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GlaMBIE – An intercomparison exercise of regional and global glacier mass changes

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Retreating and thinning glaciers are icons of climate change and impact the local hazard situation, regional runoff as well as global sea level. For past reports of the Intergovernmental Panel on Climate Change (IPCC), regional glacier change assessments were challenged by the small number and heterogeneous spatio-temporal distribution of in situ measurement series and uncertain representativeness for the respective mountain range as well as by spatial and temporal limitations and technical challenges of geodetic methods. Towards IPCC SROCC and AR6, there have been considerable improvements with respect to available geodetic datasets. Geodetic volume change assessments for entire mountain ranges have become possible thanks to recently available and comparably accurate digital elevation models (e.g., from ASTER or TanDEM-X). At the same time, new spaceborne altimetry (CryoSat-2, IceSat-2) and gravimetry (GRACE-FO) missions are in orbit and about to release data products to the science community. This opens new opportunities for regional evaluations of results from different methods as well as for truly global assessments of glacier mass changes and related contributions to sea-level rise. At the same time, the glacier research and monitoring community is facing new challenges related to the spread of different results as well as new questions with regard to best practises for data processing chains and for related uncertainty assessments.In this presentation, we introduce the Glacier Mass Balance Intercomparison Exercise (GlaMBIE) project of the European Space Agency, which is building on existing activities and the network of the International Association of Cryospheric Sciences (IACS) working group on Regional Assessments of Glacier Mass Change (RAGMAC) to tackle these challenges in a community effort. We will present our approach to develop a common framework for regional-scale glacier mass-change estimates towards a new data-driven consensus

estimate of regional and global mass changes from glaciological, DEM-differencing, altimetric, and gravimetric methods.