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Bedmap3: improved ice bed, surface and thickness datasets for Antarctica

Hamish Pritchard[1], Peter Fretwell[1], **Alice Fremand**[1], and Geir Moholdt[2]
[1]British Antarctic Survey, Cambridge, United Kingdom of Great Britain (hprit@bas.ac.uk)
[2]Norwegian Polar Institute, Tromsø, Norway (geir.moholdt@npolar.no)

We present Bedmap3, the latest suite of gridded products describing the surface elevation, ice-thickness and the seafloor and subglacial bed elevation of Antarctica south of 60°S. Bedmap3 incorporates and adds to all post-1950s datasets previously used for Bedmap1 and Bedmap2, including 84 new aerogeophysical surveys by 15 data providers, that represent an additional 52 million data points and 1.9 million line-kilometres of measurement. These latest data have filled major gaps particularly in East Antarctica, including the South Pole and Pensacola basin, Dronning Maud Land, Recovery Glacier and Dome Fuji, Princess Elizabeth Land, plus the Antarctic Peninsula, West Antarctic coastlines, and the Transantarctic Mountains. Our newly defined Bedmap3/RINGS grounding line product similarly consolidates multiple recent mappings of this spatially varying boundary into a single, spatially coherent feature. Using these new datasets plus updated rock-outcrop mappings, we have improved our interpolation of grounded ice thickness particularly in representing linear troughs under the ice sheet and in mountain ranges such that, in many parts of Antarctica, the subglacial landscape is visible in much greater detail than was previously available. Combined with updated surface topography, ice shelf thickness and bathymetry data, these products provide new opportunities for interpreting continental-scale landscape evolution, and detailed modelling of the past and future evolution of the Antarctic ice sheets.