Thanks SO Much for ALL the Data: The Amundsen Sea Sector Data Set: Applications with UMISM: Where and How Much WATER? What WILL happen in the future?

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Recent extraordinary programs of the Airborne Geophysical survey of the Amundsen Sea Embayment (AGASEA), by University of Texas [holt06] and British Antarctic Survey [vaughan06] teams in the astral summers of 2004/2005, collected some 75,000 km of flight-line data measuring ice thickness with radar sounders and surface elevation with laser or radar altimeters. Recently these data have been made available as a 5-km gridded data set in a format convenient for modeling. We apply the University of Maine Ice Sheet Model (UMISM) in its embedded mode [fastook04b] to do high-resolution analysis of the velocity distribution within the Amundsen Catchment. We show that the model adequately captures velocity distributions measured by SAR radar [rignot04]. We show the distribution of basal water predicted by the model [fastook97, johnson99, johnson02b, johnson02]. We hope that, within the limitations of our grounding line parameterization, the model has predictive capabilities and will show some examples of possible future retreat.

The nest of embedded models begins with a 40 km grid of the entire ice sheet. Embedded in this is a 10 km grid that includes the entire AGASEA measurement area. Nested inside this medium-resolution grid are two 5 km grids encompassing Thwaites and Pine Island Glaciers. This procedure allows us to obtain the highest-resolution results with very reasonable runtimes. A cycle of growth to an LGM configuration followed by retreat to the present configuration is run for this nest of embedded grids. Advance and retreat is controlled by a "thinning-at-the-grounding-line" parameter (the WEERTMAN) which is coupled to the Vostok Core temperature proxy. Full resolution 5-km results for thickness, velocity, and water distribution are shown for the two focused embedded grids.

We also present a plausible, but perhaps extreme, scenario of future retreat that might arise if conditions ever returned to the state that produced the large retreat from the LGM configuration. One of these scenarios produces complete collapse of the WAIS in a few thousand years, while the other demonstrates how the "weak underbelly" might collapse [hughes81c].

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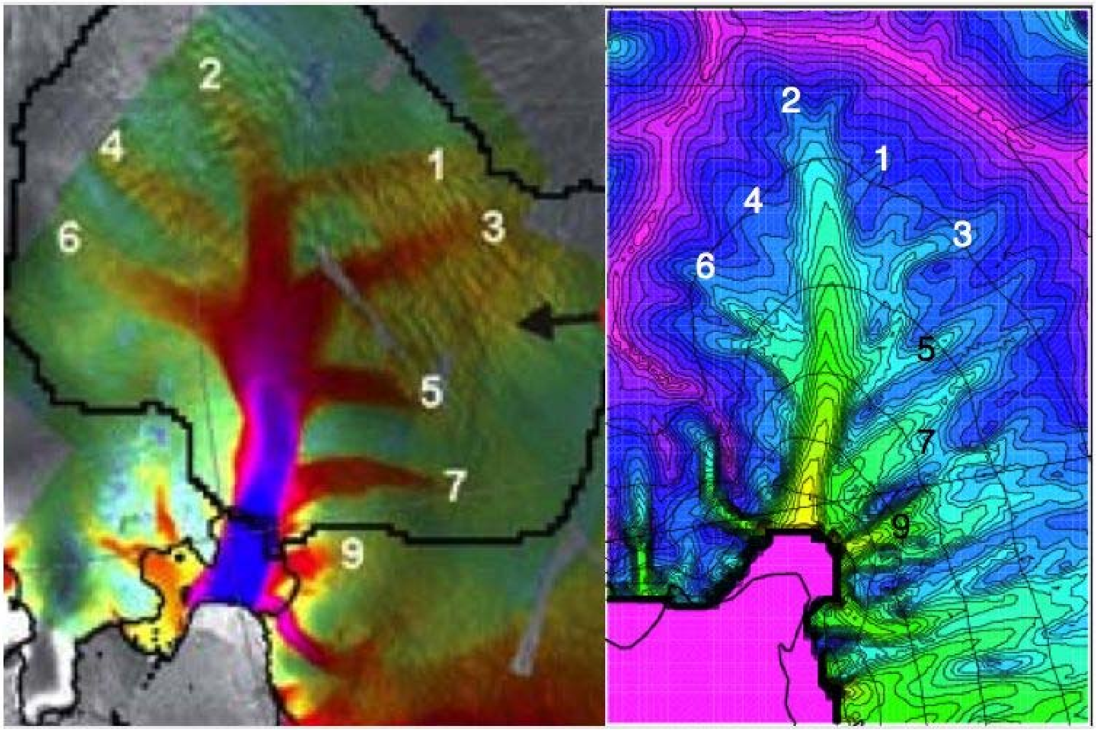
Data (Rignot 2004) and Results



Data (Rignot 2004) and Results