

Glaciology of the Bottleneck

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Major advances in ice-sheet modeling and data acquisition make possible addressing a major question in Antarctic glaciology: how high and how fast will global sea level rise if collapse of the West Antarctic Ice Sheet allows massive discharge of East Antarctic ice through the Bottleneck that now joins the East and West Antarctic Ice Sheets? The former is addressed by (1) a recap of how the West Antarctic Ice Sheet collapsed to its present size during the Holocene, (2) showing how ongoing collapse is most likely in the Pine Island Bay polynya in the Amundsen Sea sector of the ice sheet, (3) showing how this collapse may proceed through the Bottleneck into East Antarctica, (4) emphasizing drawdown of interior ice by surging ice streams followed by calving bays that migrate up stagnating ice streams to carve out drawdown interior ice, and (5) hypothesizing that these events follow from a reduction of ice height caused by reducing ice-bed coupling in a force balance that is independent of the mass balance.