A globally complete dataset of glacier outlines derived from remote sensing and other data

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One of the grand challenges in cryospheric science has been the creation of a detailed and globally complete glacier inventory. Such a dataset is required for a more precise calculation of the contribution of glaciers and ice caps (GIC) to global sea level rise, local to regional scale hydrology (run-off, hydropower), change assessment, future glacier evolution, and other purposes. The related efforts by the community resulted in more than 100 000 glacier entities that are available in vector format from the GLIMS glacier database. With the current preparation of the forthcoming 5th Assessment Report (AR5) of the IPCC, a special effort was undertaken to map the missing glaciers as well. The resulting globally complete glacier map is named Randolph Glacier Inventory (RGI) and available from glims.org/RGI.

The dataset is largely based on glacier outlines derived from satellite data but also from digitized maps, the previous world glacier inventory (WGI) and other available vector data. Bringing all these datasets together in one consistent form and format was a major challenge, as locally missing data had to be inserted from poorer quality datasets. In other regions only satellite scenes with poor snow conditions could be used, resulting in too many mapped glaciers. Together with other shortcomings (poor geolocation, debris cover not mapped, lakes included) the RGI requires further quality improvements in several regions before it can finally be integrated in the GLIMS glacier database. In its version 2 the RGI contains about 170 000 glaciers covering an area of more than 730 000 square kilometres.

This presentation gives an overview on the datasets used and their quality, presents some key statistical information, illustrates some of the regions to be improved, and the range of applications that have already been performed by the community using this dataset.