata requirements, and citation standards (observations, reanalyses, simulations)
- Research-operations synergies
- Training and education



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