

Antarctic ice rises and rumples: Their properties and significance for ice-sheet dynamics and evolution

*Kenichi Matsuoka¹

1. Norwegian Polar Institute

Locally grounded features in ice shelves, called ice rises and rumples, play a key role buttressing discharge from the Antarctic Ice Sheet and regulating its contribution to sea level. Ice rises typically rise several hundreds of meters above the surrounding ice shelf; shelf flow is diverted around them. On the other hand, shelf ice flows across ice rumples, which typically rise only a few tens of meters above the ice shelf. Ice rises contain rich histories of deglaciation and climate that extend back over timescales ranging from a few millennia to beyond the last glacial maximum. Numerical model results have shown that the buttressing effects of ice rises and rumples are significant, but details of processes and how they evolve remain poorly understood. Fundamental information about the conditions and processes that cause transitions between floating ice shelves, ice rises and ice rumples is needed in order to assess their impact on ice-sheet behavior. Targeted high-resolution observational data are needed to evaluate and improve prognostic numerical models and parameterizations of the effects of small-scale pinning points on grounding-zone dynamics.

Keywords: Antarctic Ice Sheet, ice shelf, ice rise

