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Identification of Antarctic ablation areas using a regional climate model

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The regional atmospheric climate model RACMO2/ANT, with snowdrift-related processes calculated offline, realistically predicts the occurrence of Antarctic ablation areas in Dronning Maud Land, the Lambert Glacier Basin, Victoria Land, the Transantarctic Mountains and the Antarctic Peninsula. These areas are characterized by a low solid precipitation flux and relatively strong sublimation and/or snowdrift erosion. The interaction between atmospheric circulation and topography plays a decisive role in the distribution of precipitation and hence that of ablation areas. Three Antarctic ablation area types can be distinguished, all occurring in regions where the solid precipitation flux is low: Type 1 are erosion-driven ablation areas, caused by 1D and/or 2D divergence in the katabatic wind field at high elevations (2000-3200 m asl). Type 2 are sublimation-driven ablation areas. This type occurs at low elevations ($<$ 2000 m) preferably at the foot of steep topographic barriers, where temperature and wind speed are high and relative humidity low. Type 3 are melt-driven ablation areas at the (former) Larsen Ice Shelf in the northern Antarctic Peninsula. Combination of types 1/2 and 2/3 are possible. During the period considered here (1980-2004), no significant change in Antarctic SSMB components, nor in the size of ablation areas, is found.