From saddle to corridor: How deglaciation of coalescent ice sheets contributed to sea level rise and the opening of the ice-free corridor

Jorie Clark, College of Earth, Ocean, and Atmospheric Sciences, Oregon State University, Corvallis, OR

During the last deglaciation, the ice-sheet surface that occurred between the higher domes of the Cordilleran and Laurentide ice sheets experienced rapid lowering. Climate and ice-sheet modelling suggest that this so-called saddle collapse may have contributed from 6 m to 11 m of global sea level rise over 500 years to 3,000 years. Saddle collapse is initiated when an imposed warming increases surface melting of the saddle region, causing the ablation zone to expand and the ice surface to lower to warmer altitudes. This process then crosses a tipping point whereby with no further imposed warming, surface melting rapidly accelerates as the saddle continues to lower to warmer altitudes. Surface melting peaks when the ice-free corridor (IFC) between the two ice domes opens. Dating the age of the opening of the IFC is thus critical to determining the end of the contribution of saddle collapse to global sea level rise and the beginning of the availability of the corridor for migration. In this talk, I will first summarize the saddle collapse mechanism and the corresponding contribution to global sea level rise suggested from ice-sheet modeling. I will then summarize the dating constraints on the age of the opening of the IFC and discuss their implications to sea level rise from saddle collapse and to migrations through the IFC.