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RTOPO-1: A consistent dataset for Antarctic ice shelf topography and global ocean bathymetry

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Sub-ice shelf circulation and freezing/melting rates depend critically on an accurate and consistent representation of cavity geometry (i.e. ice-shelf draft and ocean bathymetry). Existing global or pan-Antarctic data sets have turned out to contain various inconsistencies and inaccuracies. The goal of this work is to compile independent regional fields into a global data set. We use the S-2004 global 1-minute bathymetry as the backbone and add an improved version of the BEDMAP topography for an area that roughly coincides with the Antarctic continental shelf. Locations of the merging line have been carefully adjusted in order to get the best out of each data set. High-resolution gridded data for the Amery, Fimbul, Filchner-Ronne, Larsen C and George VI Ice Shelves and for Pine Island Glacier have been carefully merged into the ambient ice and ocean topographies. Multibeam ship survey data for bathymetry in the former Larsen B cavity and the southeastern Bellingshausen Sea have been obtained from the data centers of Alfred Wegener Institute (AWI), British Antarctic Survey (BAS) and Lamont-Doherty Earth Observatory (LDEO), gridded, and again carefully merged into the existing bathymetry map. The resulting global 1-minute data set contains consistent masks for open ocean, grounded ice, floating ice, and bare land surface.

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