

Regional Assessments of Glacier Mass Change (RAGMAC), (2020 – 2023)

Annual Report for 2021 to IACS

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Objectives and work packages

The overall goal of this working group (WG) is bringing together the research community that is assessing regional glacier mass changes from various observation technologies and to come up with a new consensus estimate of global glacier mass changes and related uncertainties. The WG is organized in three work packages (WPs), two related to different remote sensing technologies and a third that aims at regional comparisons of corresponding results.

Key achievements

After acceptance of the RAGMAC WG proposal by IACS in 2019, the co-chairs jointly started to bring the WG to life and action. The WG co-chairs started to tackle the proposed tasks (cf. proposal) and have been coordinating the work in about bi-monthly co-chair meetings.

The following list provides an overview on the main outcome that has been achieved so far:

- RAGMAC web page: <https://cryosphericsscience.org/activities/wg-ragmac/>
- RAGMAC proposal: https://cryosphericsscience.org/wp-content/uploads/2020/01/IACS_WG_RAGMAC_Proposal_2019.pdf
- RAGMAC kickoff presentation, including videos of kickoff meetings: <https://prezi.com/view/hZHOtiJ6MGsBnCSr8hyO/>
- RAGMAC webinars and posters: <https://prezi.com/view/FiKMliBaGgS4blhoatf3/>
- Research topic in Frontiers in Earth Sciences: <https://frontiersin.org/research-topics/9957/observational-assessments-of-glacier-mass-changes-at-regional-and-global-level>

At present, RAGMAC counts 42 members (willing to actively contribute to WG) and 58 friends (interested in news and events).

In the following, we briefly summarize the main activities of the RAGMAC WG in 2021, followed by short statements on funding and outlook.

WP 1, Glacier mass changes based on glaciological and geodetic (DEM differencing) methods

The main goals of WP1 are to (i) develop best practices for geodetic estimates of glacier mass changes and related uncertainties and to (ii) improve the global coverage of geodetic glacier change assessments.

Main activities in the current year include:

- Refine working concept within co-leads meetings.
- Active call-for-data for glaciological and geodetic mass changes through the World Glacier Monitoring Service (WGMS; <https://wgms.ch/>).
- Coordination of geodetic data integration with groups working on major regional mass change assessments within the Copernicus Climate Change Service (C3S; <https://climate.copernicus.eu/>) run by the WGMS. Note: with the integration of the geodetic results by Hugonnet et al. (2021, Nature; <https://doi.org/10.1038/s41586-021-03436-z>), the WGMS database will reach almost global coverage.
- Design and announcement of the “Glacier volume change intercomparison experiment”.

WP 2, Glacier mass changes based on altimetry and gravimetry

The main goals of WP2 is to develop best practices for the propagation of errors in glacier mass-change estimates derived from satellite altimetry and gravimetry.

Main activities in the current year include:

- Refine working concept within co-leads meetings.
- Co-lead workshop to define the concept and outline of a white paper on assessing glacier mass changes and related uncertainties from GRACE/GRACE-FO, ICESat, ICESat-2, and CryoSat-2; writing draft of white paper to be distributed to the wider community for feedback and input.

WP 3, Regional comparisons of glacier mass changes from different methods

The main goals of WP3 are to (i) encourage regional assessments of glacier mass changes, (ii) foster open and free access to glacier data, (iii) define a common framework for regional-scale mass change estimates and identify best method(s) for each large-scale glacier region, and to (iv) develop a consensus estimate of regional and global mass changes from glaciological, geodetic, altimetric, and gravimetric methods.

Main activities in the current year include:

- Assignment of co-leads for WP 3.
- Refine working concept within co-leads meetings.
- Coordination with the IACS WG on the Randolph Glacier Inventory (RGI , <https://cryosphericsscience.org/activities/working-groups/rqi-working-group/>)
- Research topic in Frontiers in Earth Sciences: <https://frontiersin.org/research-topics/9957/observational-assessments-of-glacier-mass-changes-at-regional-and-global-level>
- Initial work on paper about differences and comparability of regional glacier mass-change assessments.

Events

In 2021, RAGMAC reached out to the community with the following events:

- EGU General Assembly, April 2021, glacier monitoring session: <https://meetingorganizer.copernicus.org/EGU21/session/39045>
- Virtual RAGMAC Mini Conference using Gather Town, June 2021: https://docs.google.com/document/d/1j_vWUys_VeEXwloFqWsp3rJIMkCCoV8eFQ4_i5s6700/edit?usp=sharing
- AGU Fall Meeting, December 2021, glacier monitoring session: <https://agu.confex.com/agu/fm21/prelim.cgi/Session/124694>

Funding

In the second year, the RAGMAC WG was run without funding. The costs for the virtual conference were covered by the WGMS. Due to the COVID situation and the related difficulties in organizing (physical) workshops, it is not yet clear if funding will be required in 2022. We will get in contact with IACS in due time as soon as the release of the assigned budget becomes possible and needed. In addition, we are currently evaluating options to raise additional funding for scaling RAGMAC activities into a larger project.

Outlook

Besides the continuation of the planned work in the three WPs, we have submitted RAGMAC-related sessions and workshops for EGU General Assembly 2022 (<https://egu22.eu/>) and the IGS “International Symposium on Ice, Snow and Water in a Warming World” to be held in Iceland (<https://cryosphere2022.is>).