



Morphology of Basal Crevasses at the Grounding Zone of Whillans Ice Stream, West Antarctica



2013 WAIS Workshop

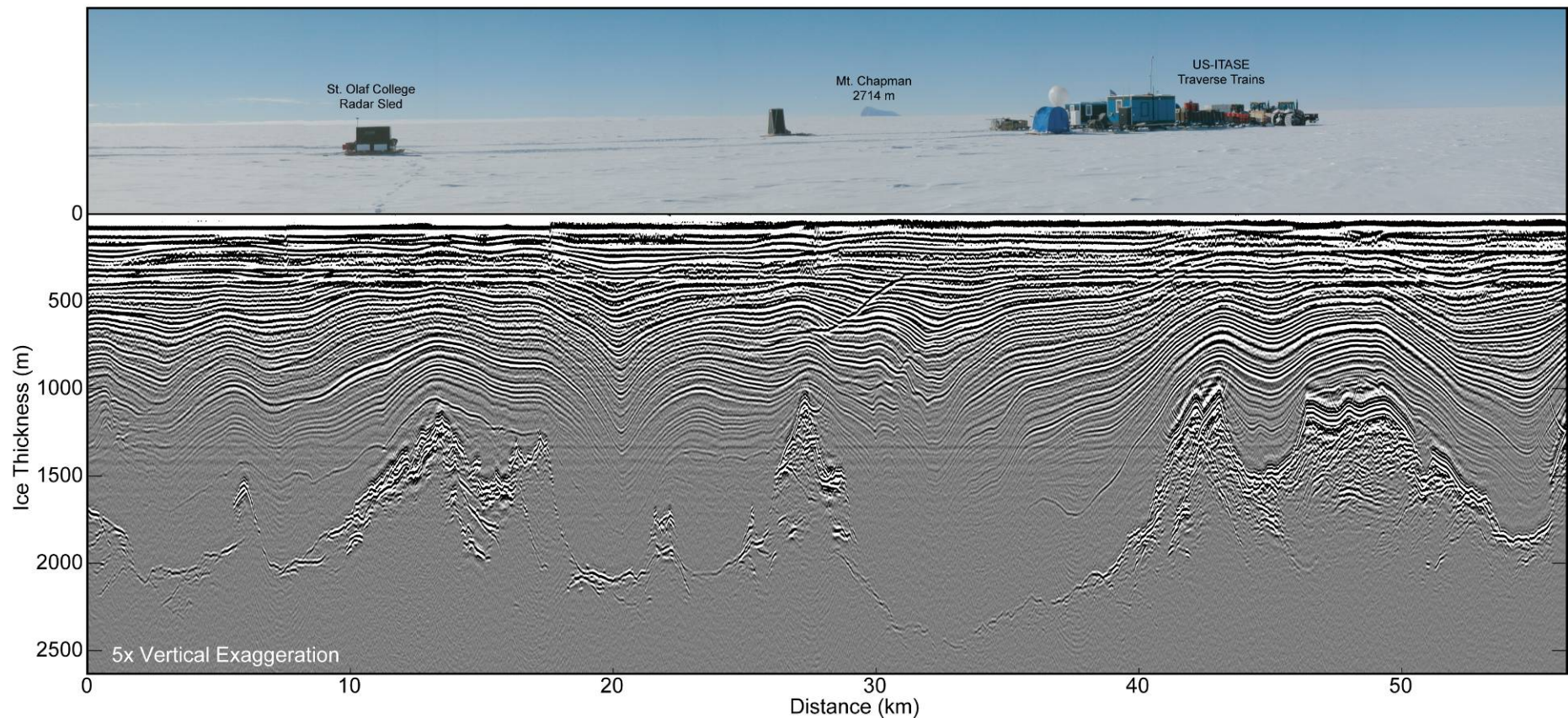
October 1, 2013

***Robert Jacobel, Knut Christianson, Adam Wood, Kevin DallaSanta
and Rebecca Gobel***

Department of Physics



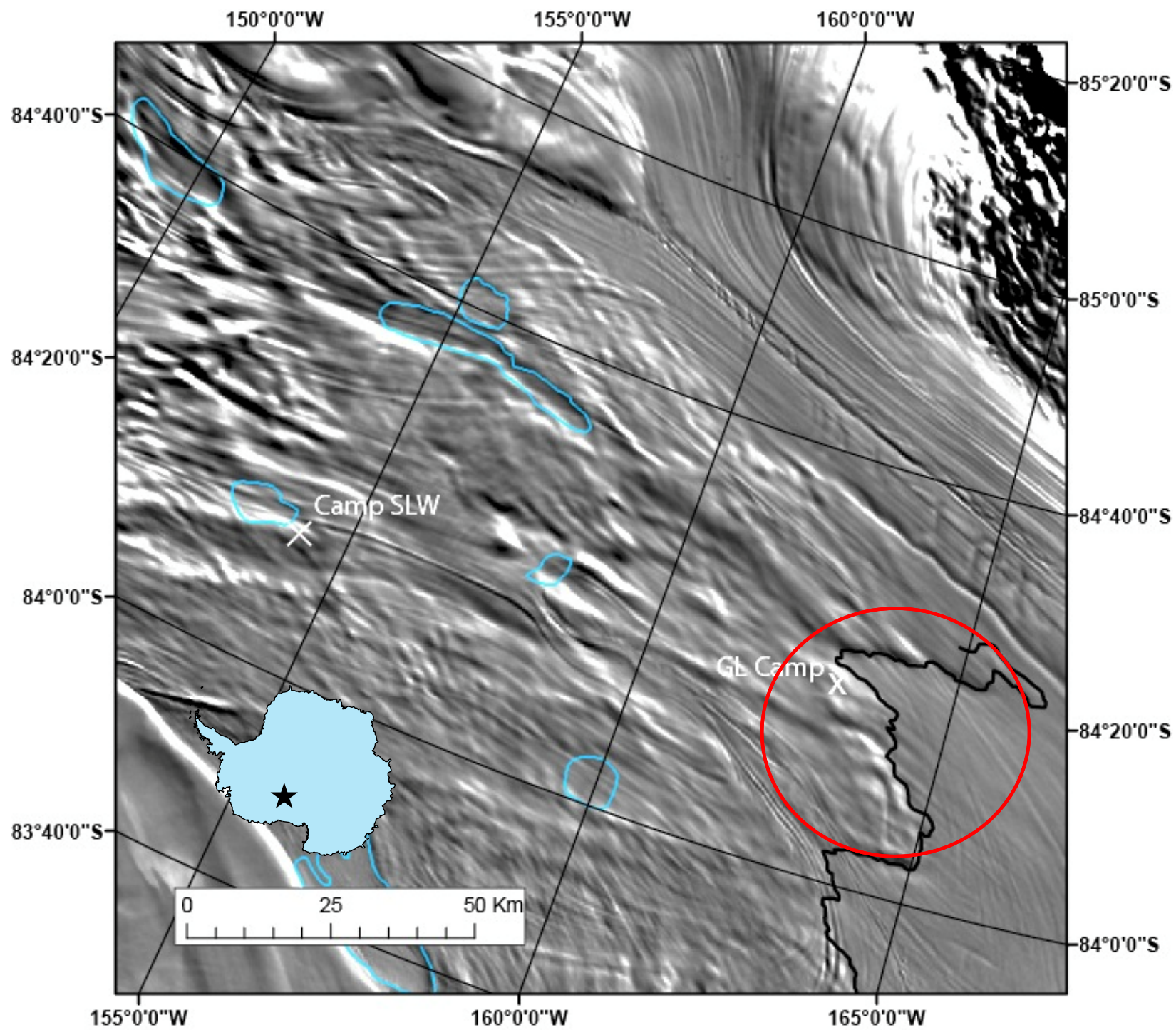
St. Olaf College

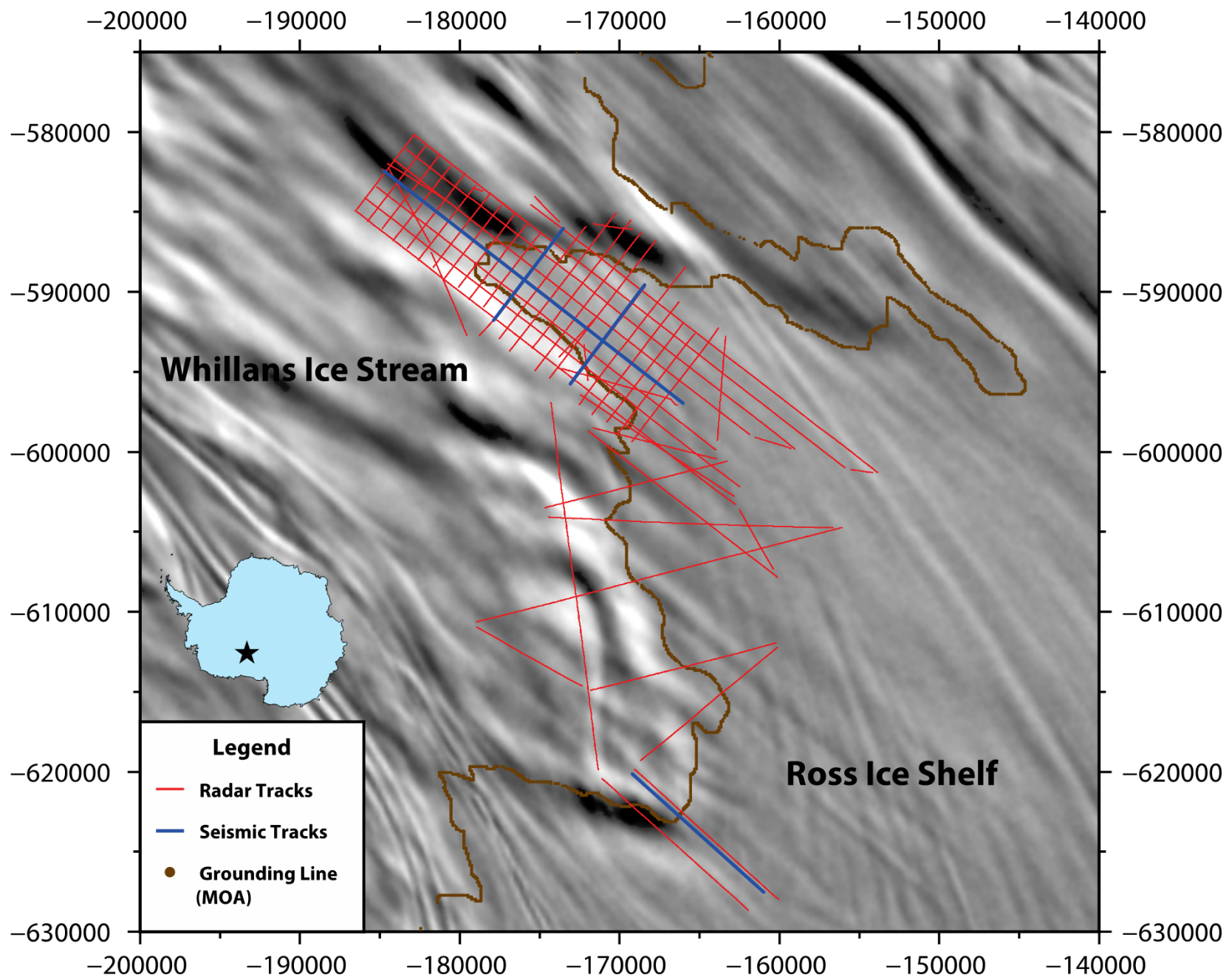


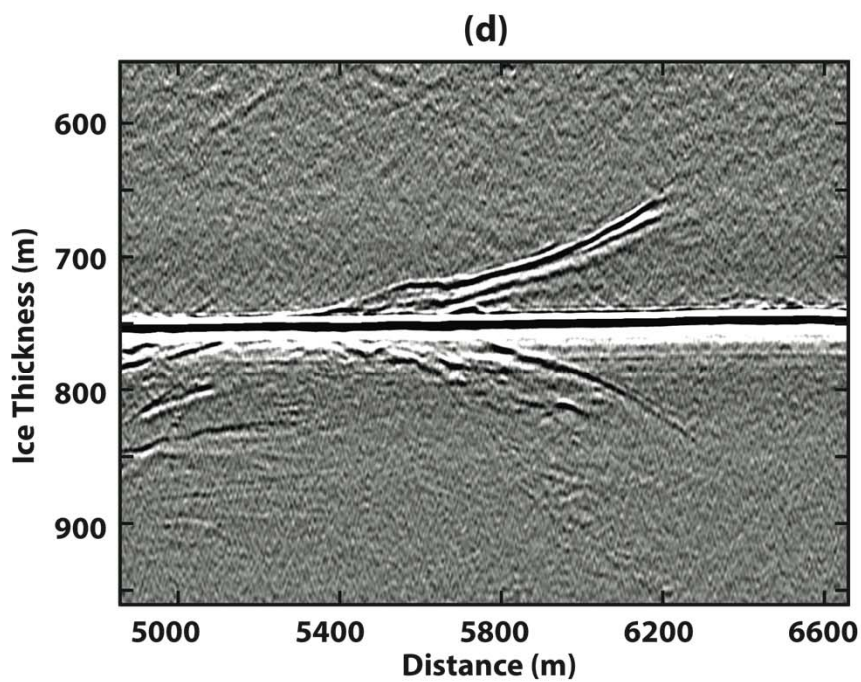
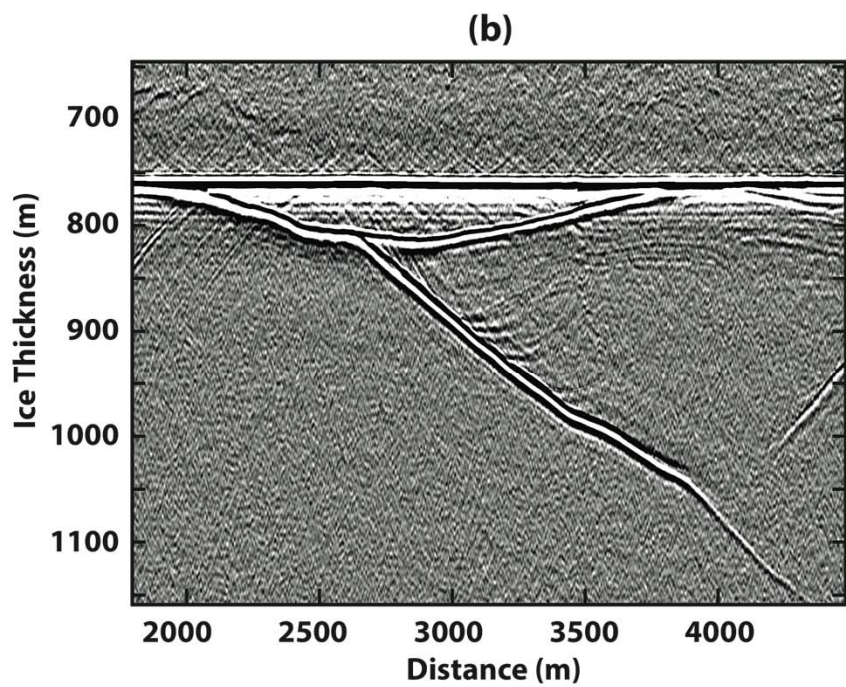
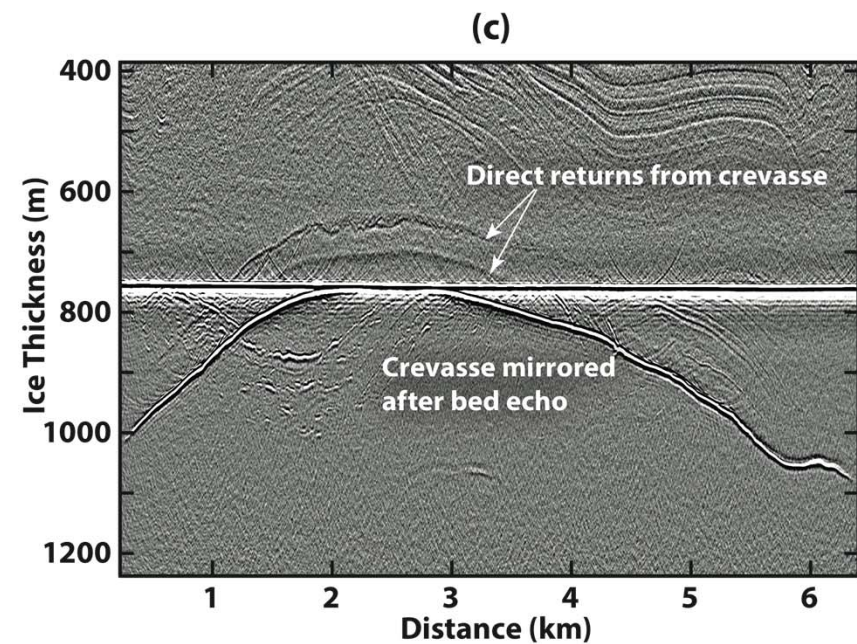
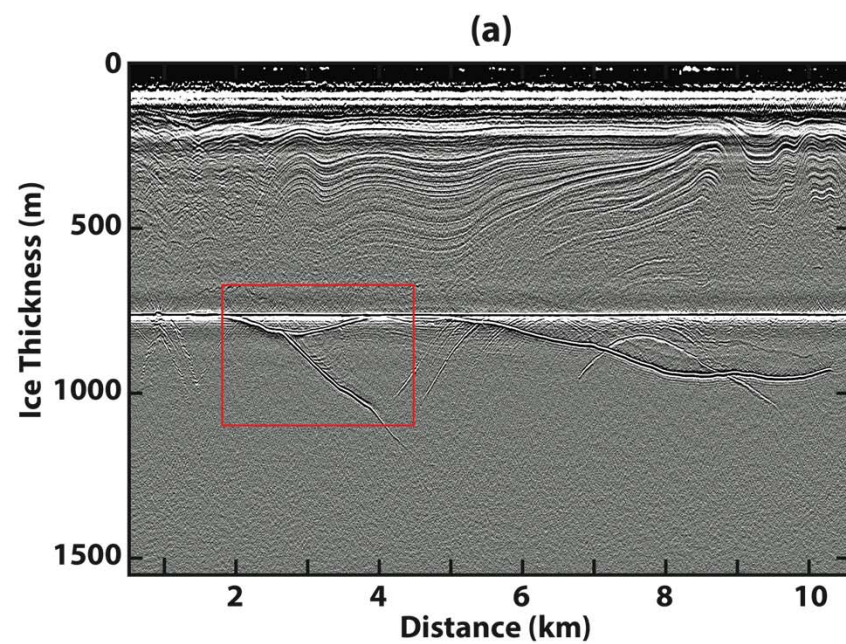
WISSARD Ground-Based Geophysics 2010-12

- **Ice-Penetrating Radar**
- **Active-Source Seismics**
- **GPS Surface Elevation**

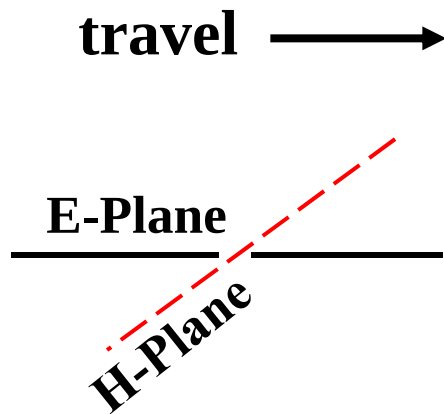




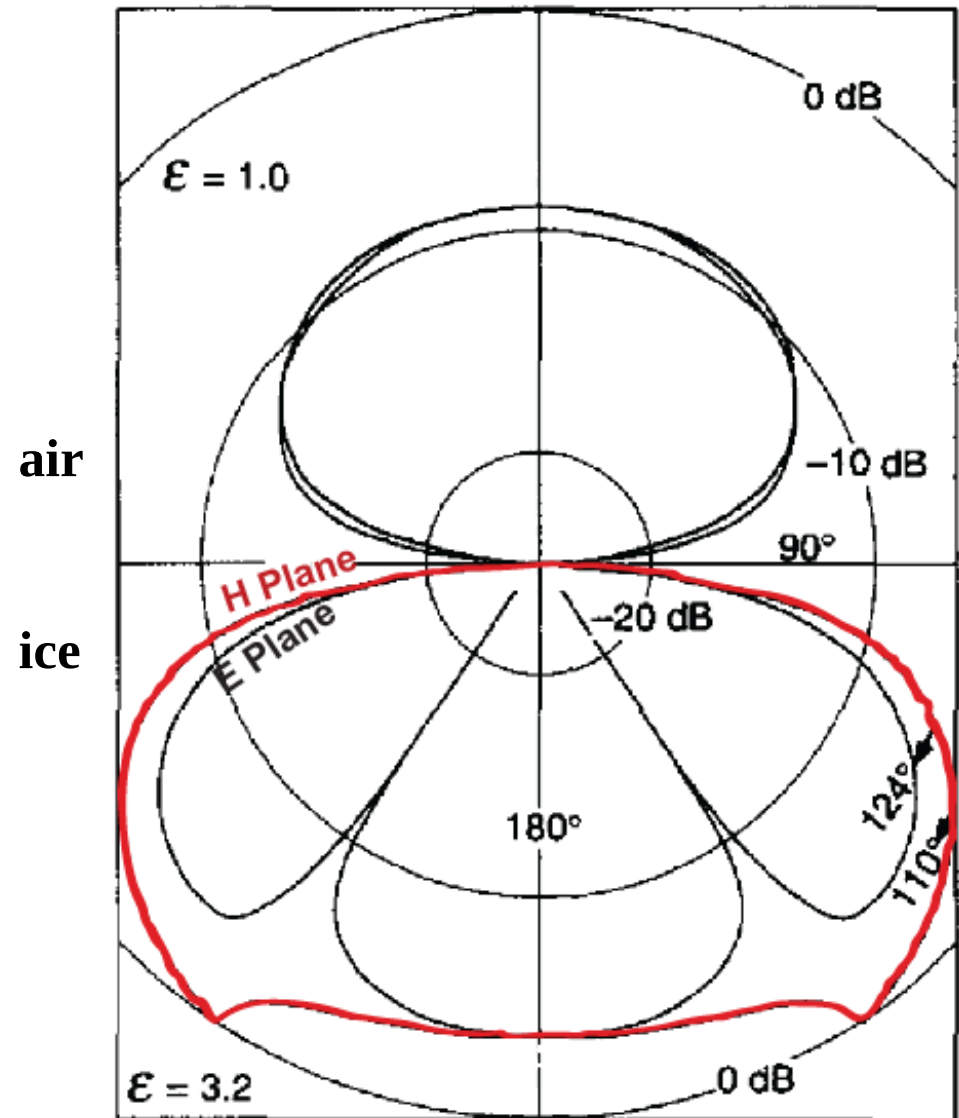




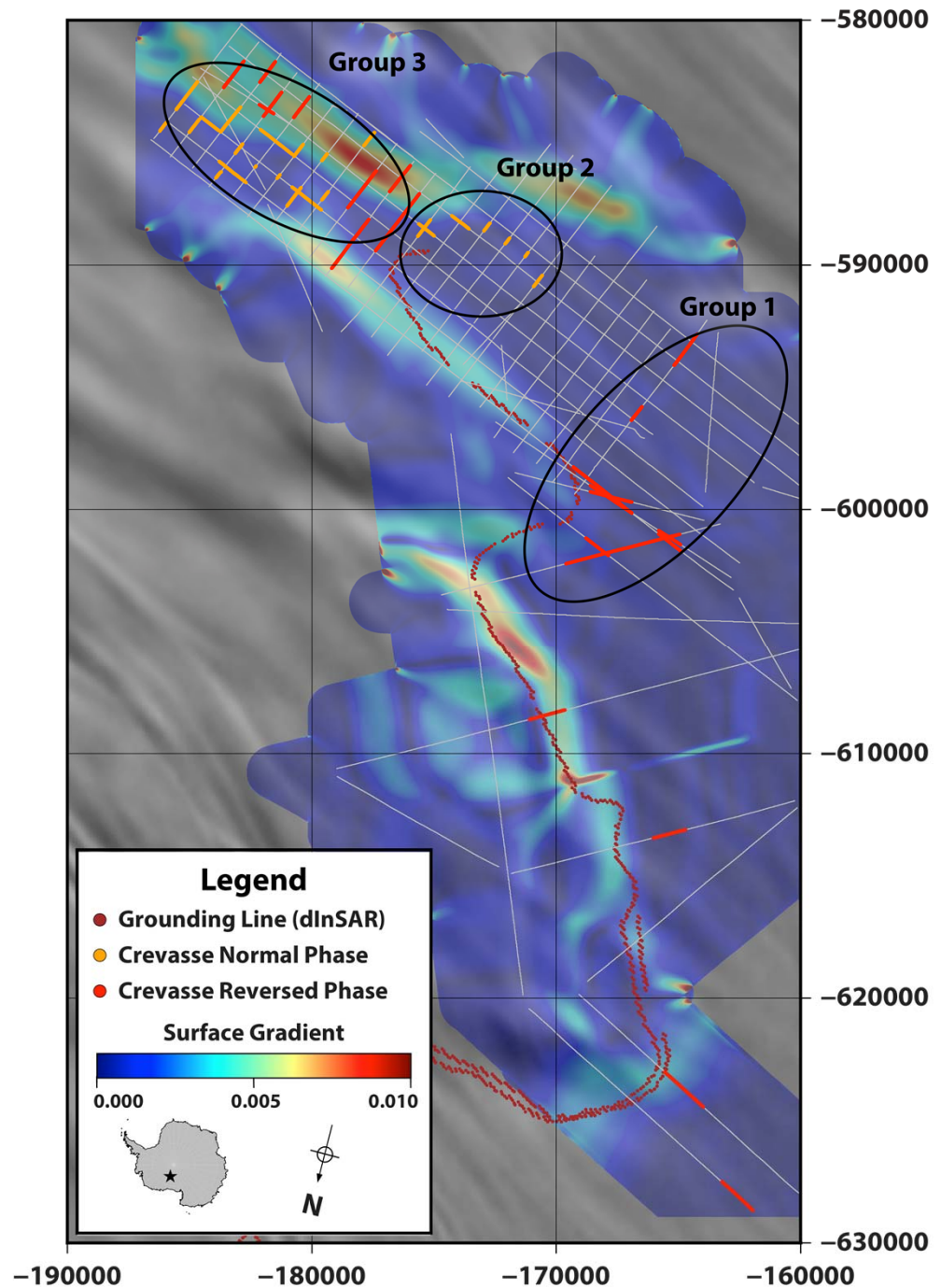
Dipole Antenna Radiation Patterns



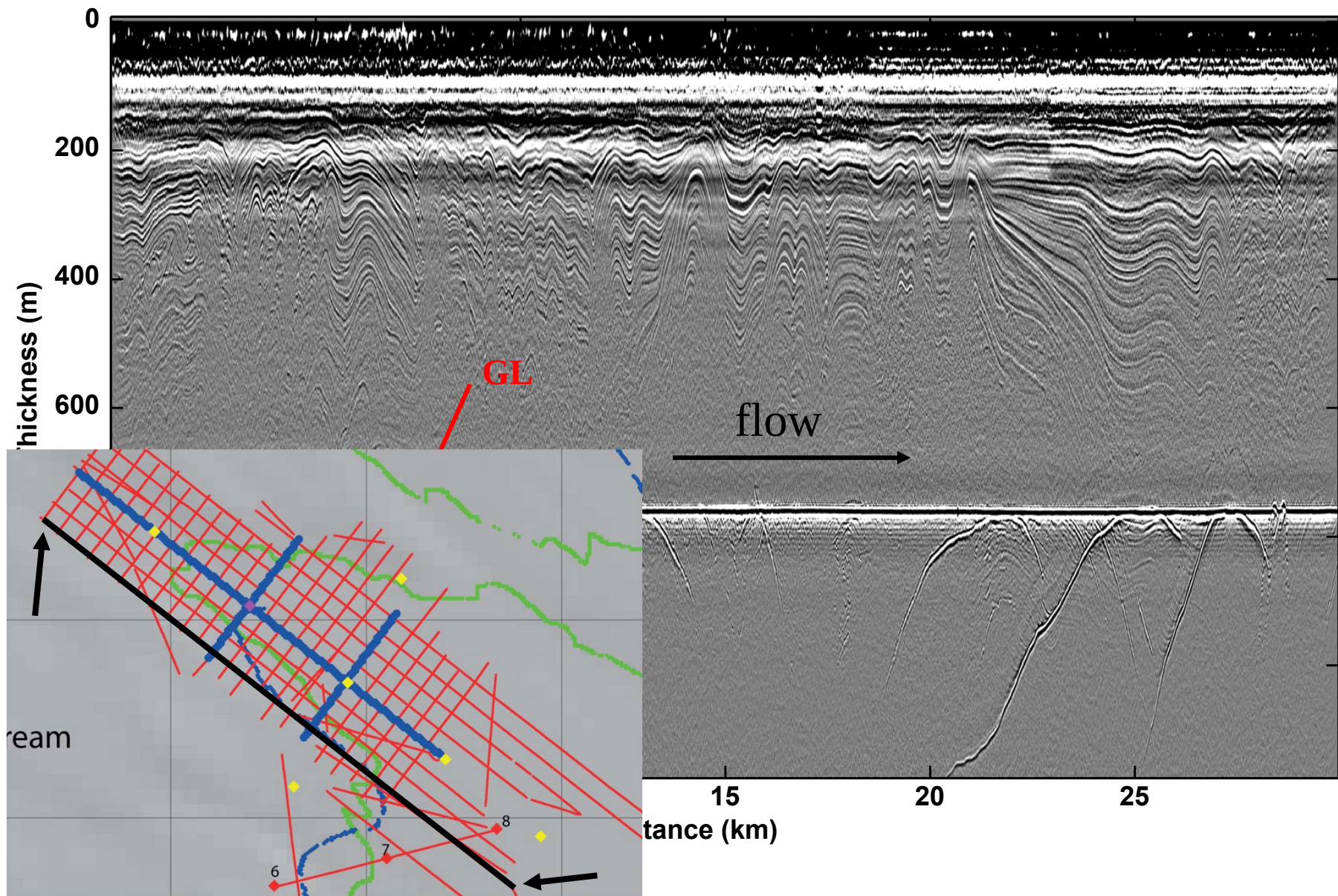
Arcone, 1995, *Applied Geophysics*



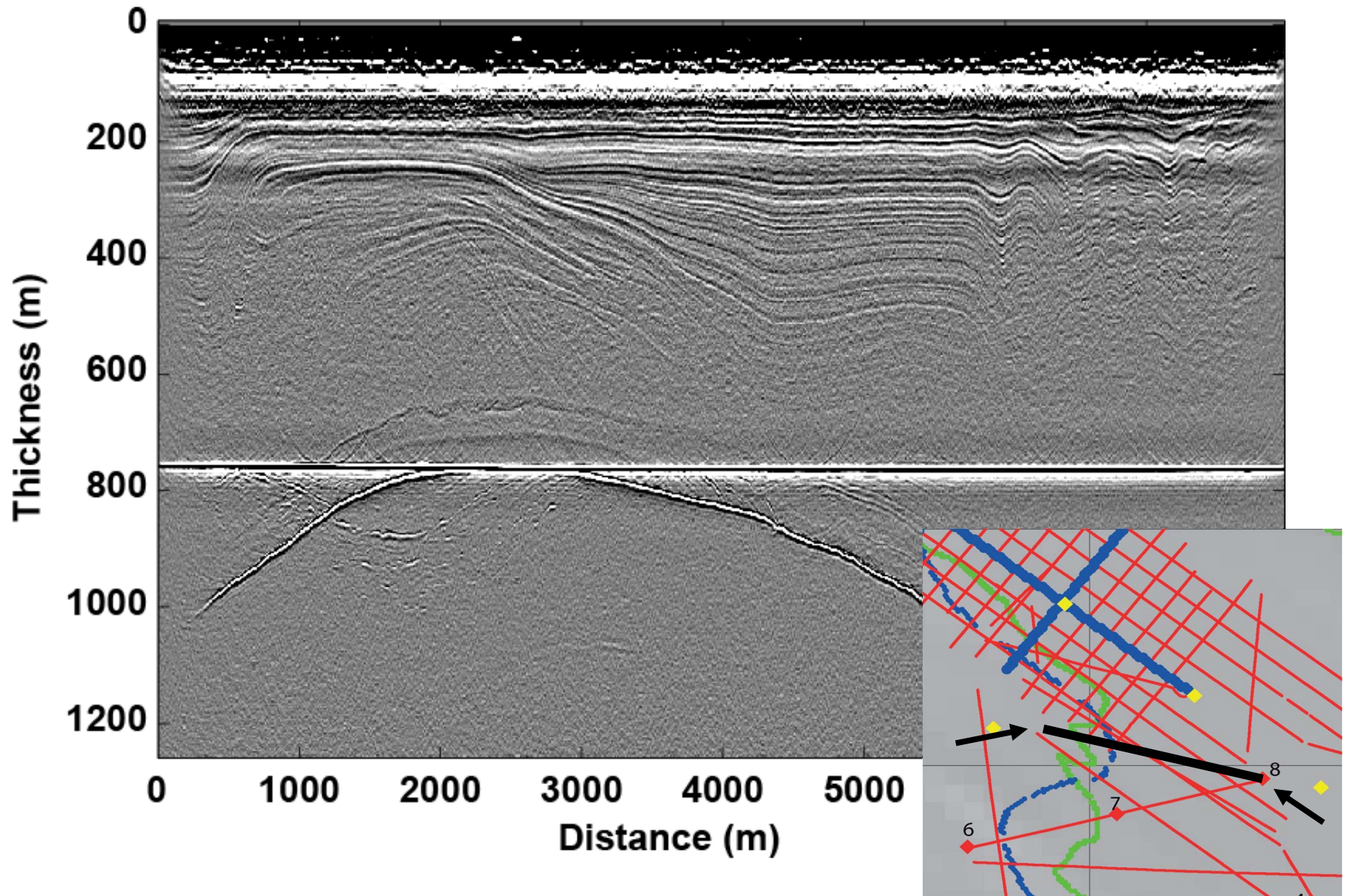
Surface Slope Gradient (color)



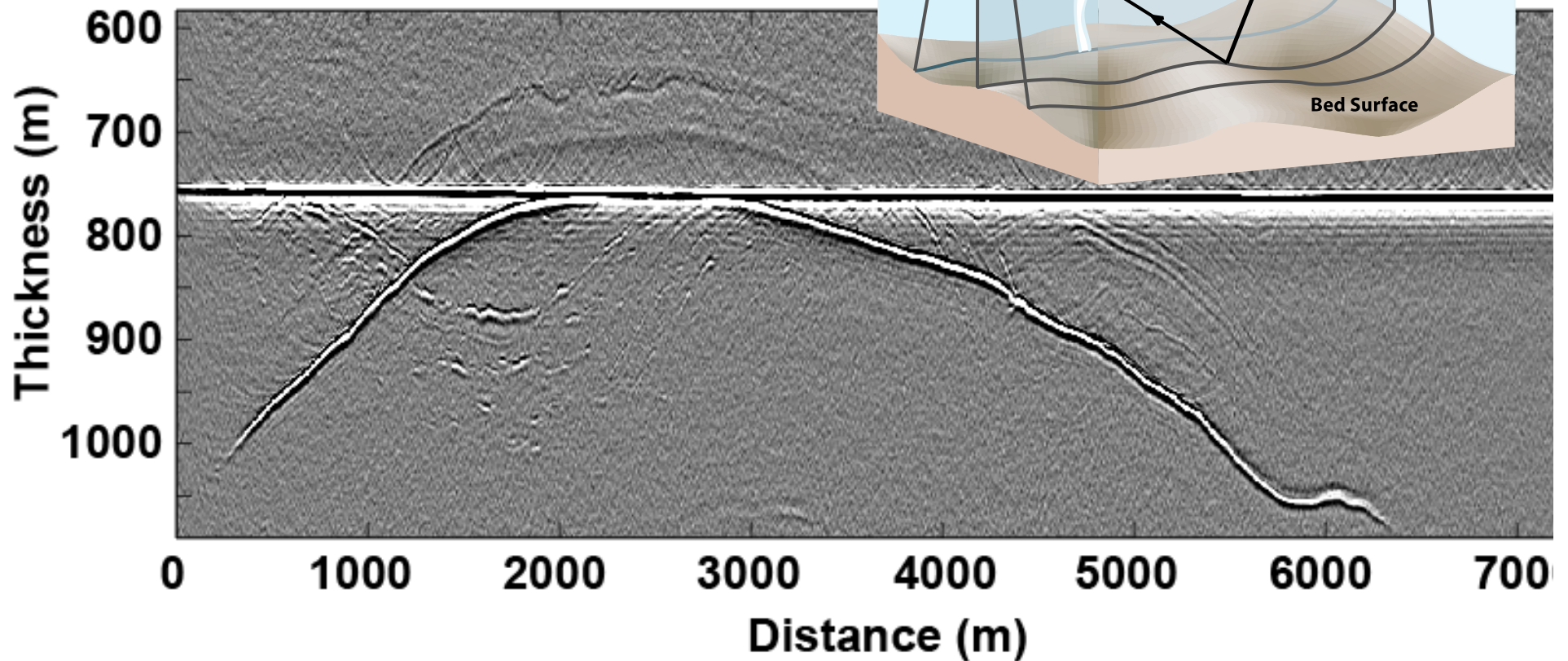
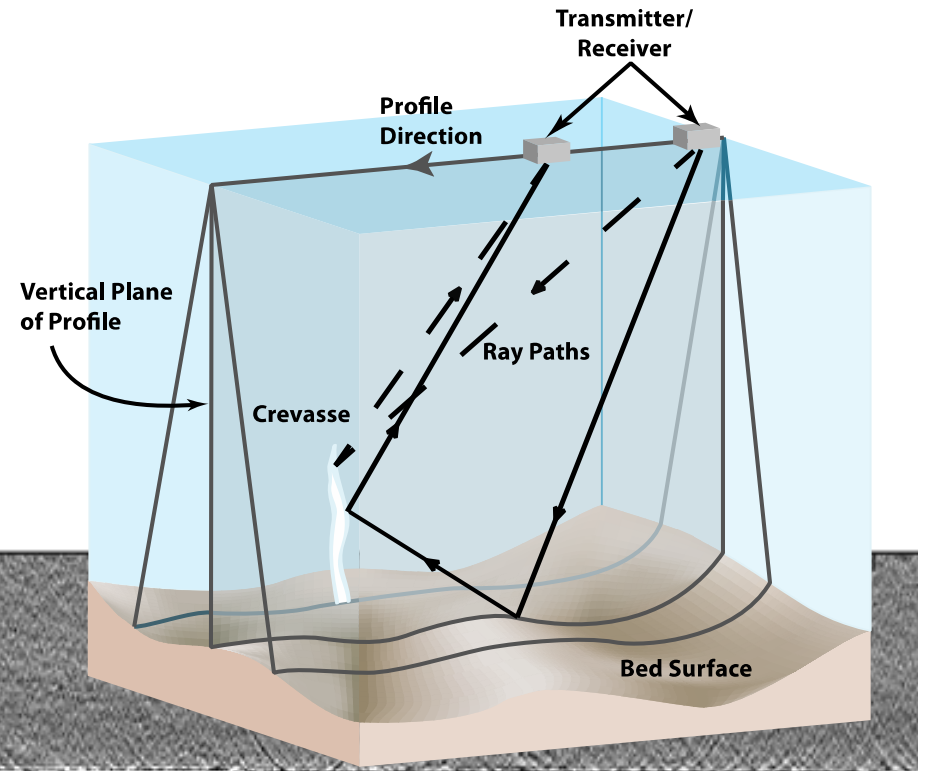
Basal Crevasses

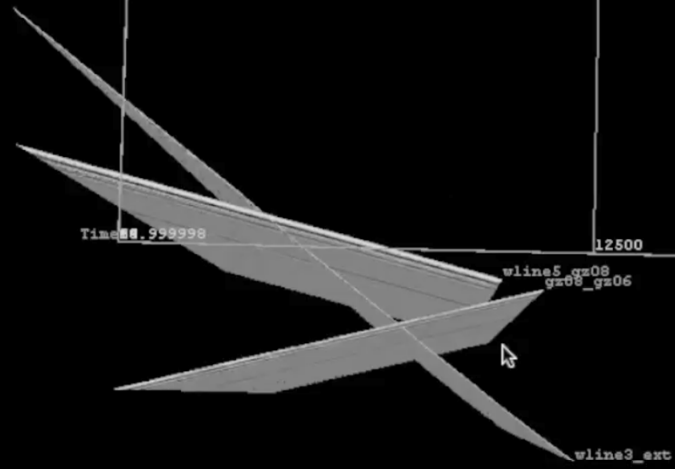
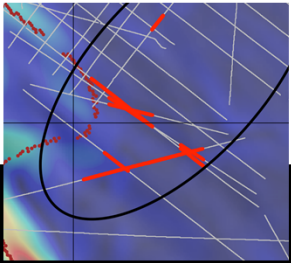


Phase Reversal for a Basal Crevasse

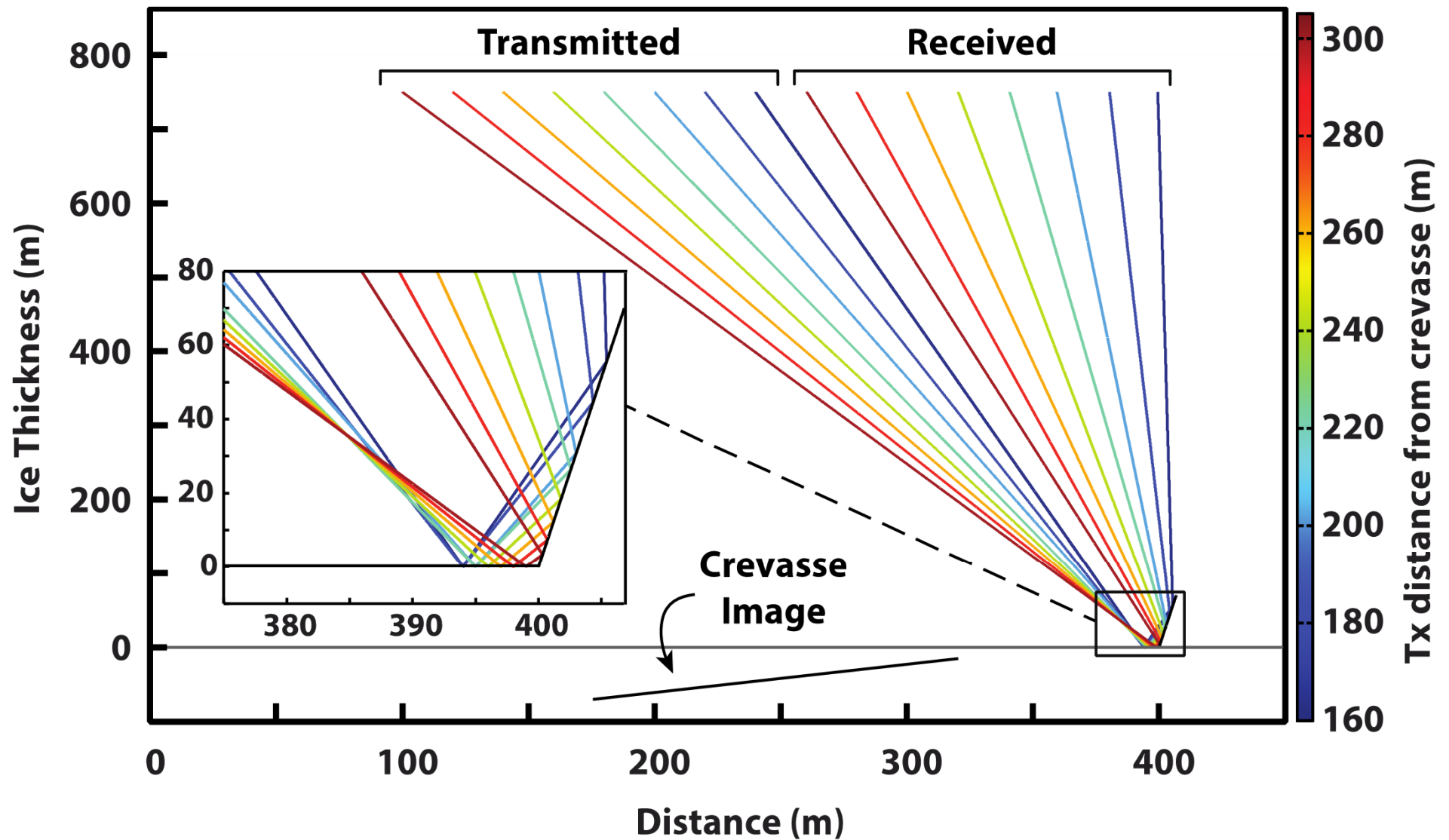


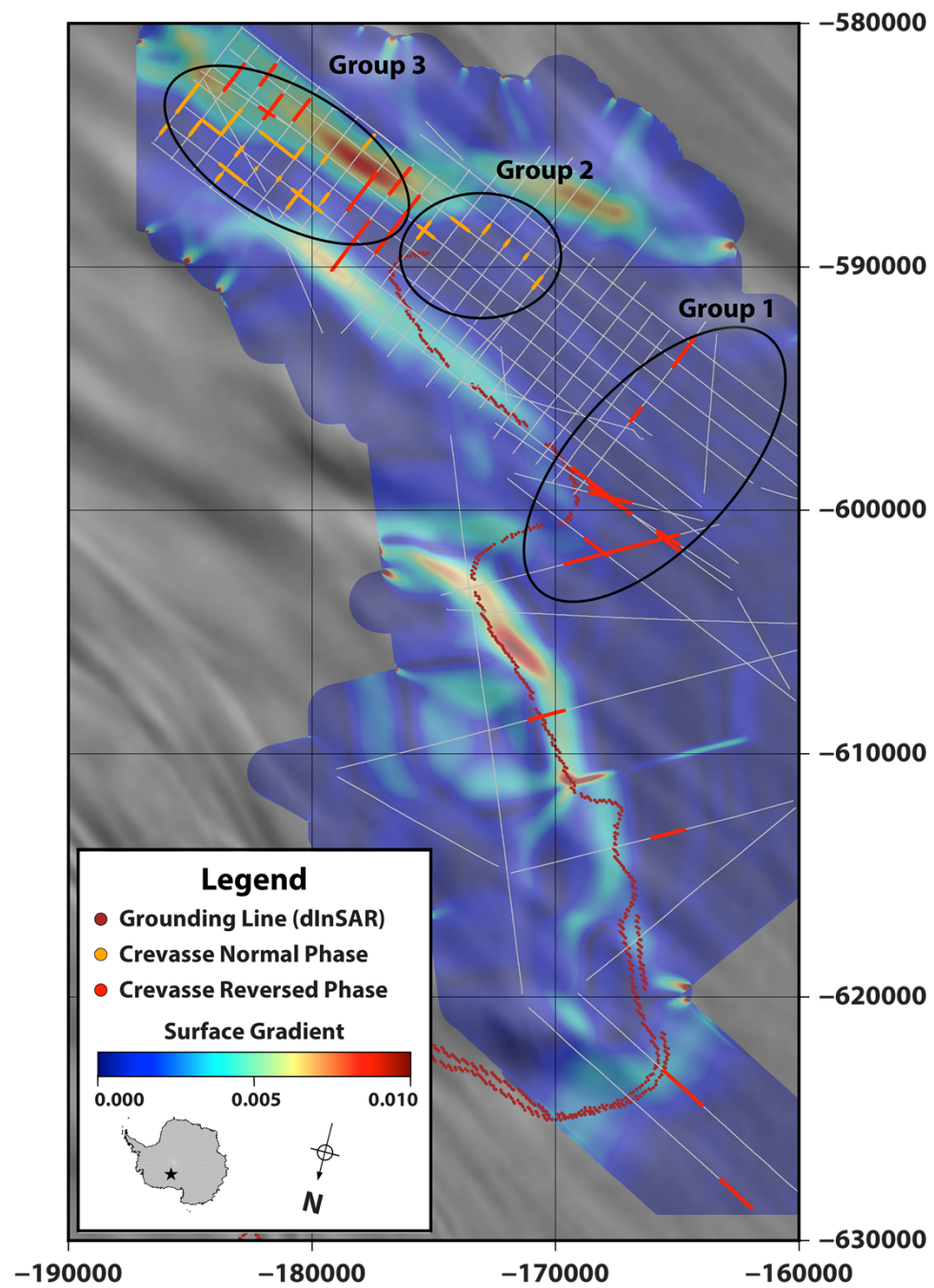
Phase Reversal From a Basal Reflection

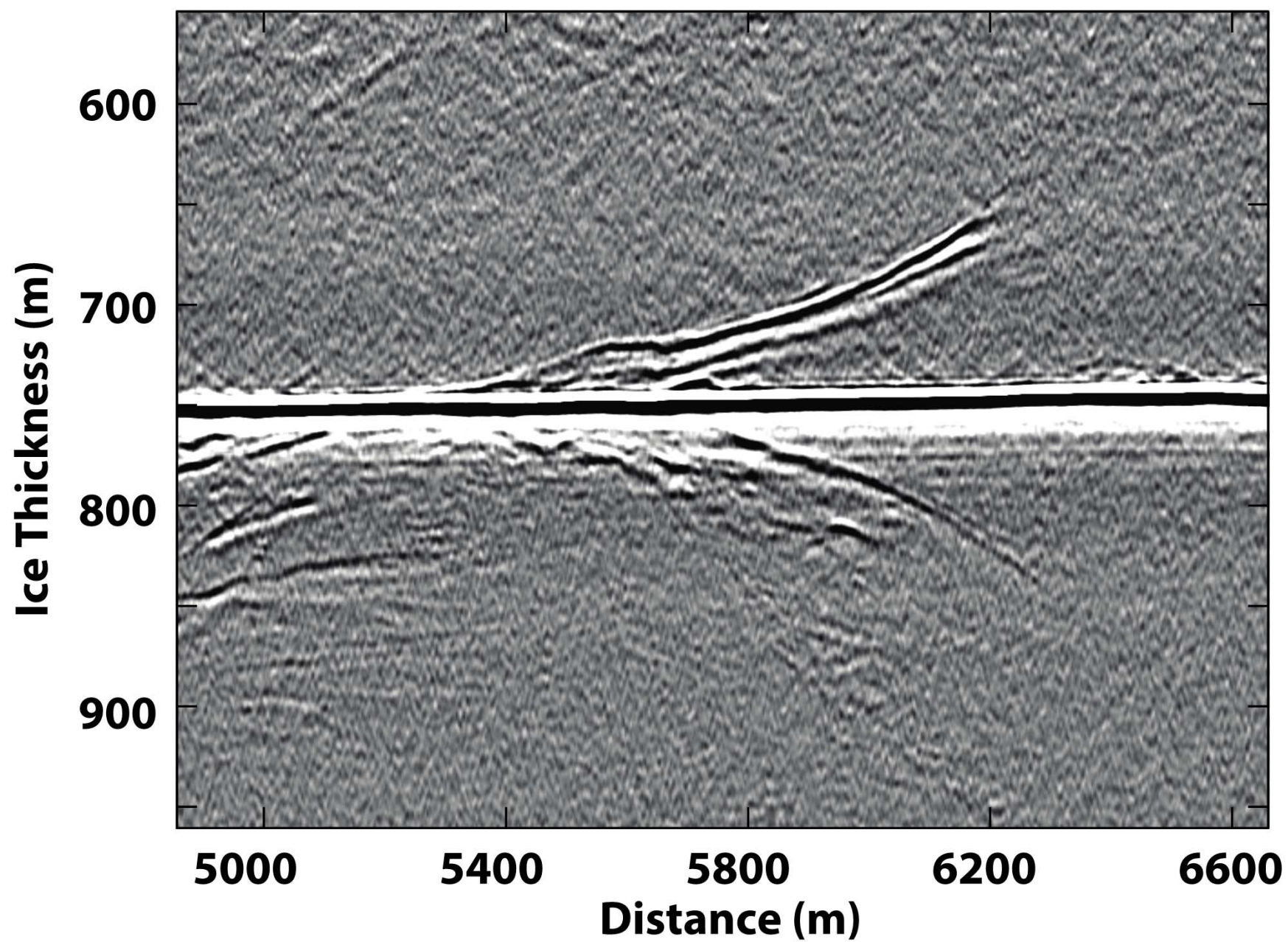


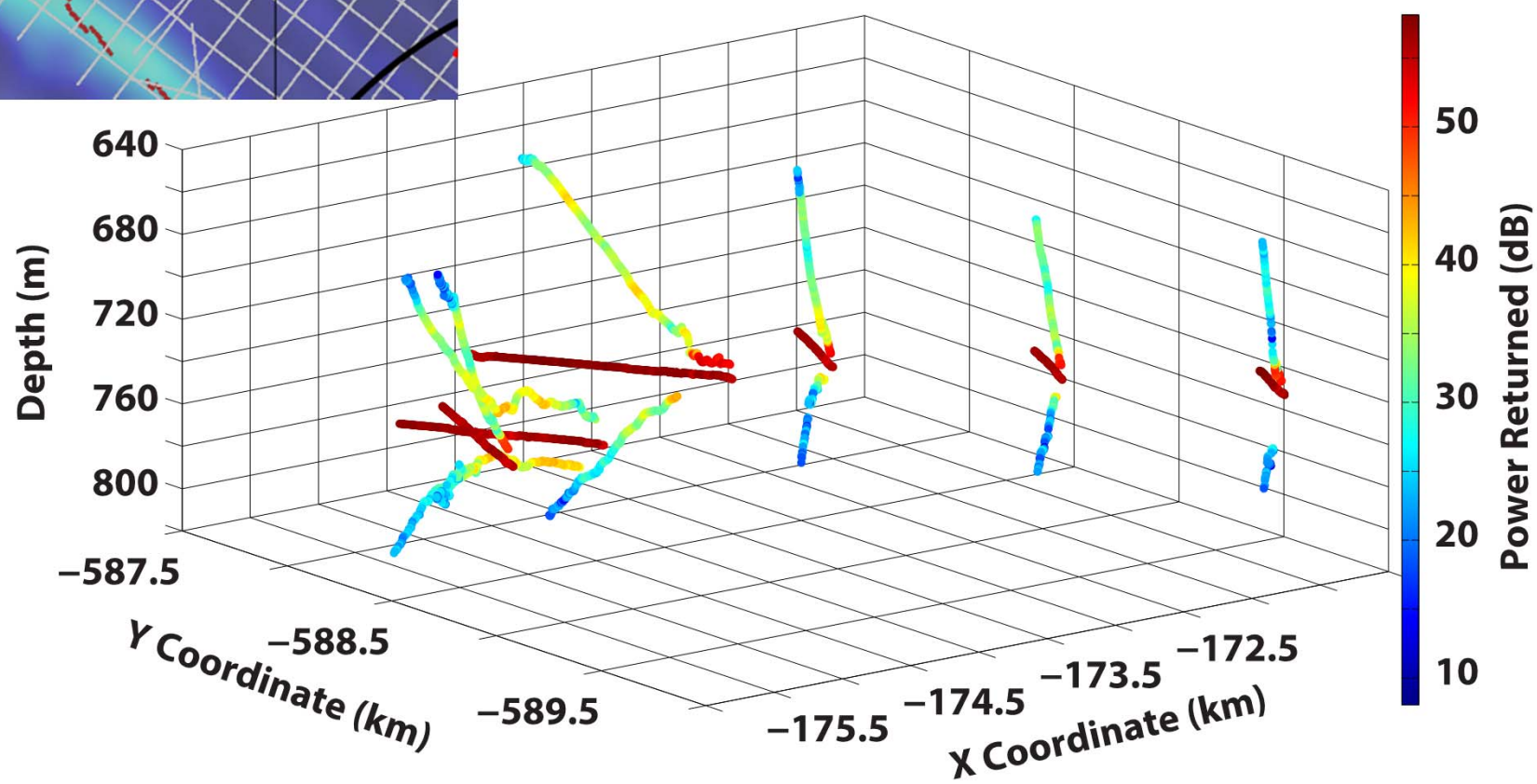
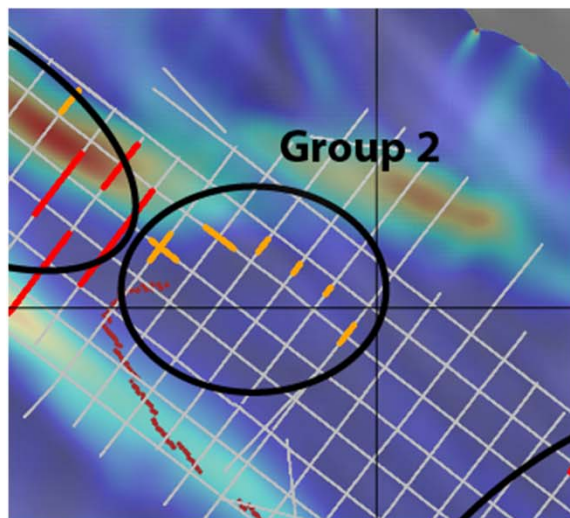


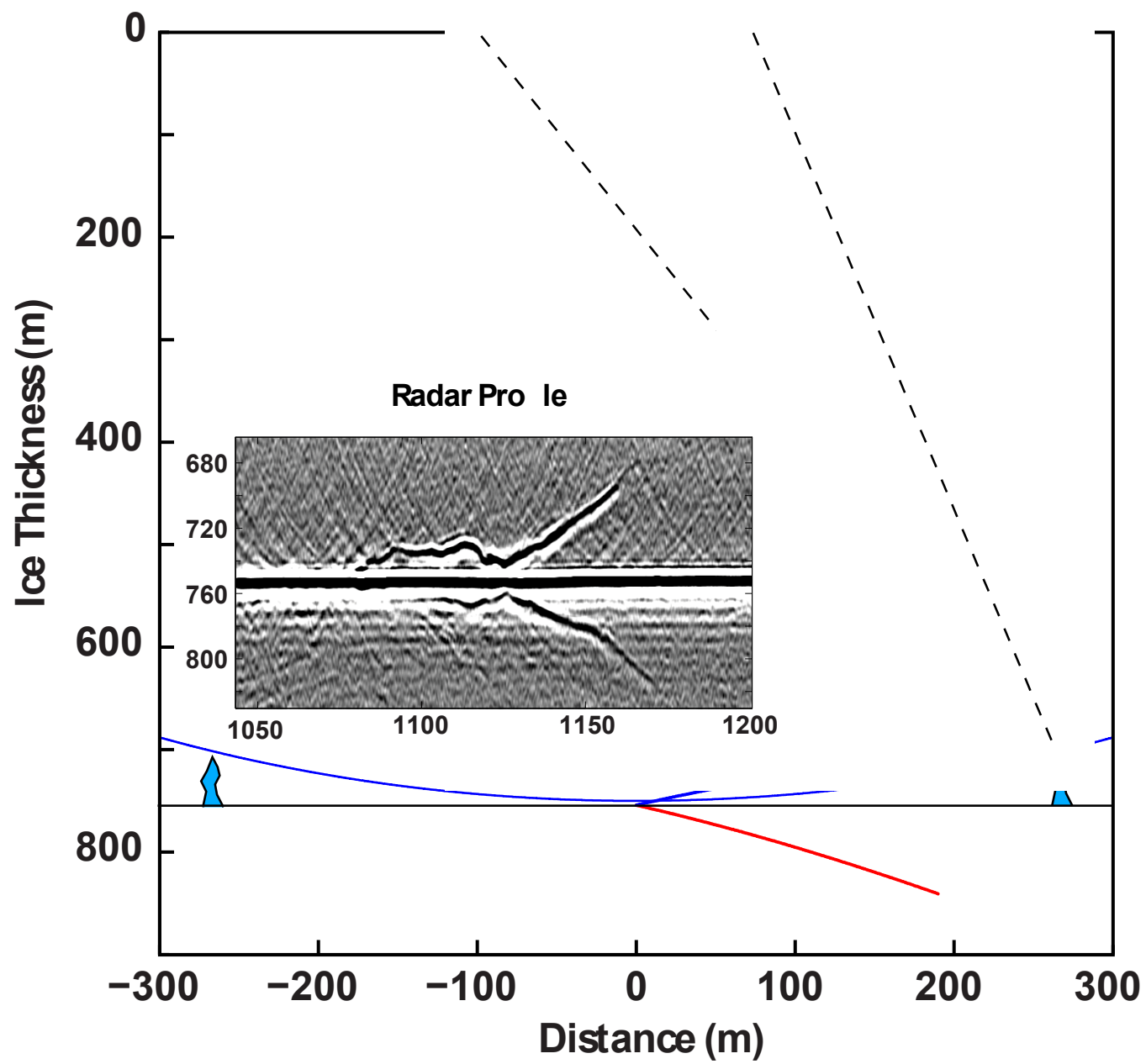
Geometric Model for Crevasse Double-Reflection

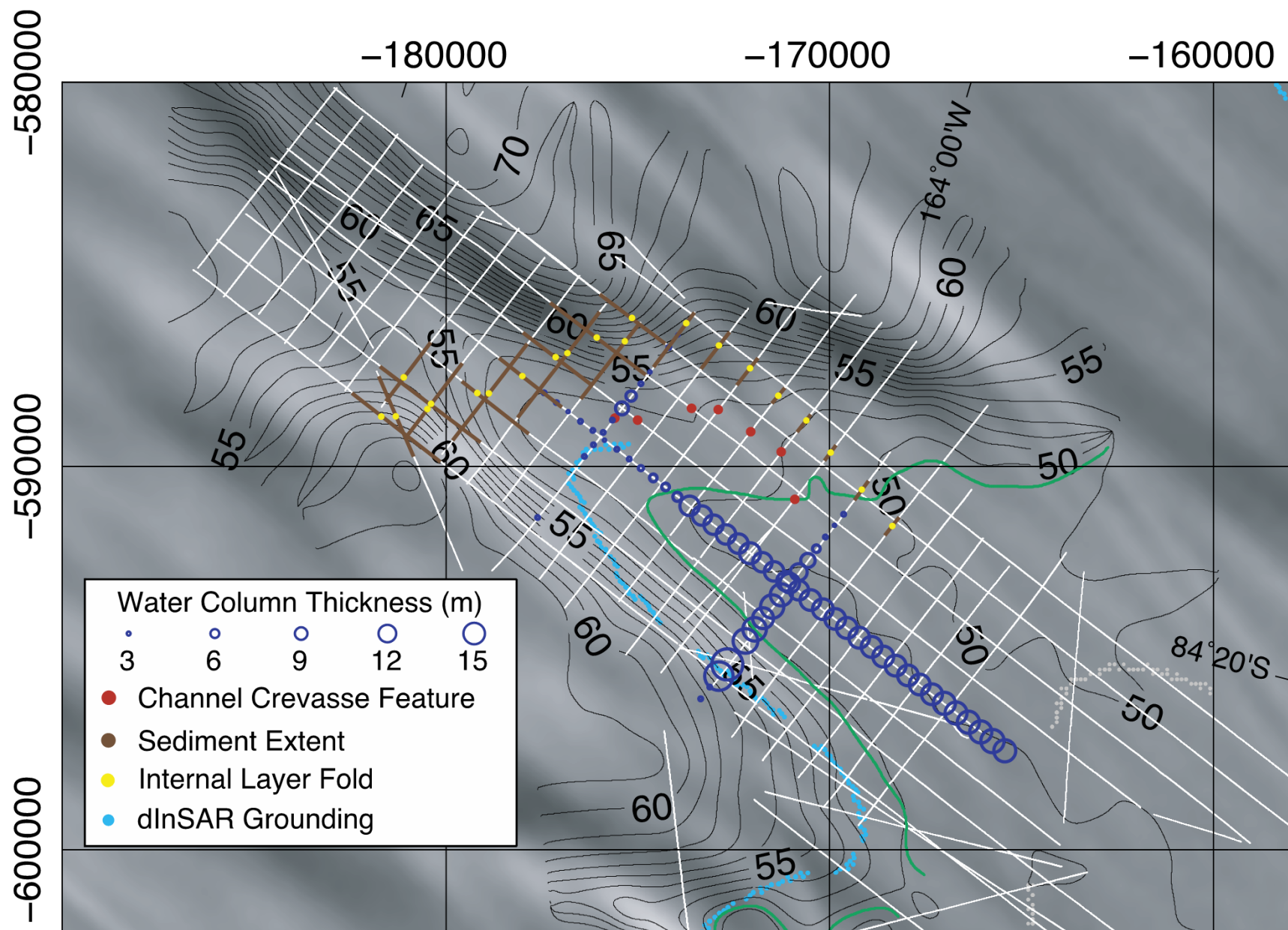








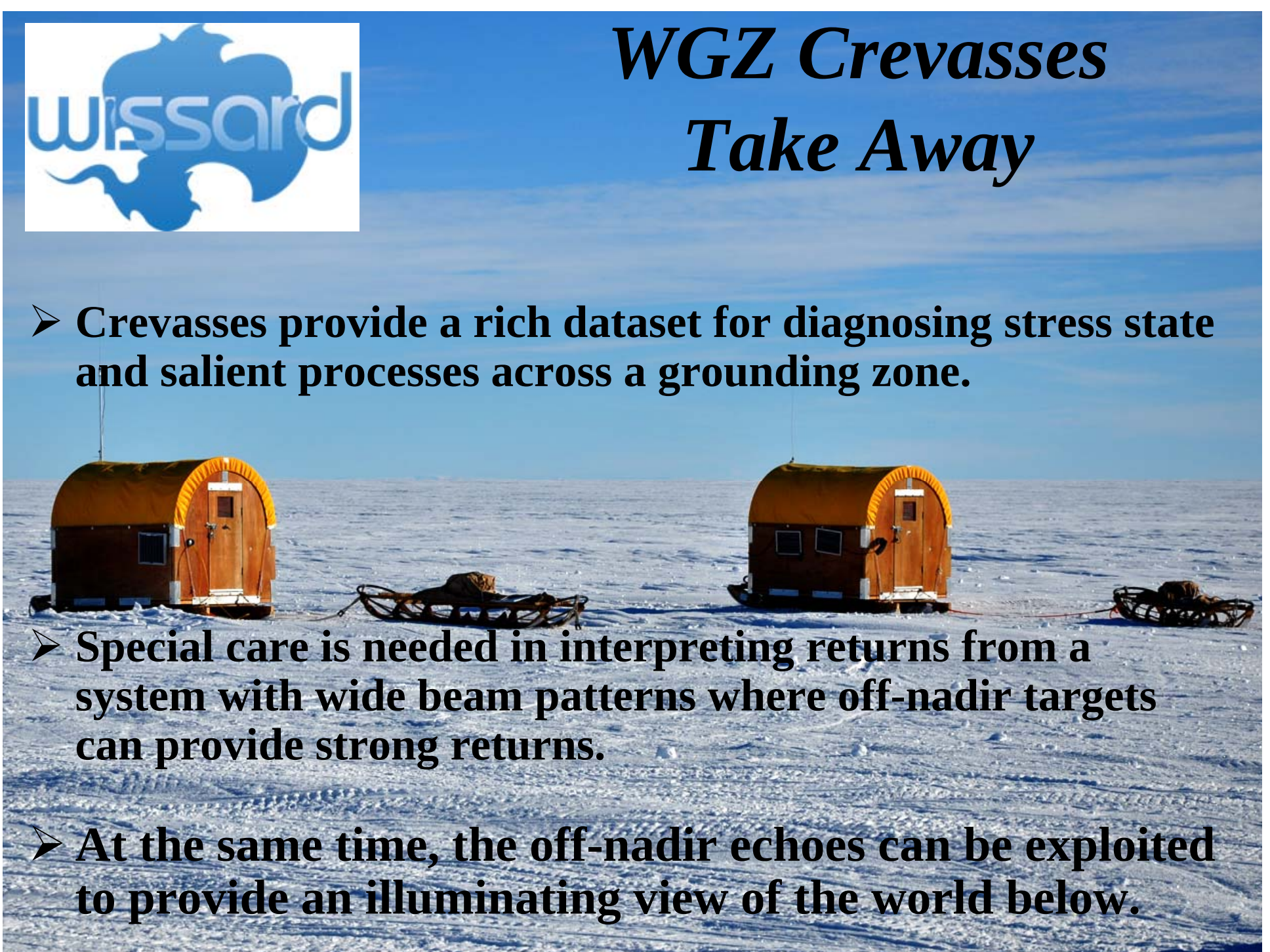




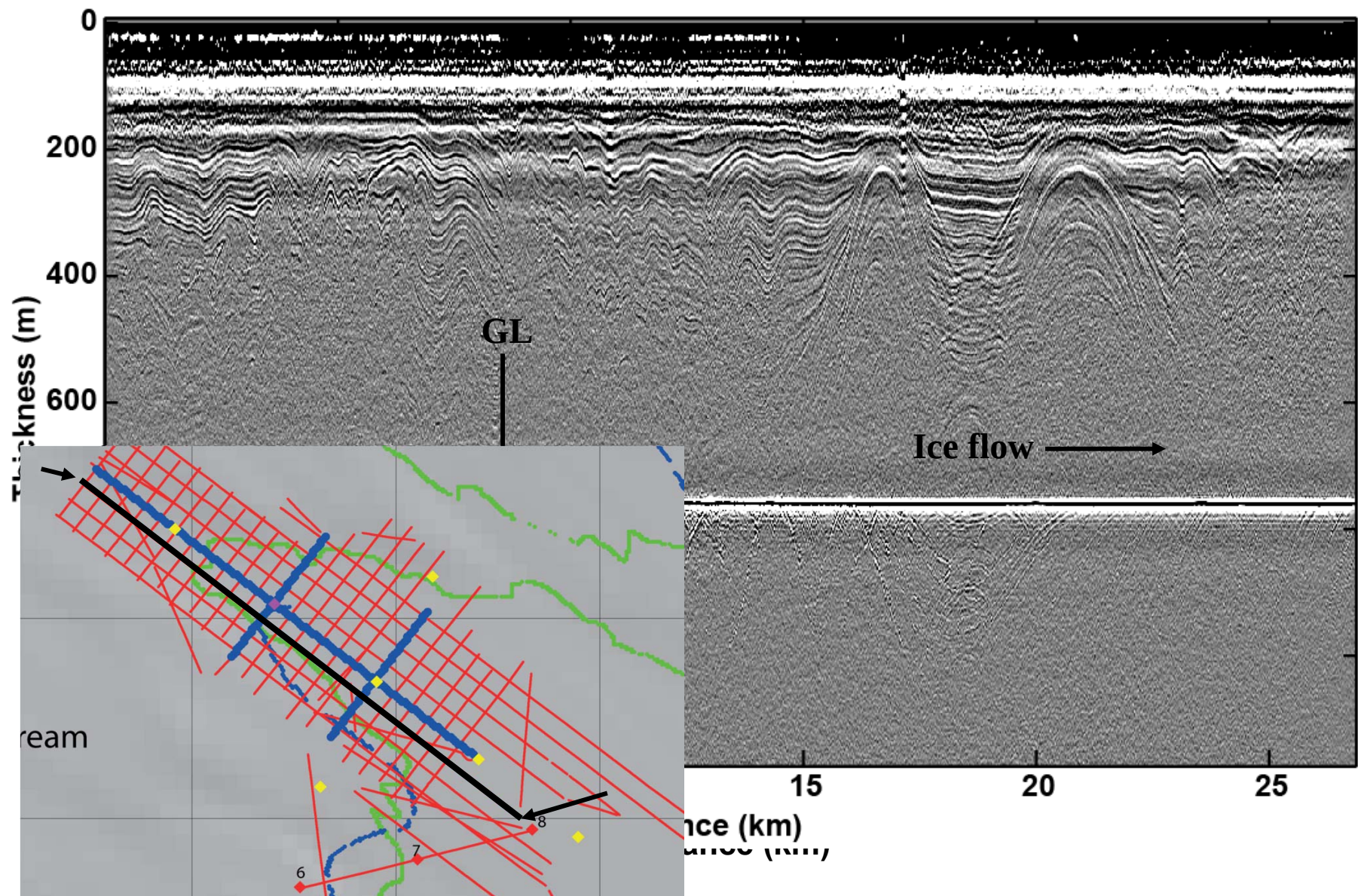


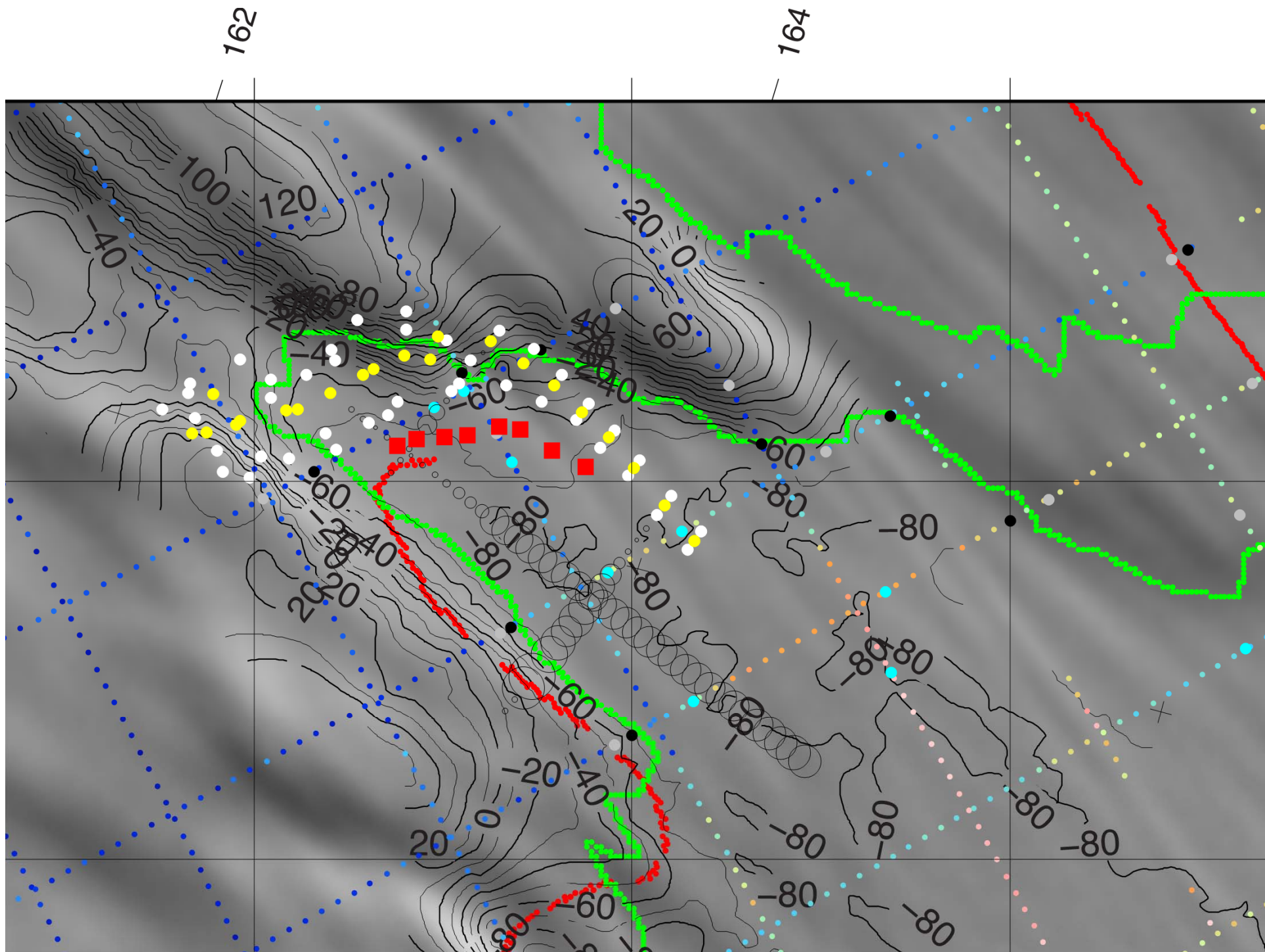
WGZ Crevasses Take Away

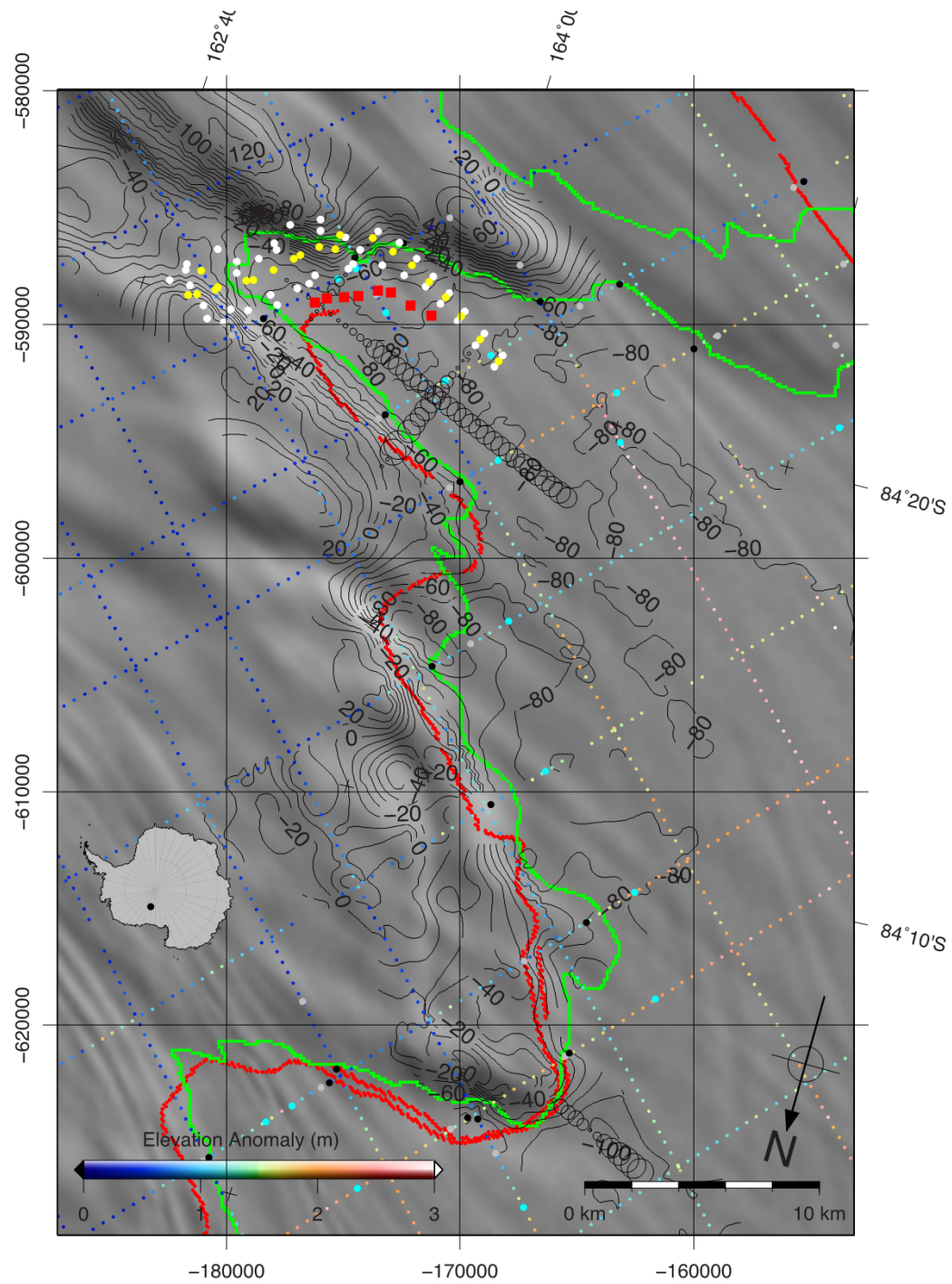
- **Crevasses provide a rich dataset for diagnosing stress state and salient processes across a grounding zone.**
- **Special care is needed in interpreting returns from a system with wide beam patterns where off-nadir targets can provide strong returns.**
- **At the same time, the off-nadir echoes can be exploited to provide an illuminating view of the world below.**

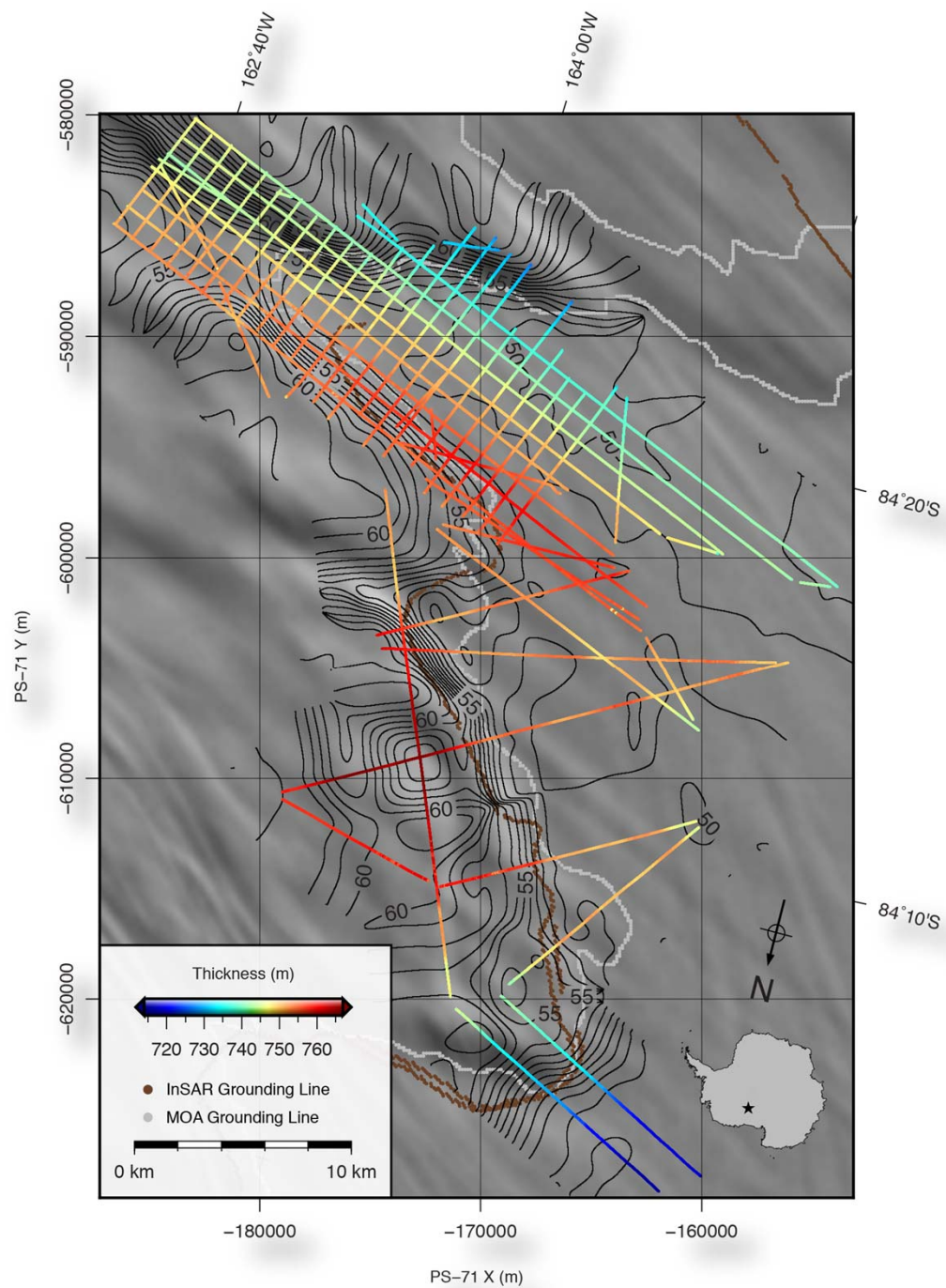


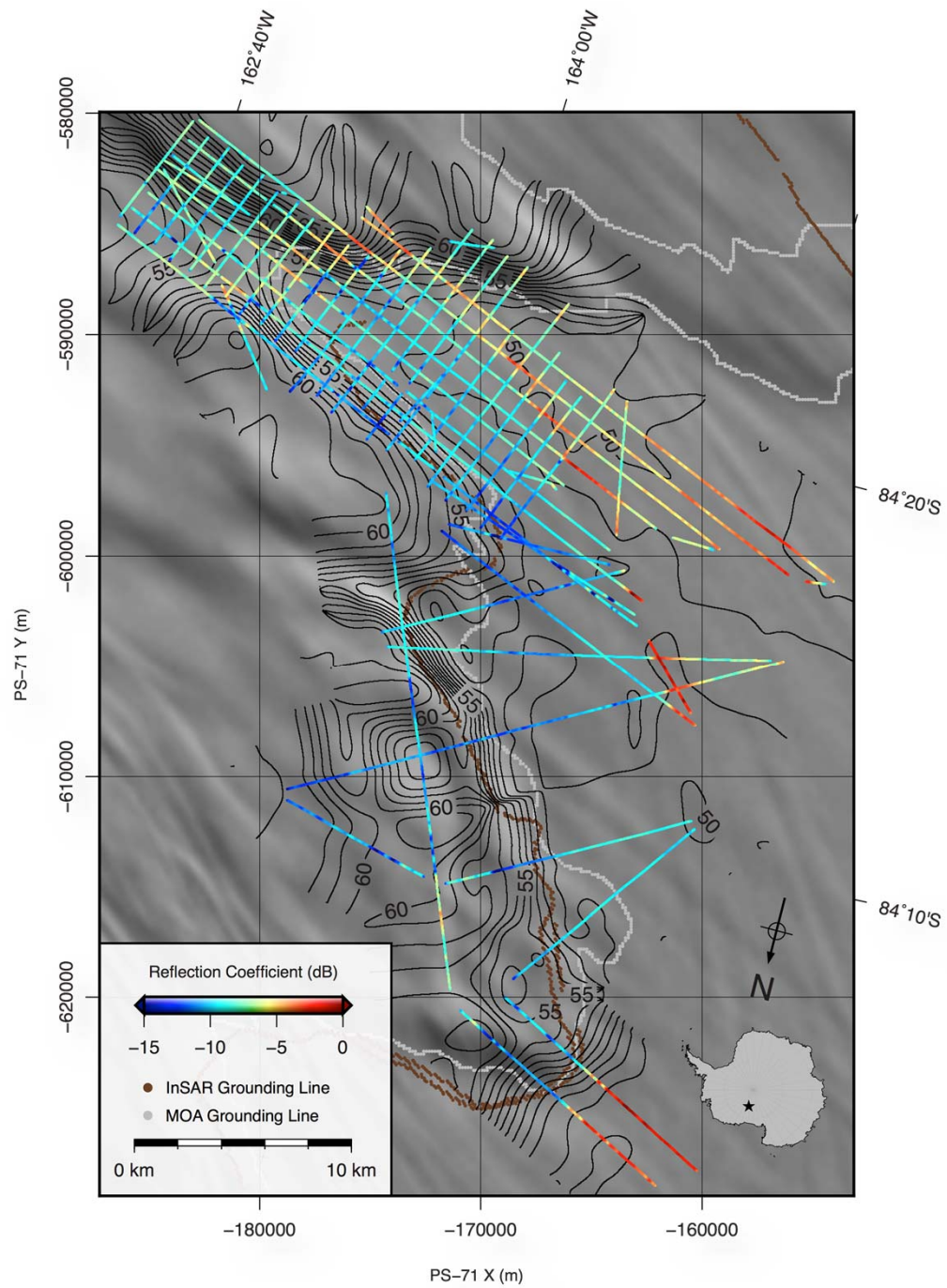
Wline1 Basal Crevasse

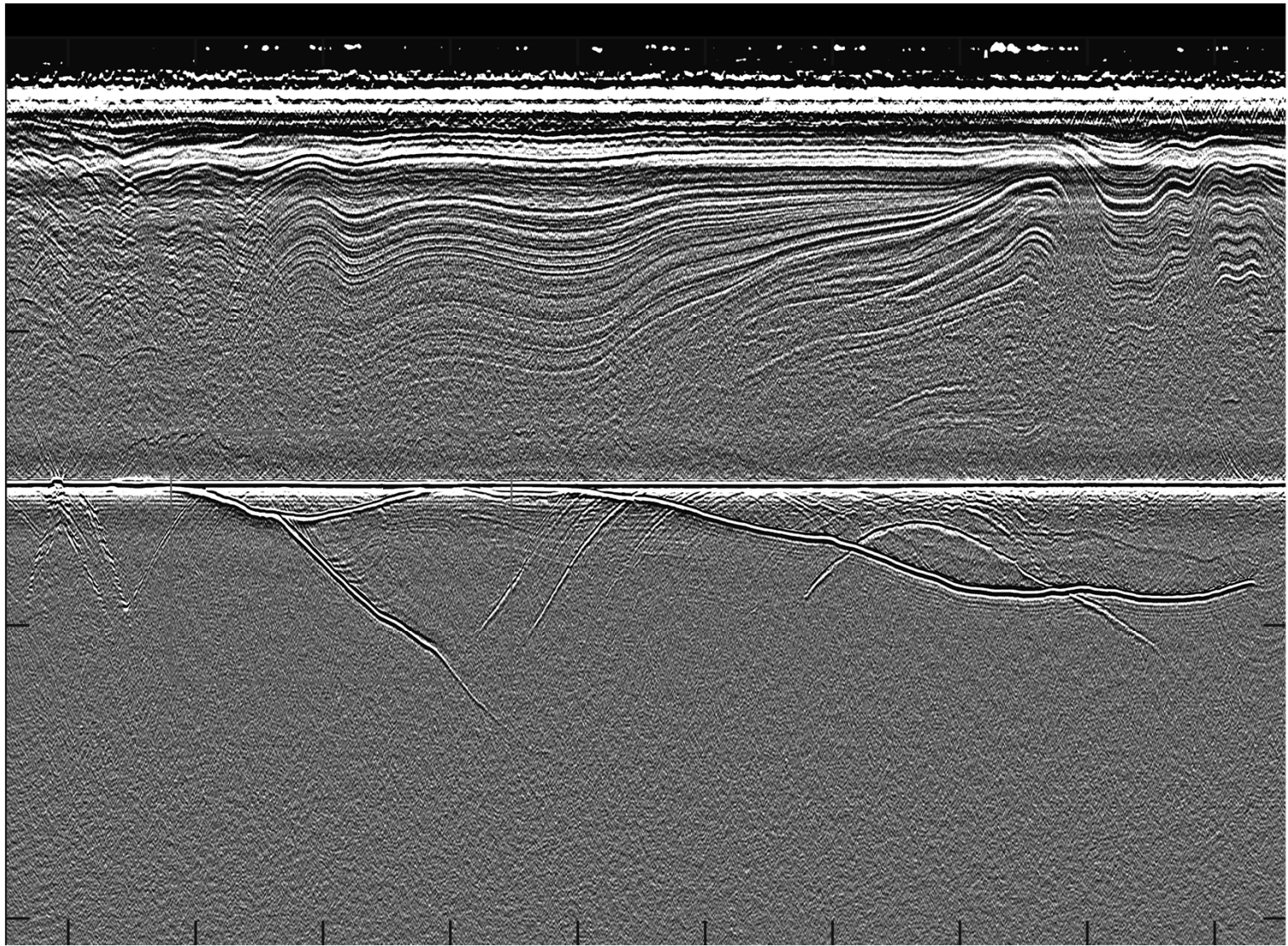


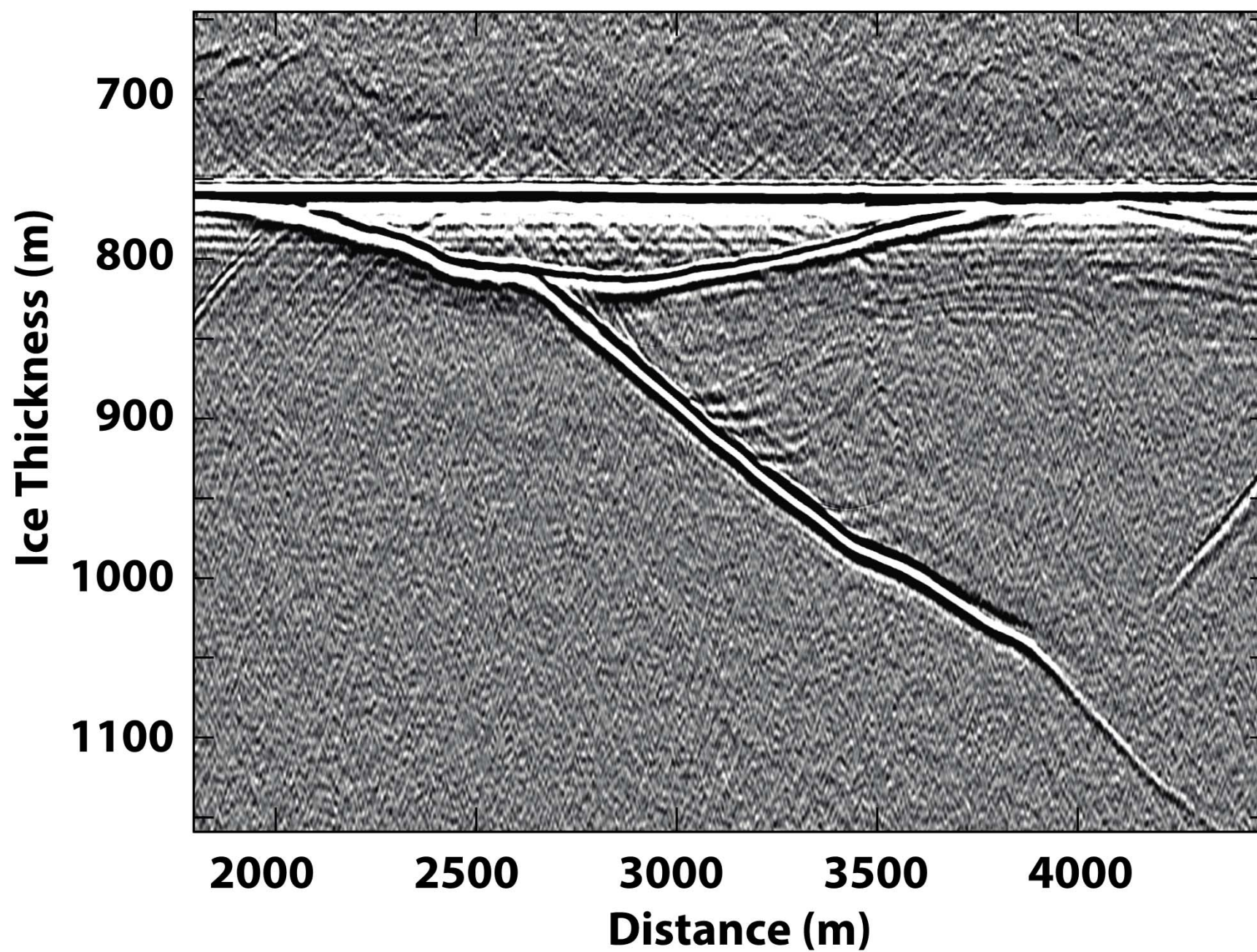


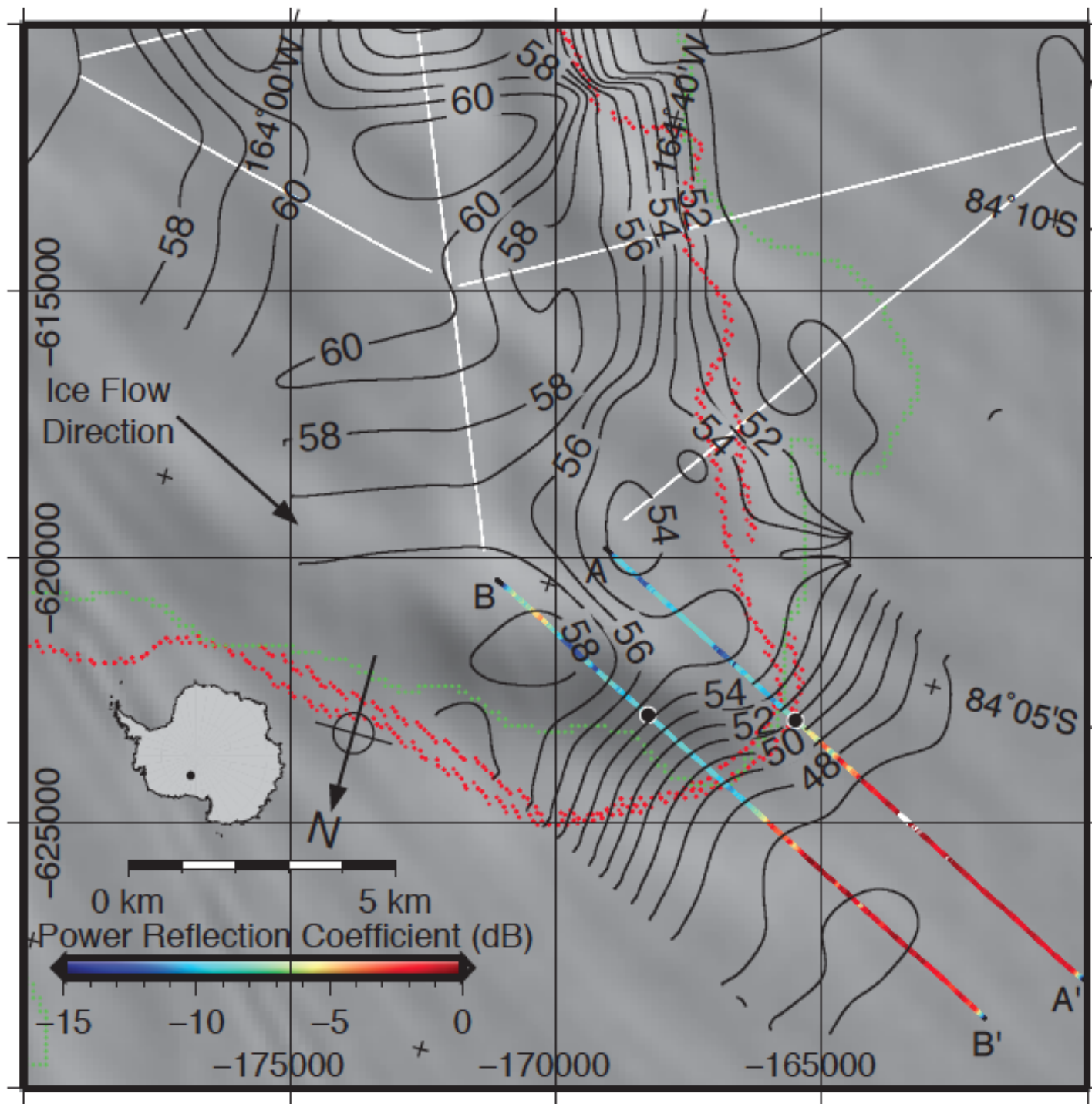


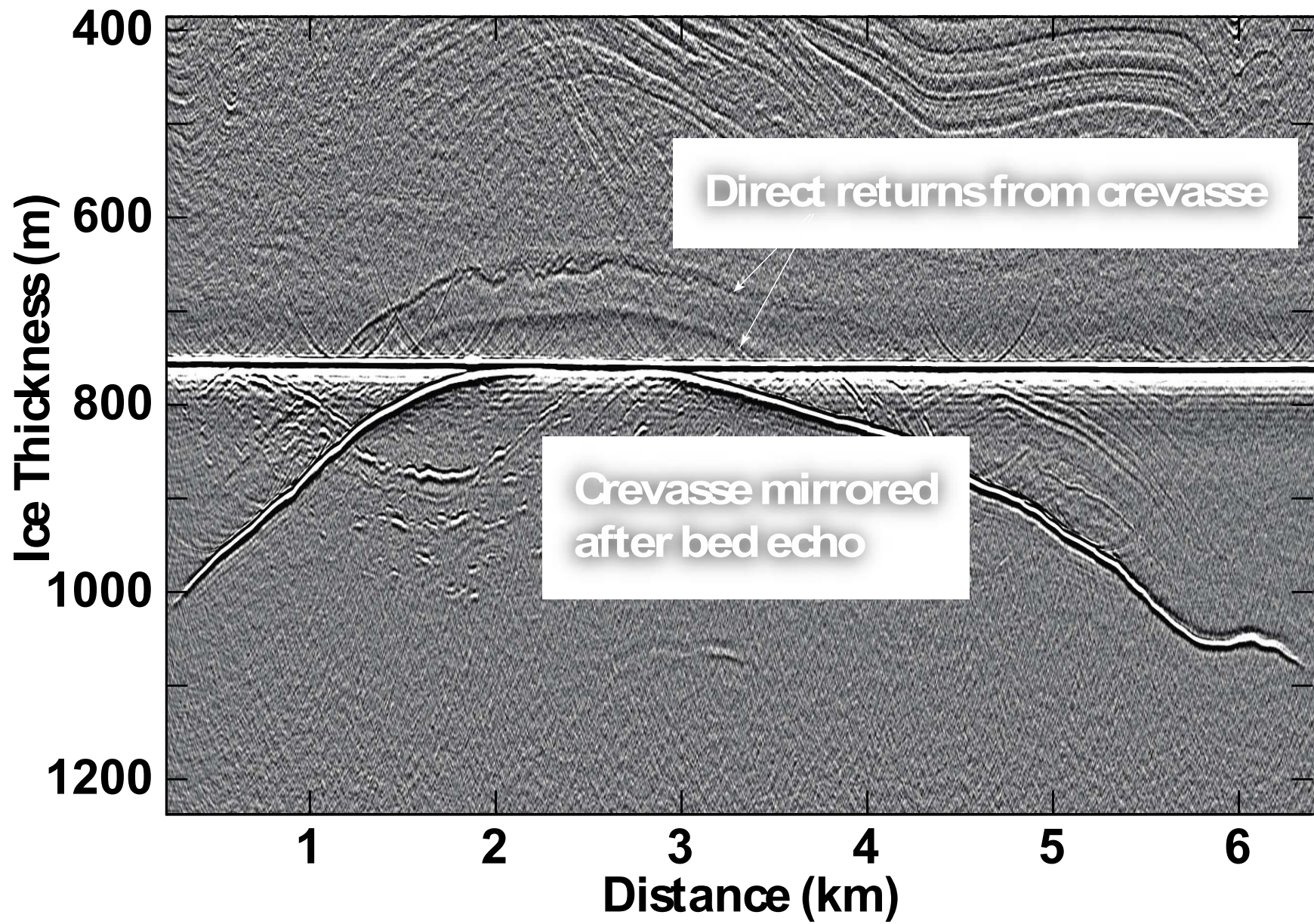


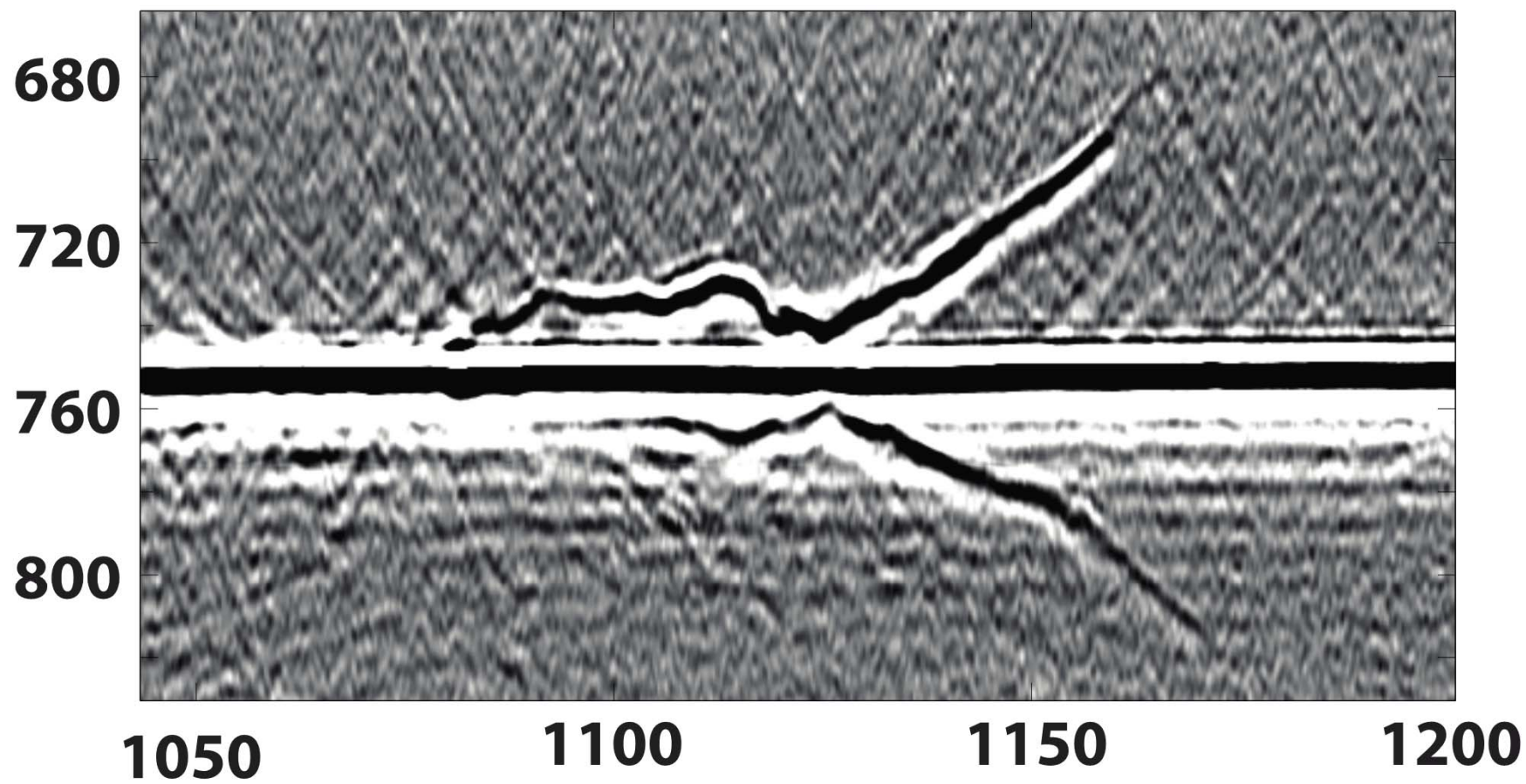


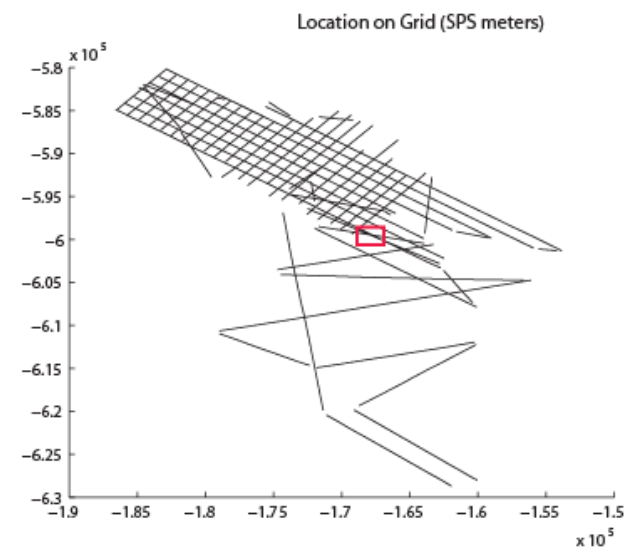
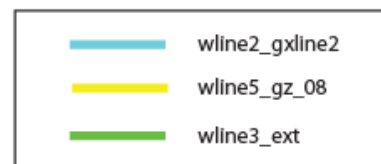
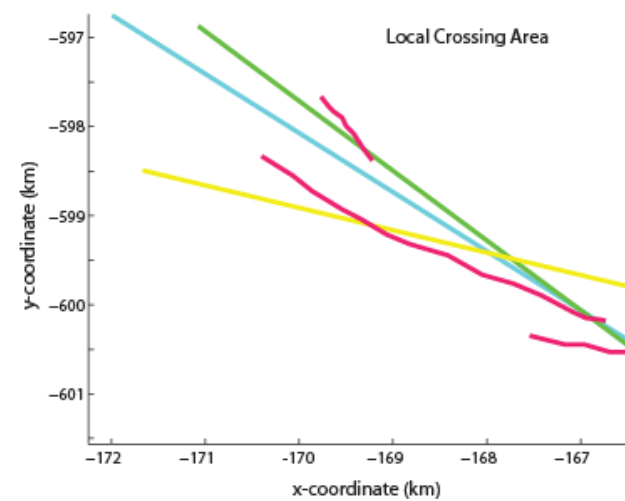
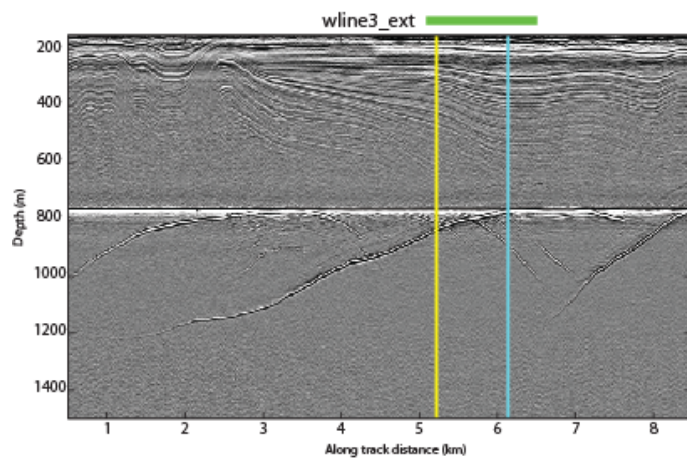
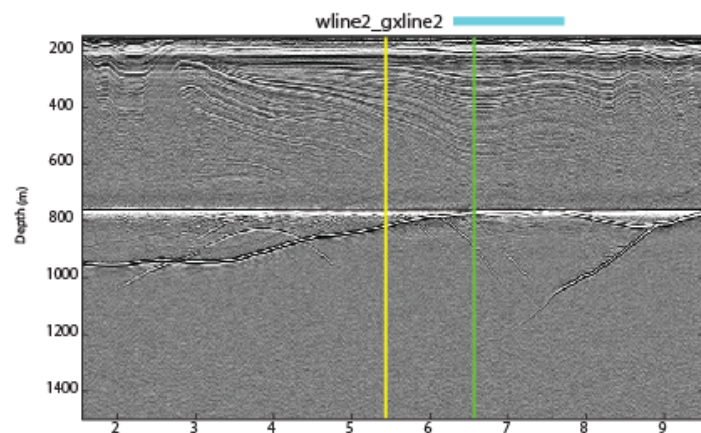
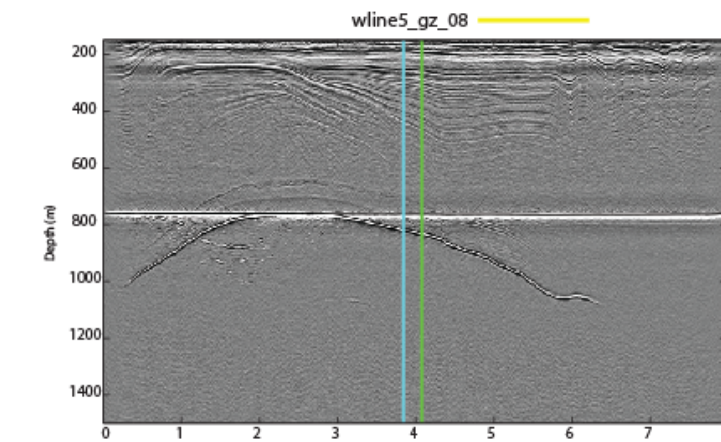


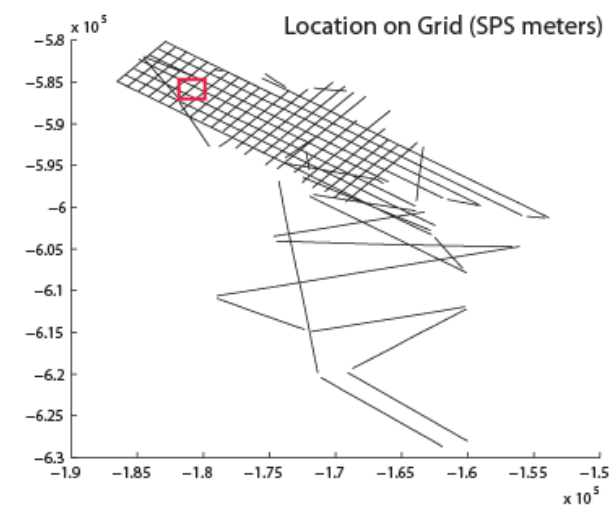
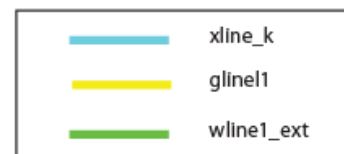
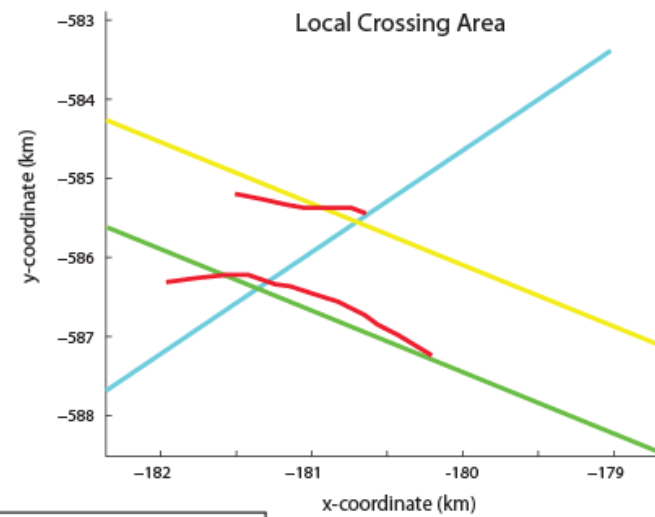
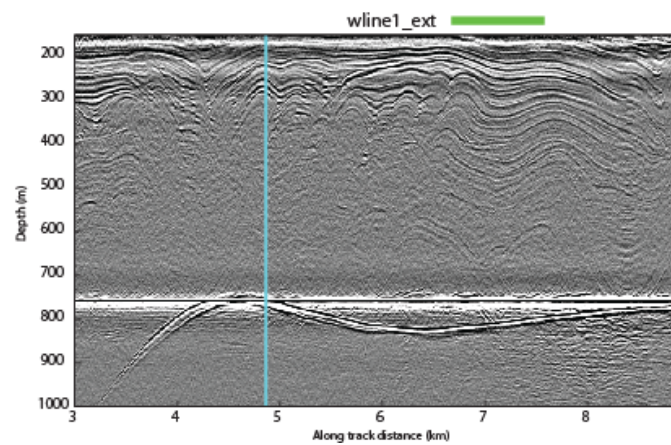
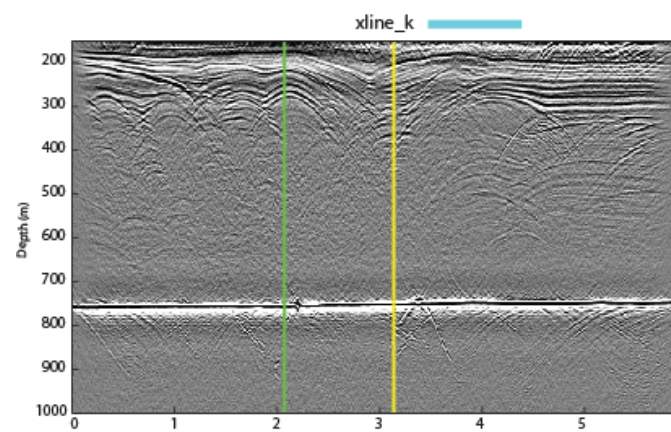
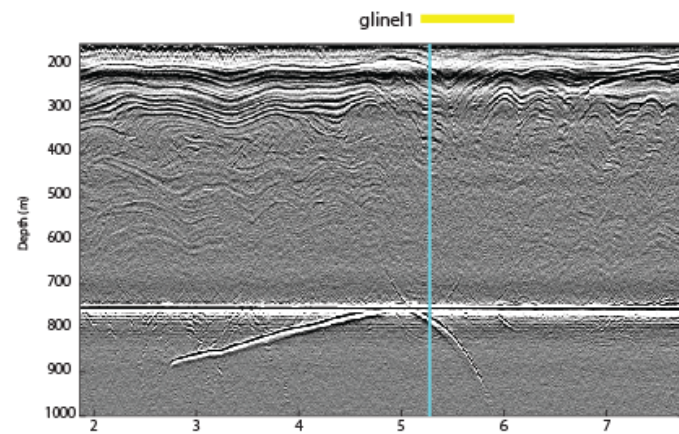




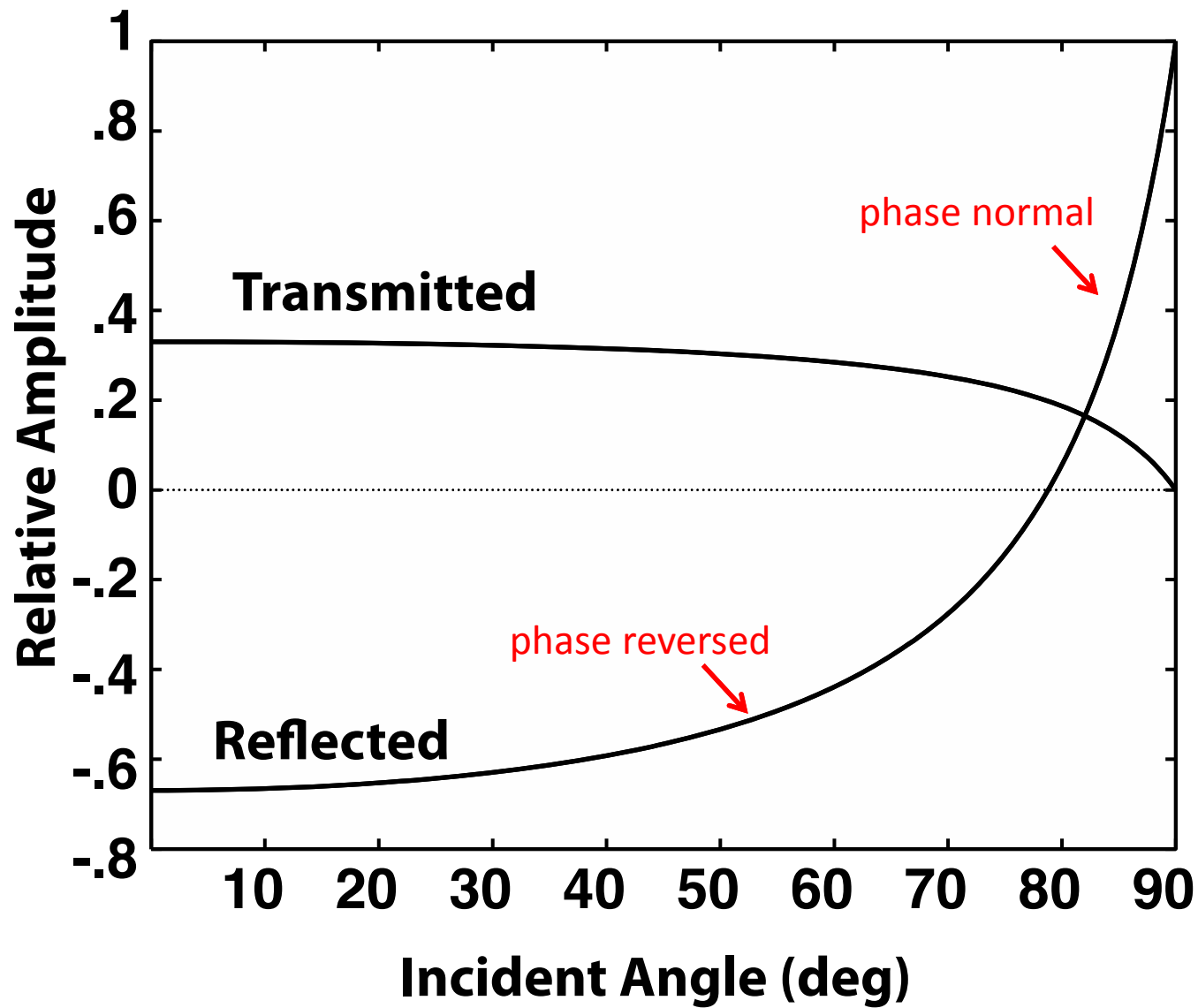




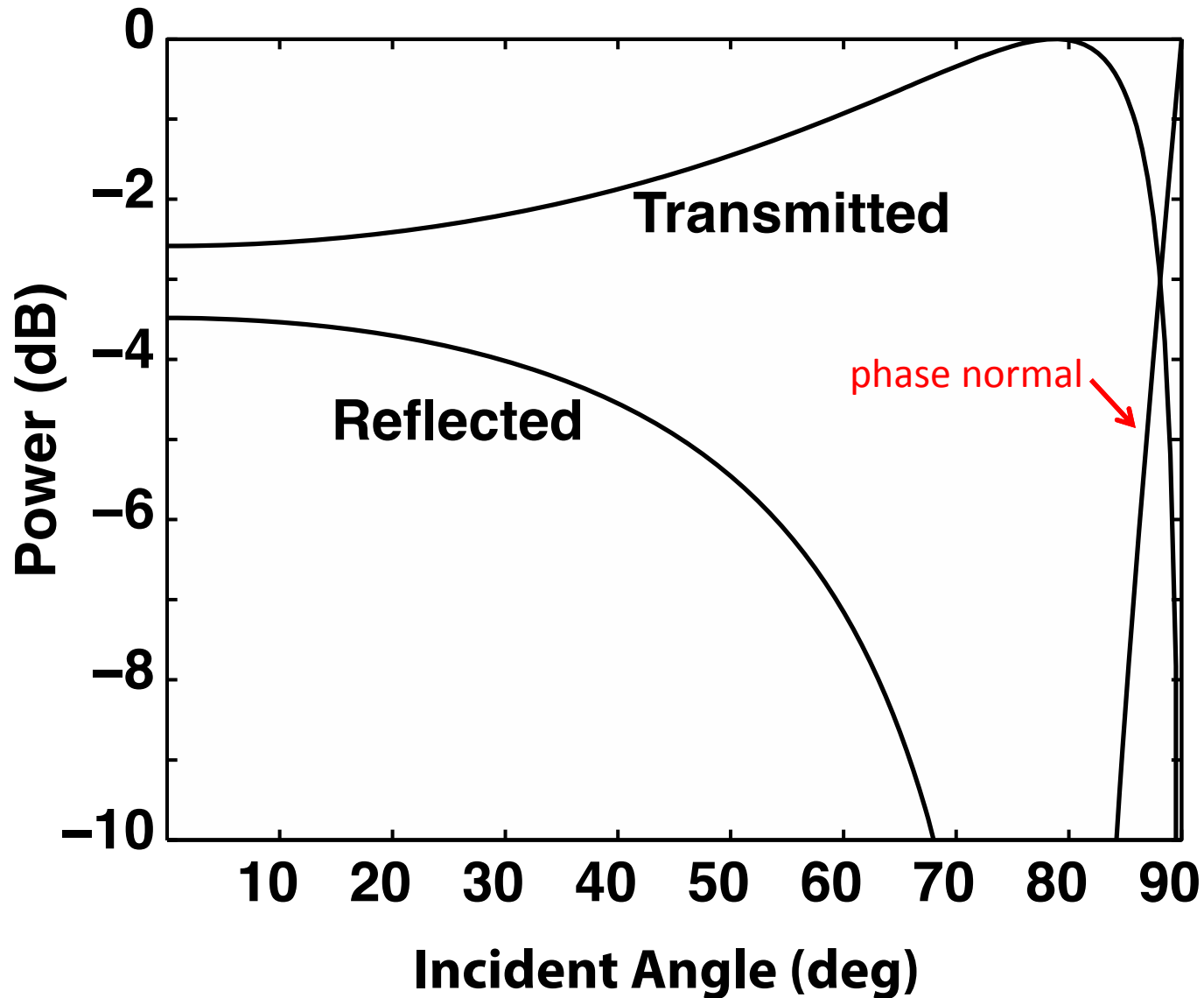




Fresnel Amplitude Ice-Water



Fresnel Power Ice-Water Interface



Mirror image of basal crevasse

