



TOPC

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GCOS Steering Committee
Item 3.2 - reports

Main activities over the last year?

1. Contributions to Status Report
2. Preparations for public consultation of ECV requirements:
 - a) Proposed changes to ECV
 - b) Consideration of responses postponed
3. Adapation Task Team
 - Work delayed due to COVID
 - Reported to TOPC in October: needs revitalising and GCOS-wide inputs.
4. Development of Biosphere indicator continuing
 - Focussing on phenology in temperate and boreal zones.
5. Agreement on the development of a new list of major lakes
 - Integrating different existing lists.
6. Cycles papers continuing: Carbon and Biosphere
 - Water paper submitted to BAMS

1. Adaptation Task team:
 - Revitalise the TOPC Task Team on adaptation with 1st meeting in early 2021. Prepare a timeline
 - TOPC to ensure engagement of SC & the 3 panels
 - Inputs from relevant users (e.g. Copernicus, GEO)
 - Prepare a report for SC 2021.
2. Finalise lists of major lakes and do the same for rivers
3. Progress biosphere indicator including a community discussion (led by Nadine Gobron, Martin Herold)
 - Designed by early 2021,
 - Approved by SC 2021,
 - Potential production by Jan 2022.
4. Agree revised ECV requirements
 - Consider needs of users especially adaptation and mitigation
 - Consider rock glaciers as part of permafrost
5. Improving collaboration between/with Global Terrestrial Networks (GTN)
6. Status Report, Implementation plan and GCOS Conference

Gaps and needs for cross panel interactions?

1. Coastal Areas
 - Identify user needs
 - Land Use/ Land Use Change in Coastal Areas
 - River discharge (lack of reported data)
 - Overlaps – mangroves?
2. GSRN
 - Identify Suitable ECV (e.g. Soil Moisture) and contribute to its development
3. Data Centres
 - Improve long-term sustainability (e.g. Soil Moisture and Permafrost have both recently had finding and institutional issues)
4. Climate Cycle Work – contribute to SC task team
 - The cycles are a good basis for cross-domain activities
5. With AOPC consider adequacy of flux (energy & water) measurements



Total Water Storage

a proposal from TOPC

GCOS Steering Committee 28

Item 6.1.b



WMO



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Only TWS change provides the full picture of hydrological changes on the continents

Continental water balance

$$P = ET + Q + \Delta TWS$$

- P: Precipitation
ET: Evapotranspiration
Q: Runoff
 ΔTWS : Storage change

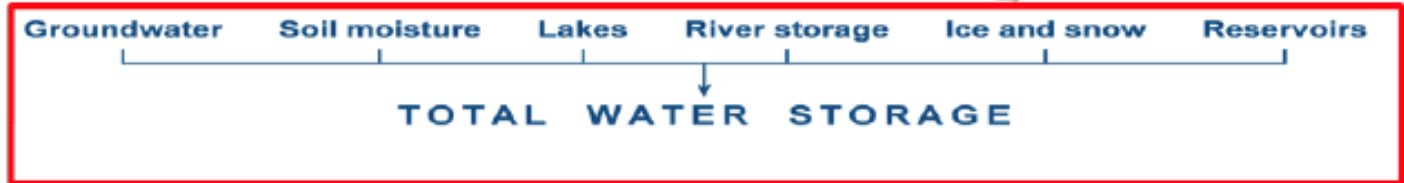
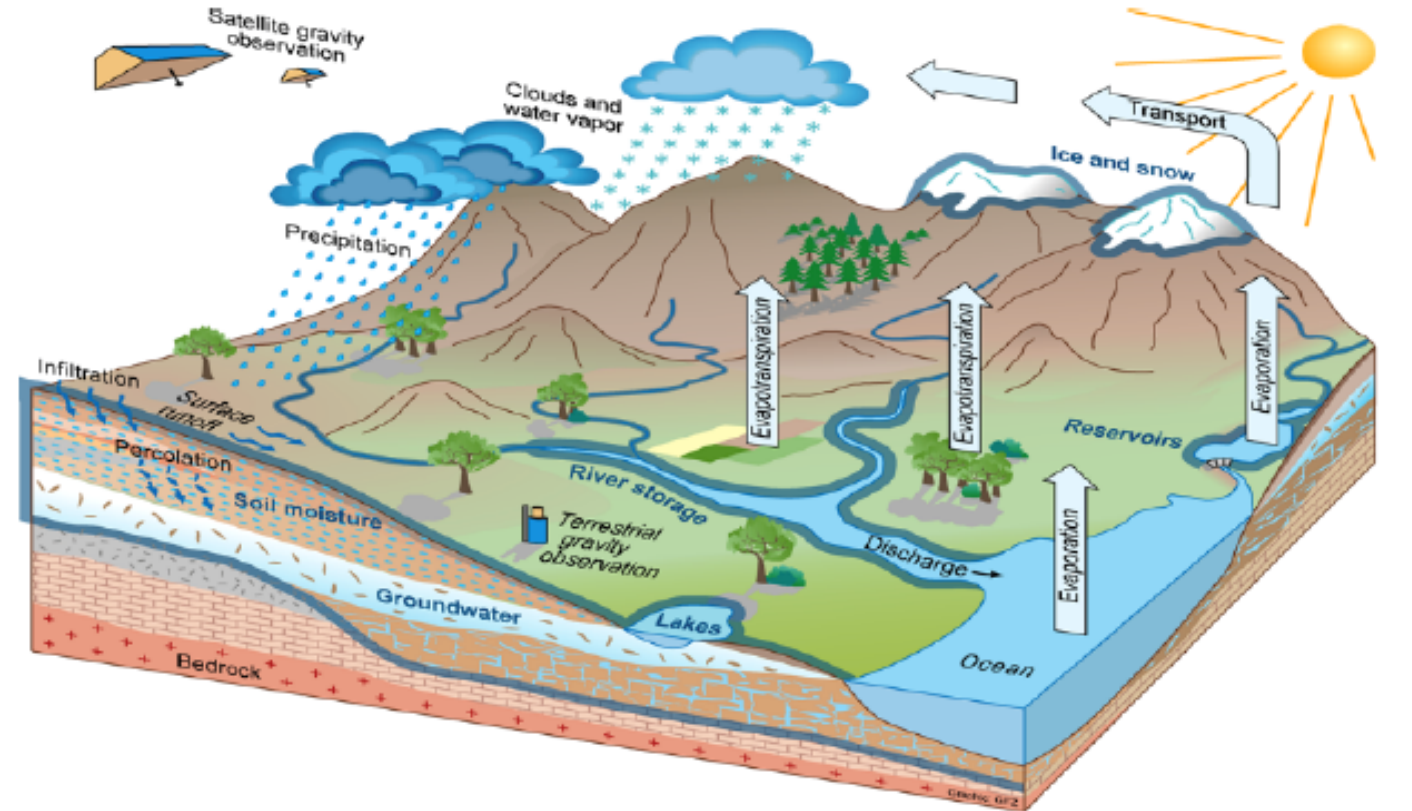


Figure 1: Total terrestrial water storage and its change as part of the continental water cycle

- Quantifying the net effect of changes in the climate, human water use and other hydrological effects on the continental water budget
- Closing the terrestrial water balance
- Identifying hot spots of changes in the water cycle assessing the severity of droughts, contributing to flood prediction by measuring the wetness status of river basins, monitoring the ice mass loss of glaciers and ice caps, quantifying the contribution of TWS to sea level rise
- Improving the predictive skill of Earth system models through validation and calibration

Total water storage trends 2002 - 2016

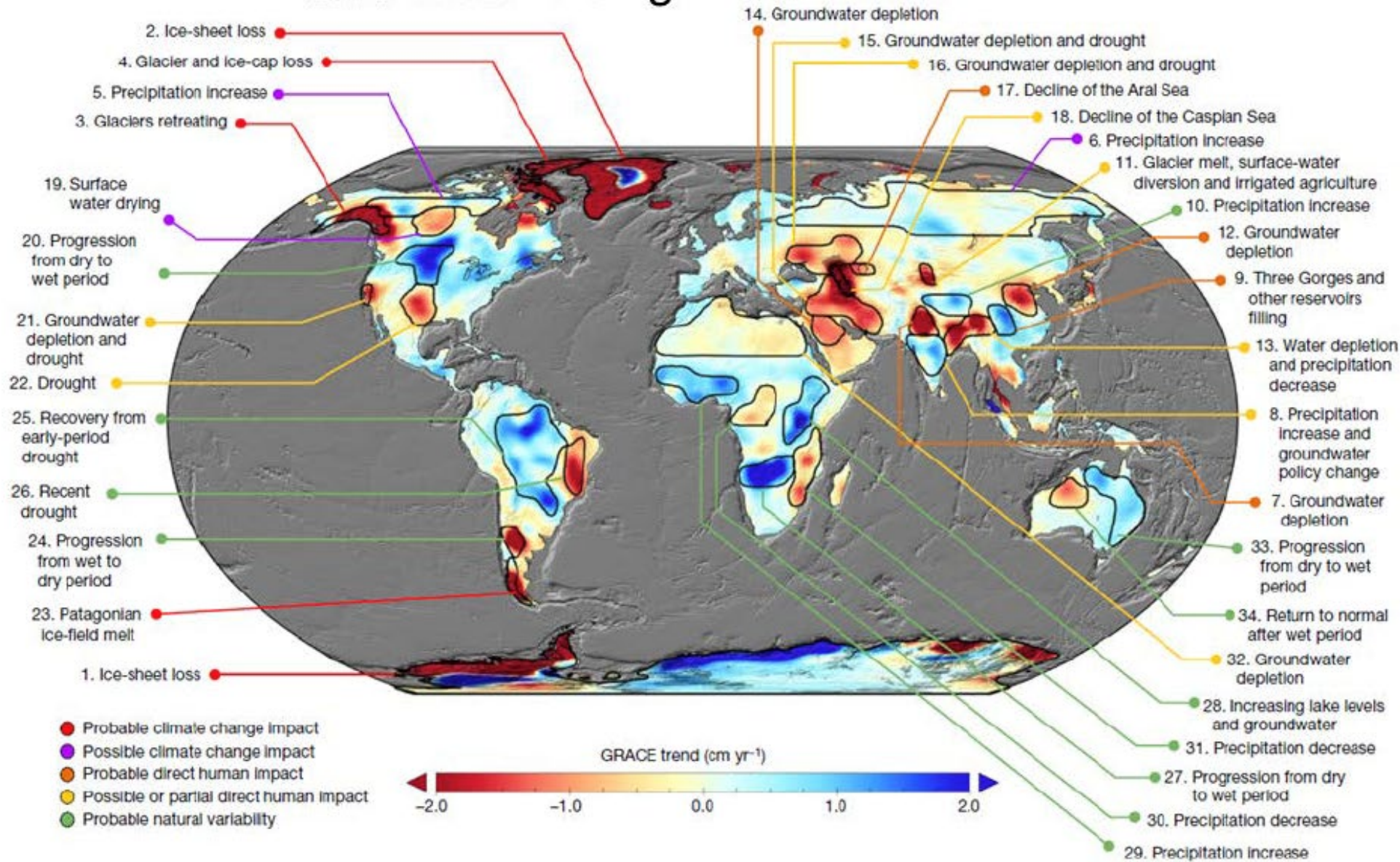


Figure 2: TWS trends from GRACE time-variable gravity data (Rodell et al., 2018)

Table 1 ECV product requirements for proposed new ECV - Thresholds*

ECV	Product	Temporal resolution	Latency	Spatial resolution	Required measurement uncertainty	Stability (per decade)
Terrestrial Water Storage (TWS)	TWS anomaly	monthly	monthly	300 km	10-20 mm, Trend 10 mm/a	No drift

*GCOS ECV guidelines: The threshold defines the minimum requirement, i.e., the value that has to be met to ensure that data are useful

Table 3 ECV product requirements for proposed new ECV – Goals⁺

ECV	Product	Temporal resolution	Latency	Spatial resolution	Required measurement uncertainty	Stability (per decade)
Terrestrial Water Storage (TWS)	TWS anomaly	daily	2-3 days	50 km	10-20 mm, Trend 10 mm/a	No drift

⁺GCOS ECV guidelines: The goals define the ideal requirements above which further improvements are not necessary. This is likely to evolve as applications and technologies progress

- The Steering Committee decides that Total Water Storage (TWS) should be an ECV and asks TOPC to include it, and its requirements, in the next revision of the GCOS Implementation Plan.



thank you

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