



TOPC Update

Wolfgang Wagner, Simon Eggleston

Introducing Myself

- From physics & electrical engineering to remote sensing & environmental sciences
- Professor for remote sensing and head of the Department of Geodesy and Geoinformation of TU Wien
- Co-founder of and scientist at the Earth Observation Data Centre
- Main R & D Interests
 - Physical modelling of microwave and full-waveform lidar measurements
 - Retrieval of biogeophysical variables from scatterometers and SAR data
 - Development of applications in hydrology, meteorology, climate research, ...
 - Big Data, cloud computing and collaboration in earth observations
- Several first-off data set releases
 - first single-satellite global soil moisture data set in 2002
 - first essential climate data record on soil moisture in 2012 (ESA)
- TOPC member since 2012

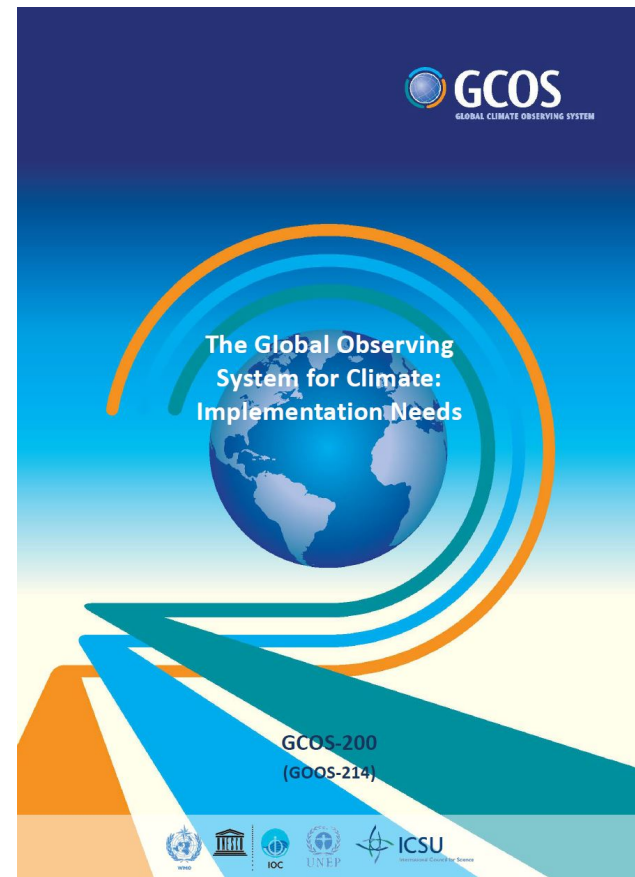


Renewal of TOPC Panel

- TOPC Chair
 - Konrad Steffen → Wolfgang Wagner
- TOPC Secretariat
 - Simon Eggleston
- Open call for nominations
 - Issued jointly with AOPC and OOPC in fall 2016
 - Selection process completed in January 2017
- Renewed panel will meet for first time 5-7 April 2017 at TU Wien
 - TOPC-19

Work Plan & Timeline

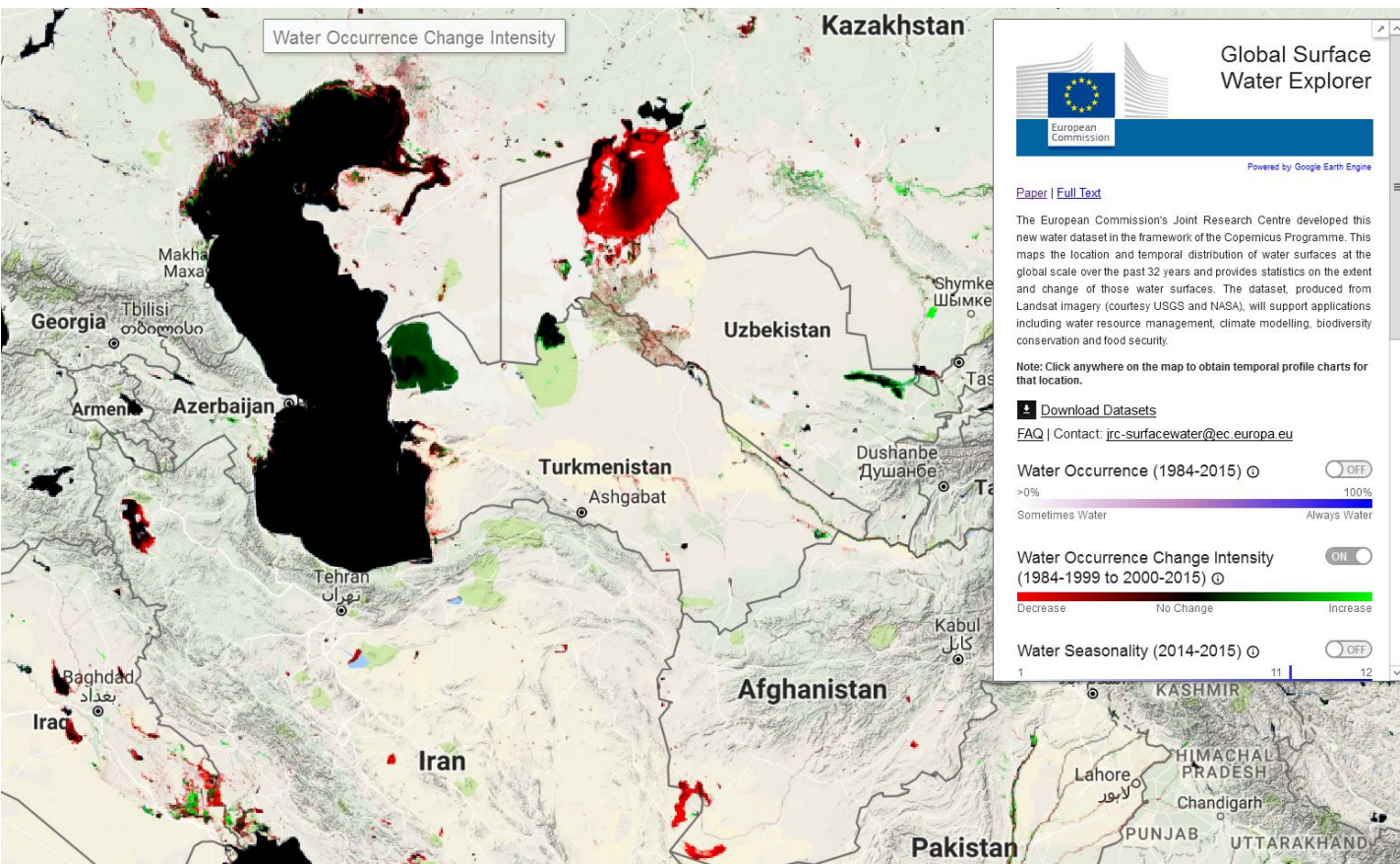
- Assessing the current state of the global observing system
- Advocating and promoting the establishment and enhancement of the systems
- Promoting the transfer and accessibility of data to the user community
- Identifying measurable key variables
- Coordinating activities with other global observing systems, panels and task groups



	2017				2018				2019				2020				2021			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Panel Meetings	■				■				■				■				■			
Steering Committee				■				■				■				■				■
Update new Implementation Plan															■	■	■	■		
Publish Updated Implementation Plan															■	■	■	■		■
Invite suggestions & comments on requirements		■	■	■																
Panels to consider and prepare proposals						■	■	■												
Agree Proposals									■											
Public Review of requirements										■	■									
Revised Requirements												■	■							
Second Public Review														■	■					

Consideration of Adaptation Needs

- More focus on local/regional scale
- Need to collect high-resolution data
- Puts climate change in context with other on-going pressures
 - population growth, land degradation, etc.



<https://global-surface-water.appspot.com/>

Pekel et al. (2016) High-resolution mapping of global surface water and its long-term changes. *Nature*.

GCOS • GTOS • WCRP



Terrestrial
Observation
Panel for
Climate

Proposal for Evaporation/Latent Heat Flux as ECV

- Proposal to be presented at TOPC-19
 - Coordinated by Han Dolman
- There is a high need for λE data but is it technically and economically feasible for systematic observation?
 - λE cannot be measured directly from space, requires multiple observations
 - Solar radiation, humidity, air temperature, wind speed, soil moisture, vegetation cover, stress and phenology
- Several successful intercomparison exercises

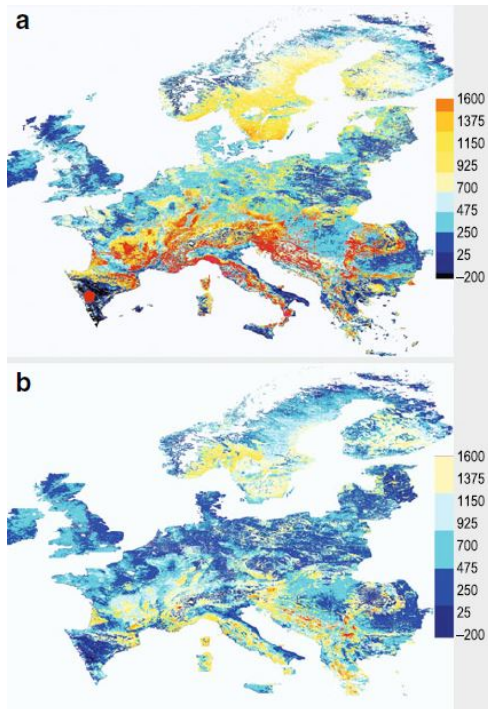
		R^2	
		EC	ER
PT-JPL	3 h	0.77	0.78
	d	0.61	0.60
PM-MOD	3 h	0.58	0.55
	d	0.43	0.41
SEBS	3 h	0.64	0.78
	d	0.45	0.50
GLEAM	3 h	0.70	0.80
	d	0.60	0.66

[Michel et al. \(2016\) TheWACMOS-ET project–Part 1: Tower-scale evaluation of four remote-sensing-based evapotranspiration algorithms, HESS 20.2, 803-822](#)

Summary of 24 stations average R^2 for 3-hourly and daily tower forcing. EC denotes the model agreement with the evapotranspiration reference from eddy-covariance measurements, and ER is the model agreement with the evapotranspiration reference based on the in situ energy residual.

Carbon Budget

- Goal as stated in new GCOS Implementation Plan
 - Quantify fluxes of carbon-related greenhouse gases to $\pm 10\%$ on annual timescales
 - Quantify changes in carbon stocks to $\pm 10\%$ on decadal timescales in the ocean and on land, and to $\pm 2.5\%$ in the atmosphere on annual timescales
- Spatio-temporal patterns of land-based carbon fluxes are not well known



Verstraeten, Veroustraete, Wagner, Van Roey, Heyns, Verbeiren, Feyen (2010) Remotely sensed soil moisture integration in an ecosystem carbon flux model. The spatial implication, *Climatic Change*, 103(1-2), 117-136.

Estimated average daily net ecosystem productivity (in 10^1 g C m⁻² d⁻¹; thus divide by 10 to get the real value) for 1997 for Europe using the production efficiency model C-Fix. **a** Partially water limited model run (NEP_{PWL}) and **b** fully water limited model run (NEP_{FWL}).

Some Thoughts on the Monitoring of ECVs

- Our current approach to “monitoring of the adequacy ECVs” currently relies on expert judgements
- Are there more objective and quantitative ways?
 - Scientific quality
 - Uptake by the user community
- Nowadays the impact of publications is well documented. What about data and the software used for producing it?
 - Producers of data and software are often thankful for feedback on data quality and user statistics
- How may one benefit from and interact with emerging initiatives/organisation/technologies?
 - DataCite (<https://www.datacite.org/>)
 - Depsy for software citations (<http://depsy.org/>)
 - Using GitHub (<https://github.com/>) to store, publish, and collaborate on open, machine-readable datasets
 - Etc.