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Ice-shelf and glacier changes in Northern Greenland

Jeremie Mouginot^{1,2}, Eric Rignot^{2,3}, Bernd Scheuchl², Romain Millan¹, Anders Bjørk⁴, Shivani Ehrenfeucht², and Anna Derkacheva¹

¹CNRS-IGE, Universite Grenoble Alpes, Grenoble, France

²ESS, University of California Irvine, Irvine, CA, USA

³Jet Propulsion Laboratory, Pasadena, CA, USA

⁴University of Copenhagen, Copenhagen, Denmark

In the northern sectors of Greenland, that hold more than 2.7 m of sea level equivalent, ice drains through ice shelves similarly to Antarctica. Zachariae Isstrøm, in northeast Greenland, is retreating and accelerating, most probably because of enhanced melting at its ice-shelf bottom followed by its break-up. Nioghalvfjerdingsfjorden, its neighbor, is also showing signs of thinning close to its grounding line, as is Petermann Gletscher, located 800 km more to the west. Here, we investigate dynamic and geometrical changes of all current and former ice shelves located along the northern coast of Greenland, namely Humboldt Gletscher, Steensby Gletscher, Ryder Gletscher, Ostenfeld Gletscher, Marie Sophie Gletscher, Academy Gletscher and Hagen Bræ. Using satellite and airborne-based remote-sensing sensors, we reconstruct the time series of speed, grounding-line position, submarine melt, ice thickness and surface elevation changes since the 80s. We will provide an update of the glacier ice discharges and will discuss any large-scale pattern of enhanced melting of the northern Greenlandic ice shelves. We will conclude with the possibility of actual or future destabilization -or lack thereof- of the glaciers in this sector of Greenland.