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Sensitivity of last deglacial and modern Antarctic Ice Sheet to the distribution of basal roughness

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The distributions of basal roughness and deformable sediment versus hard bedrock underneath Antarctica are poorly known, yet have a large influence on the geometry of the Antarctic Ice Sheet. Most paleoclimatic continental-scale ice-sheet simulations to date have assumed very simple distributions, which probably contribute to the large errors found in modern surface ice elevations. Here a crude inverse method is used to deduce the distribution of basal sliding coefficients, by fitting to modern observed surface elevations in a 3-D hybrid ice sheet-shelf model. Modern errors in ice elevation are considerably reduced, from several hundred meters to a few tens of meters in most areas. However, it is found that the simulated total ice volume at Last Glacial Maximum $\sim$15 ka, deglacial retreat history, and contribution to eustatic sea-level rise are quite sensitive to the new sliding-coefficient distribution, and also to the value assumed on continental shelves. Last deglacial results are presented, and model-data comparisons that could reduce the model uncertainty are discussed.