Inventory of ice rises and rumples in Antarctica

This inventory is aimed to provide an approximate picture of the continent-wide distribution of ice rises and rumples in Antarctica. It was made as a part of a review paper by Matsuoka et al. [2015], following up on an international workshop on Antarctic ice rises held at the Norwegian Polar Institute in 2013. Please consult the paper for general statistics, figures and a discussion of the inventory results. The development of the inventory is described in Appendix A of the paper and in the text below. We acknowledge all authors in the reference list for making the source data available to the community for further analyses.

The inventory is based on available grounding-zone products and additional visual interpretation of satellite imagery. Beginning with the island polygons of the MODIS Mosaic of Antarctica (MOA) 2003-2004 product [*Haran et al.*, 2005; *Scambos et al.*, 2007], we extracted all polygons that were contained within an ice shelf, assuming that they represent ice rises or rumples. We then updated this dataset using the new MOA 2009 product as well as independent grounding-zone points from SAR interferometry [*Rignot et al.*, 2011a] and ICESat altimetry [*Brunt et al.*, 2010; *Fricker et al.*, 2009]. This preliminary inventory was then manually edited and updated based on visual interpretation of the two MOA image mosaics, the high-resolution Landsat Image Mosaic of Antarctica (LIMA) [*Bindschadler et al.*, 2008], and the Antarctica Velocity Map [*Rignot et al.*, 2011b]. We also digitized polygons around the most prominent ice ridges and domes within the continental grounding zone.

The grounded features were classified into four groups. The first group is identified by clearly elevated features that are very likely isle-type ice rises surrounded by ice shelves and is labeled as type 1 in the inventory attribute table. The second group is identified by prominent ice ridges and domes connected to the inland ice sheet (promontory-type ice rises, type 2). Their landward extent is often hard to discern. We do not use a clear criterion to include or not such features in this inventory; the inventoried features are samples that either have been investigated or could be interesting research targets. The third group is identified by less-prominent grounded isles that show more diffuse, dynamic characteristics. Such features include ice rumples (type 3). The fourth group is similar to the first group but features have outcropping bedrock or sediments [SCAR, 2012] within the grounded features (nunataks, type 4).

Attributes of individual features are provided in the inventory shape file and associated population statistics are presented in Table 1 and Fig. 4 of Matsuoka et al. [2015]. These attributes include: maximum, minimum and mean values of bed elevations and ice-surface elevations, maximum ice thickness, mean ice-surface slope, relative height of the highest place (summit) of the feature measured from the adjacent ice shelf or stream surface (extracted from the Bedmap2 dataset [*Fretwell et al.*, 2013]), and mean ice-flow speed [*Rignot et al.*, 2011b]. These datasets have grid sizes of about 1 km, so they may include large errors associated with the spatial extent of the grounded features. Elevations are referenced to the GL04C geoid, which is used for the Bedmap2 dataset [*Fretwell et al.*, 2013].

The inventory is published through a data center at the Norwegian Polar Institute (NPI): data.npolar.no/dataset/9174e644-3540-44e8-b00b-c629acbf1339. We provide it in a shape file format with an associated text file that describes each attribute and a GIS style file that enables use of the inventory in the freely available GIS data package "Quantarctica" downloadable at www.quantarctica.org.

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