



Regional sea level rise from a collapse of the West Antarctic Ice Sheet

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Theory has suggested that the West Antarctic Ice Sheet may be inherently unstable. Recent observations lend weight to this hypothesis. Previous estimates of the potential contribution to sea level rise were based on incomplete data on bed and surface topography and, therefore, the volume of marine ice. They also lacked a complete calculation of how this volume would be distributed over the World's oceans as a result of i) changes in the gravity field after collapse and ii) solid earth effects.

We assess the regional contribution of a collapse of the marine portion of the ice sheet based on a glaciologically plausible wastage scenario. We find that the global contribution has been overestimated by ~65-110%. We obtain a global mean sea level contribution of 3 m, with large and important zonal variations. Latitudes between -60 and -10 degs S are subject to the largest increases, with a potential sea level rise of >3 m. The rise peaks for latitudes encompassing Australia, New Zealand, South Africa, and central South America. A sea level reduction occurs in the Weddell Sea but is rather localised. The far field signal, for latitudes above ~ 30 degs N, is 60% of the global value. This equate to a 2 m sea level contribution for a complete collapse of the marine sector of the ice sheet. The regional pattern is identical and linearly scaled for a partial loss of the ice sheet.