

Radar Studies on Kamb Ice Stream

– In the search for the mechanisms for the restart
an Ice Stream

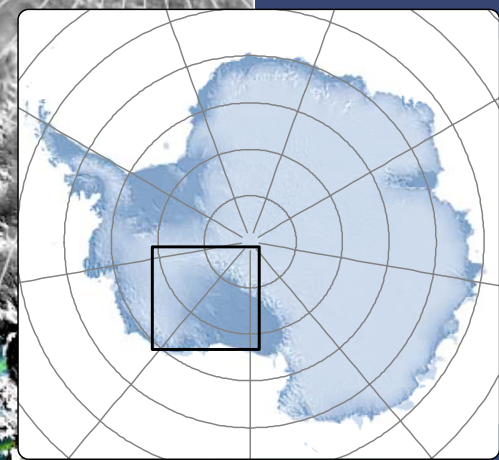
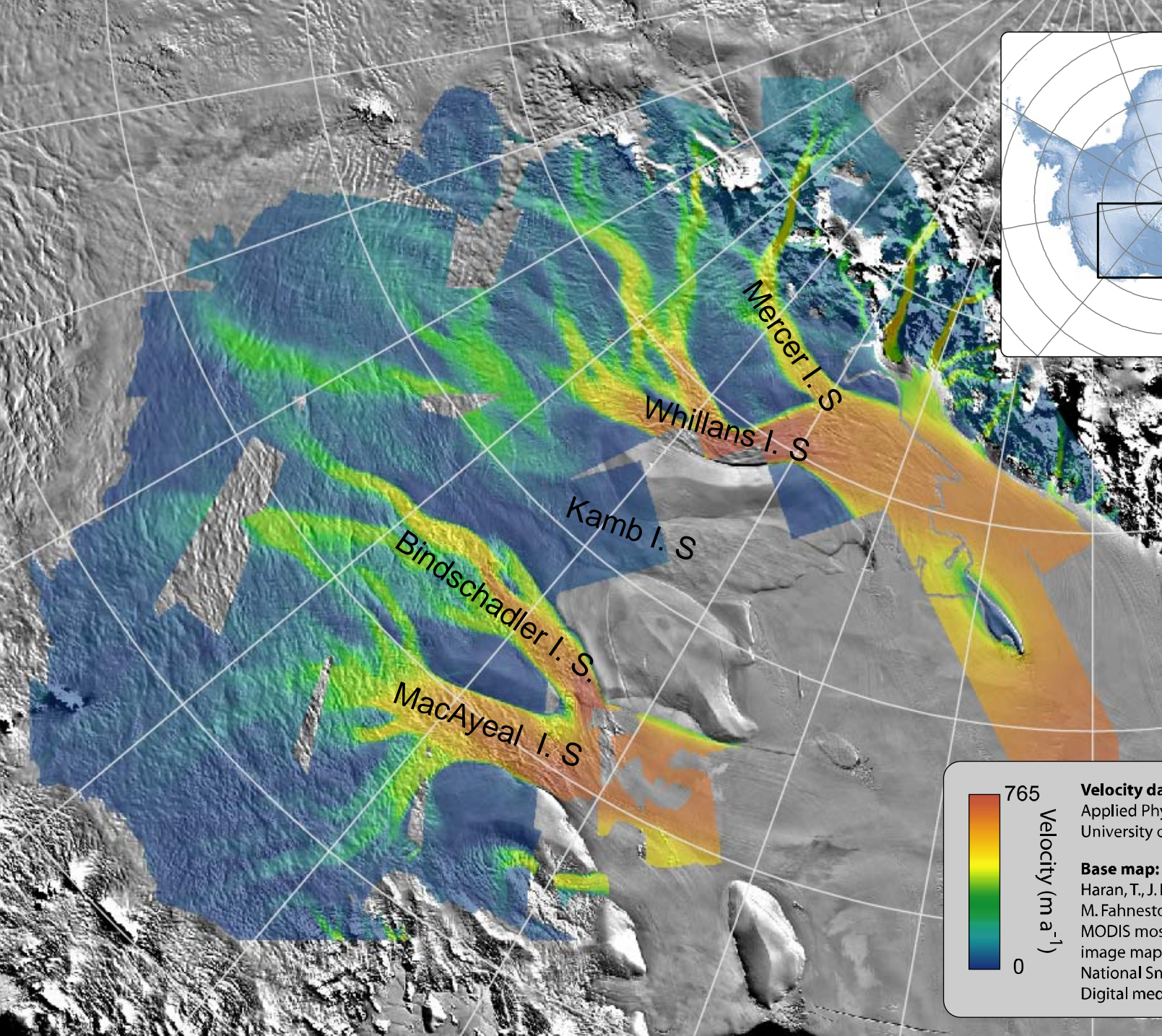
David Osterhouse, Andrea Mulhausen, **Rickard Pettersson**,
Brian Welch, and Robert Jacobel

Department of Physics
St. Olaf College
Northfield, MN, USA



Funding provided by
NSF grant 0337567



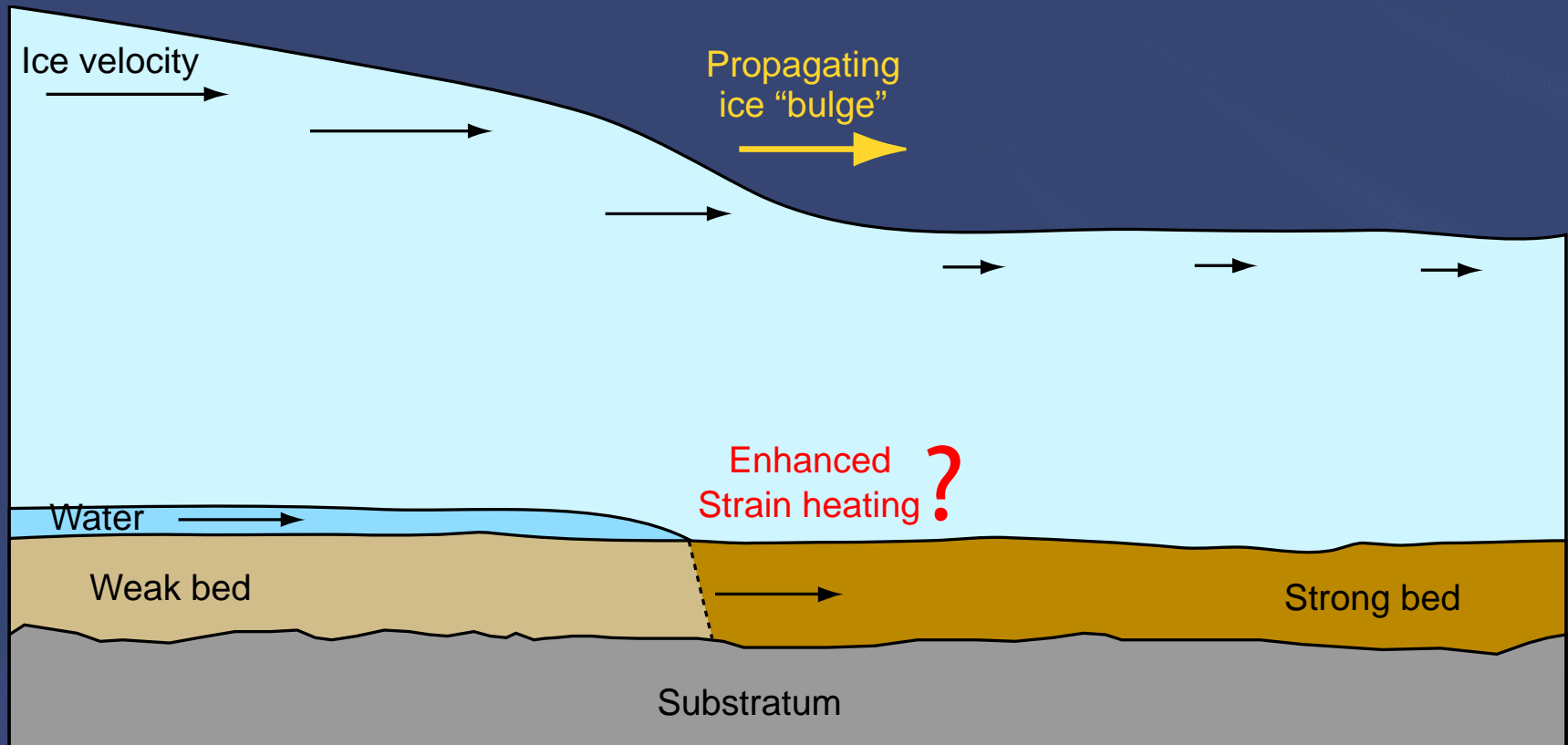


765
Velocity (m a⁻¹)
0

Velocity data: Ian Joughin, Applied Physics Laboratory, University of Washington

Base map: MODIS imagery. Haran, T., J. Bohlander, T. Scambos, and M. Fahnestock compilers. 2005. MODIS mosaic of Antarctica (MOA) image map. Boulder, CO, USA: National Snow and Ice Data Center. Digital media.

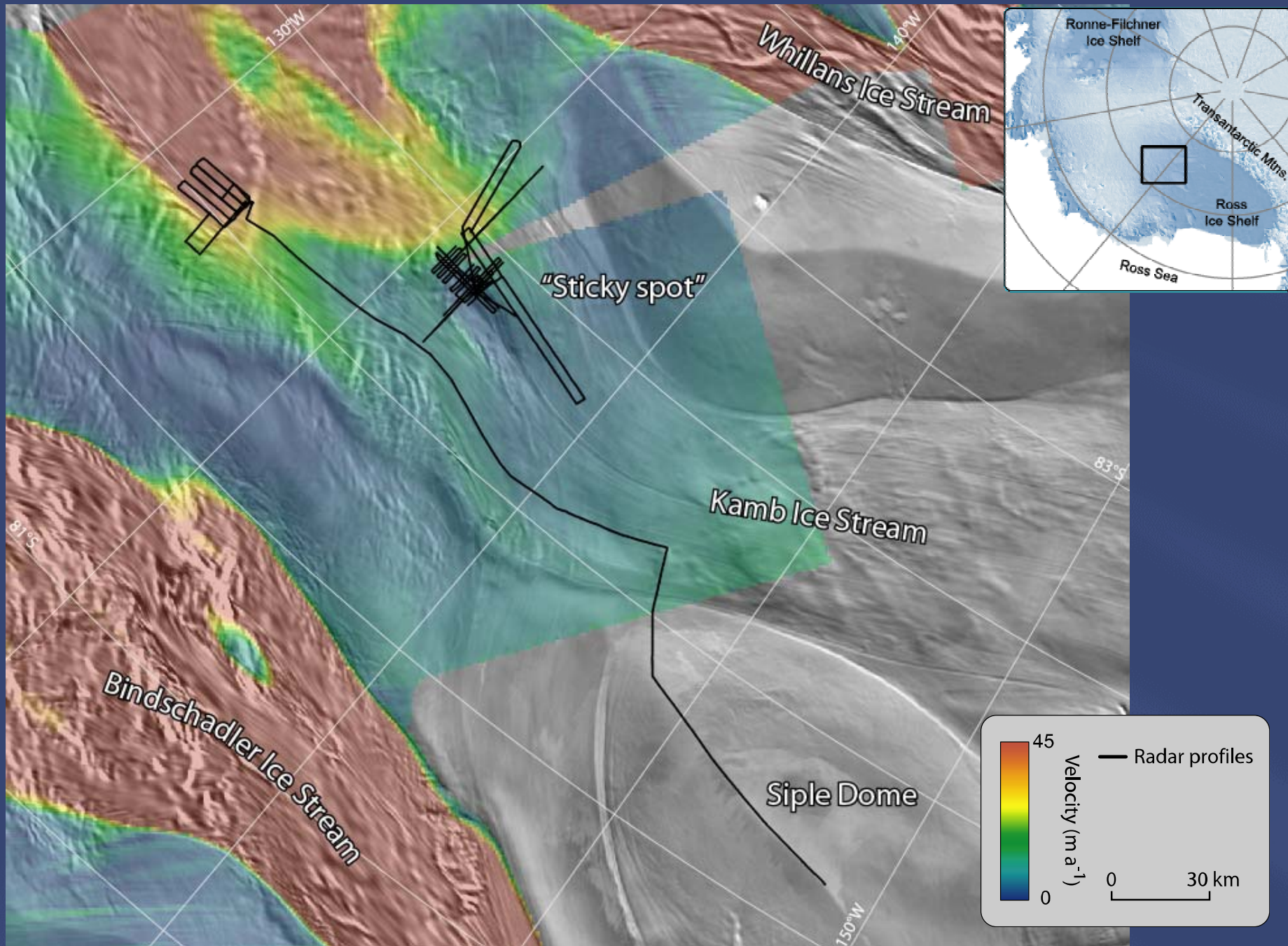
Restarting of an Ice Stream?

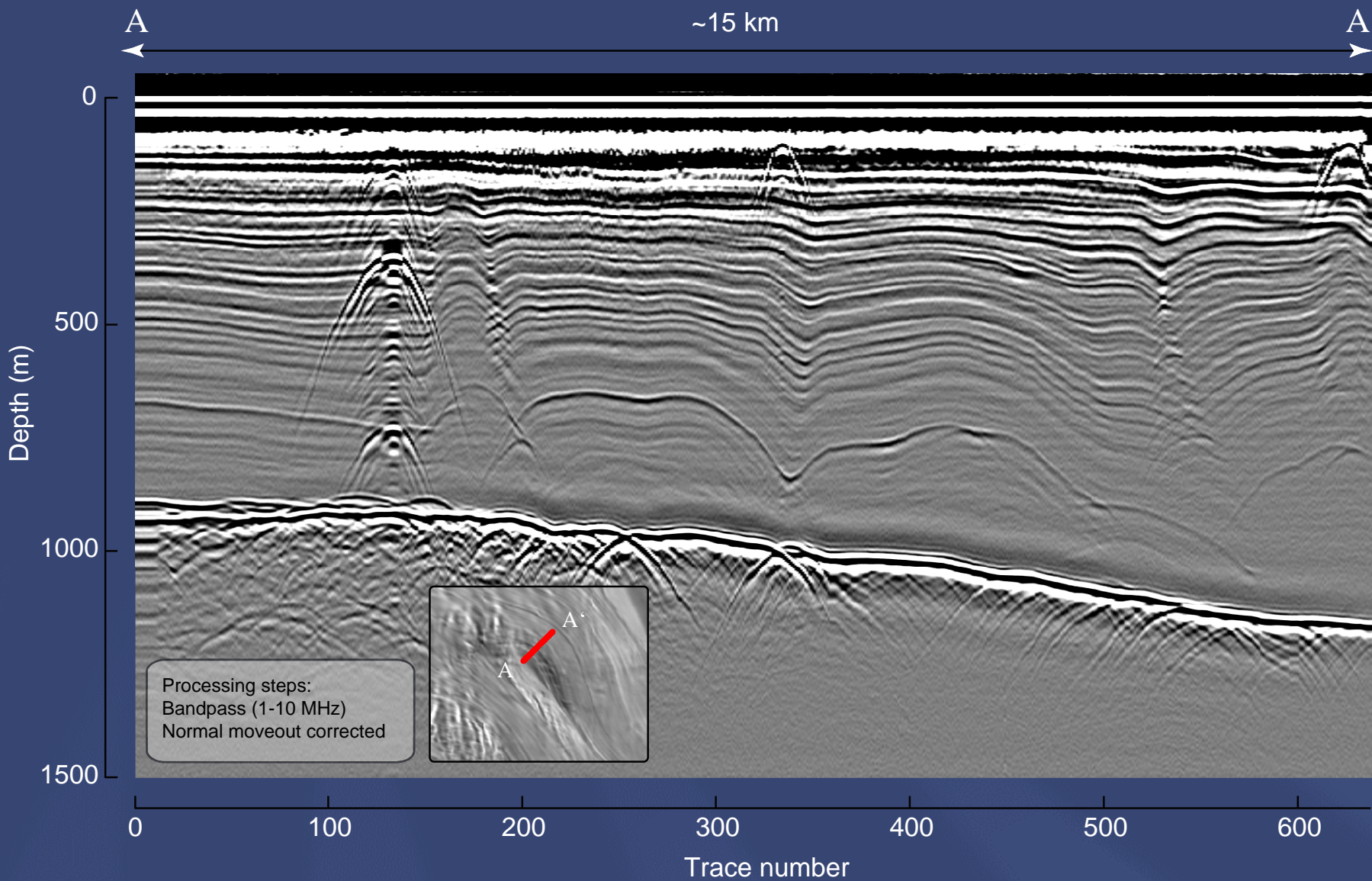


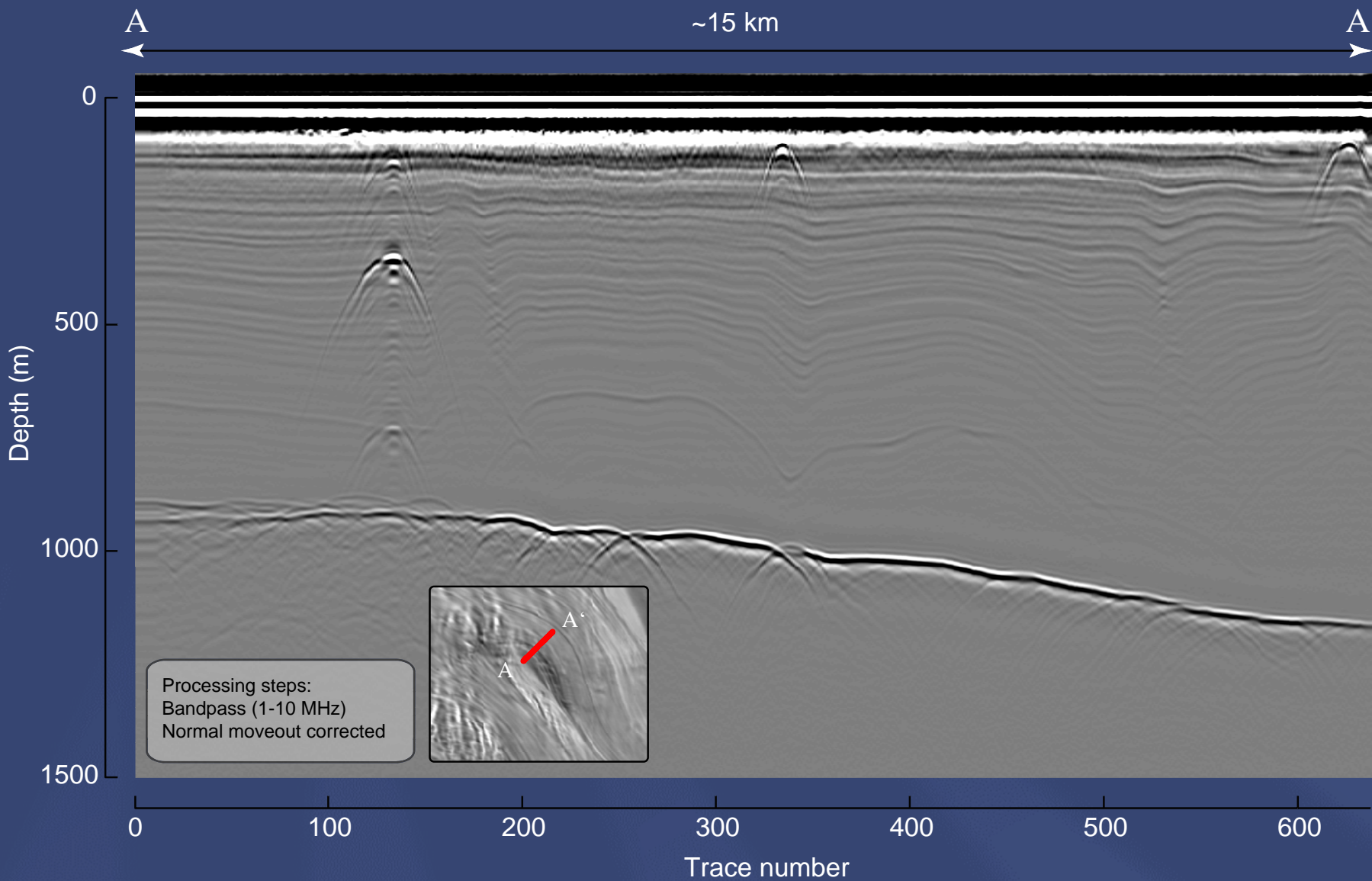
Collected data

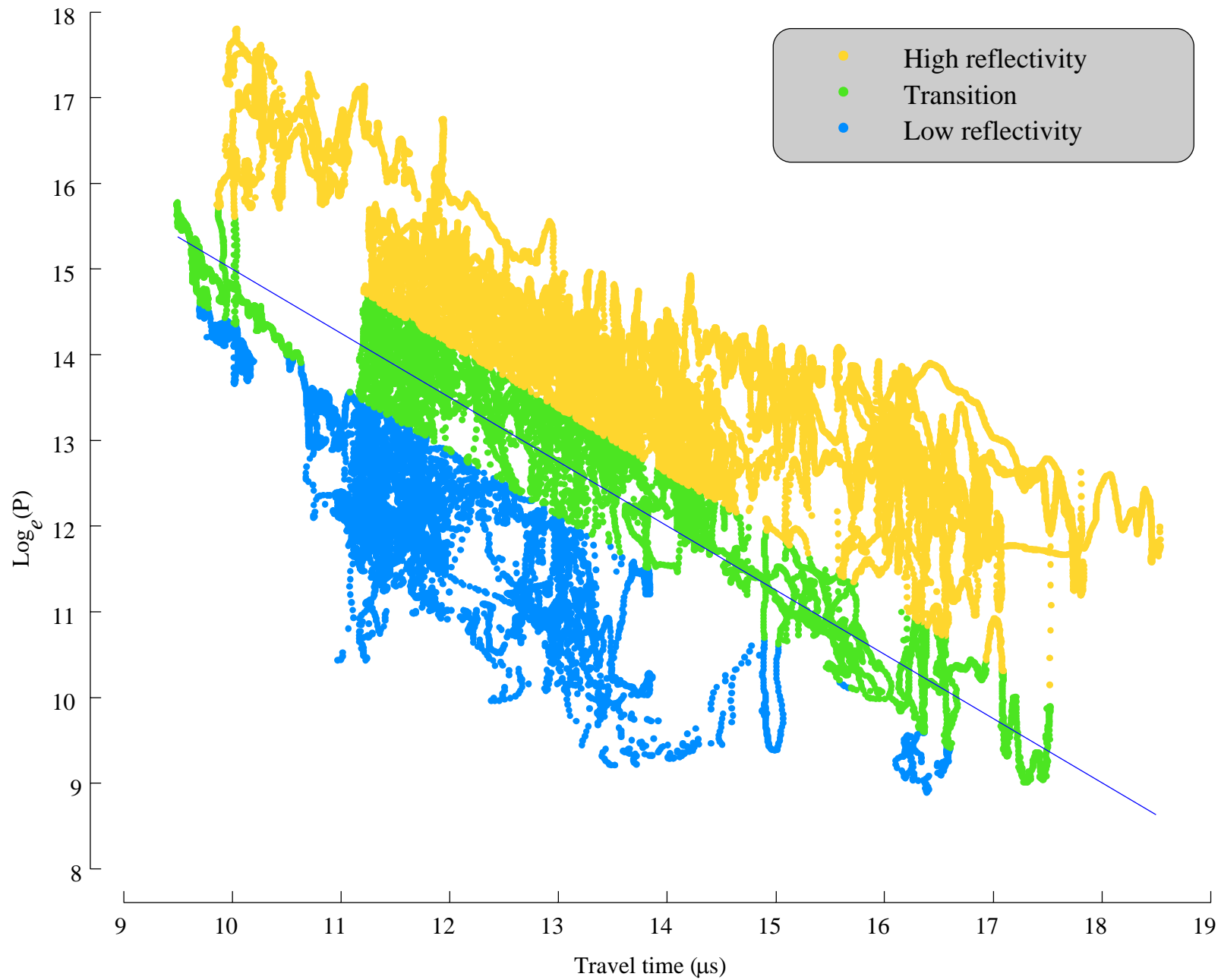
- GPS measurements
 - Velocity measurements in strain grids
- Radio-echo common mid-point (CMP) gathers
 - EM-wave speed and attenuation
- Radio-echo common offset (profiling) surveys
 - Detailed bed topography
 - Radio-echo reflectivity studies

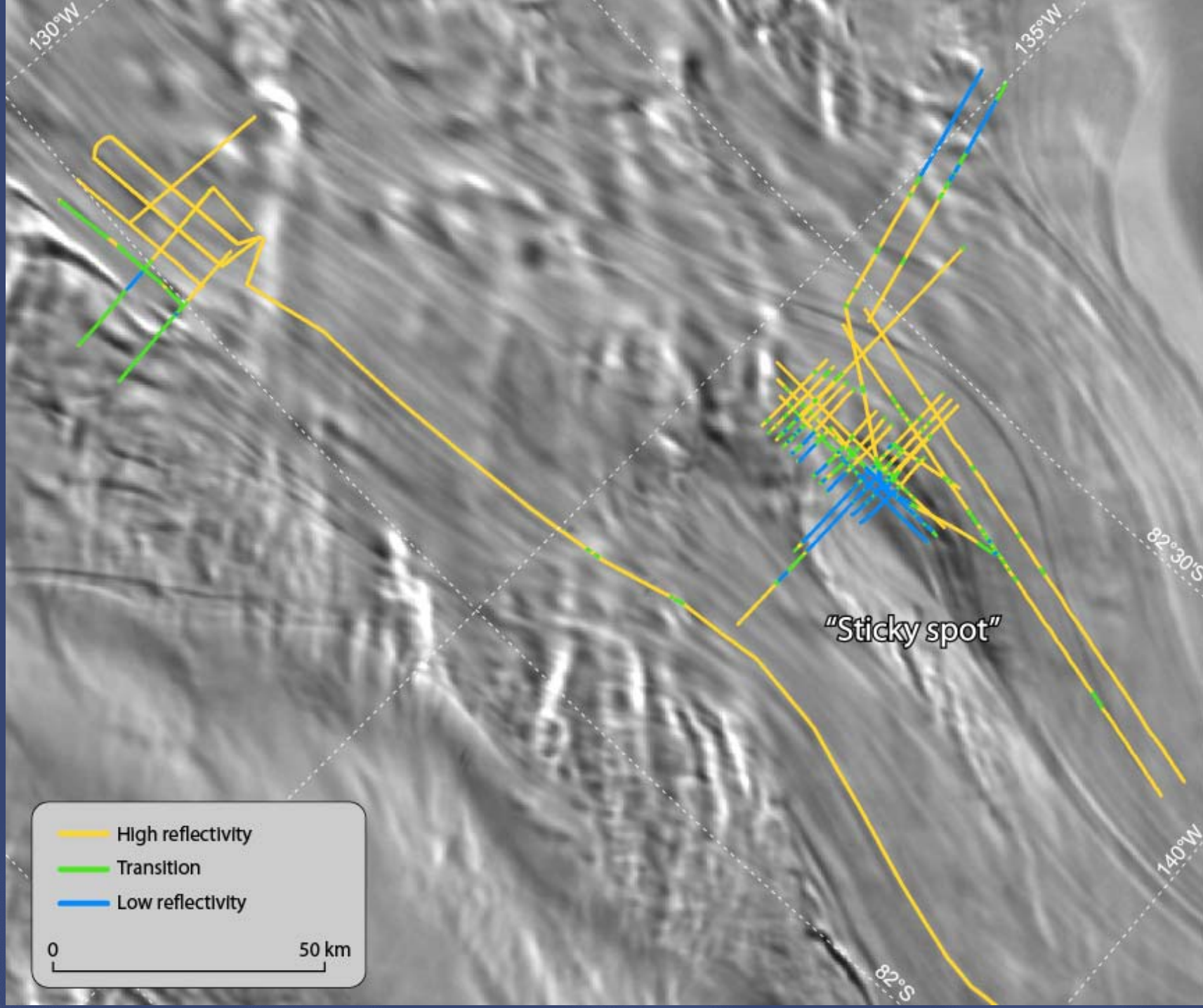








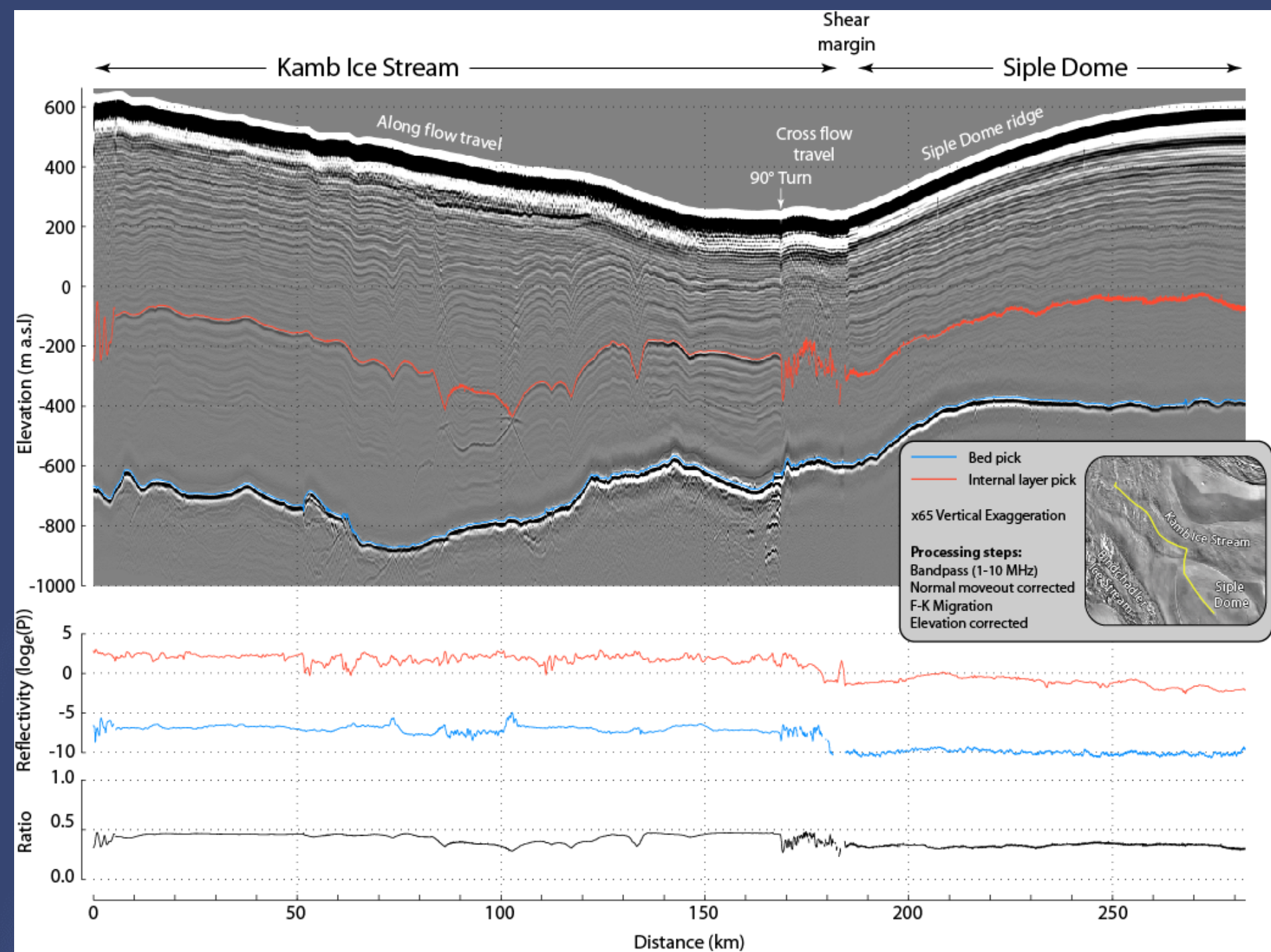




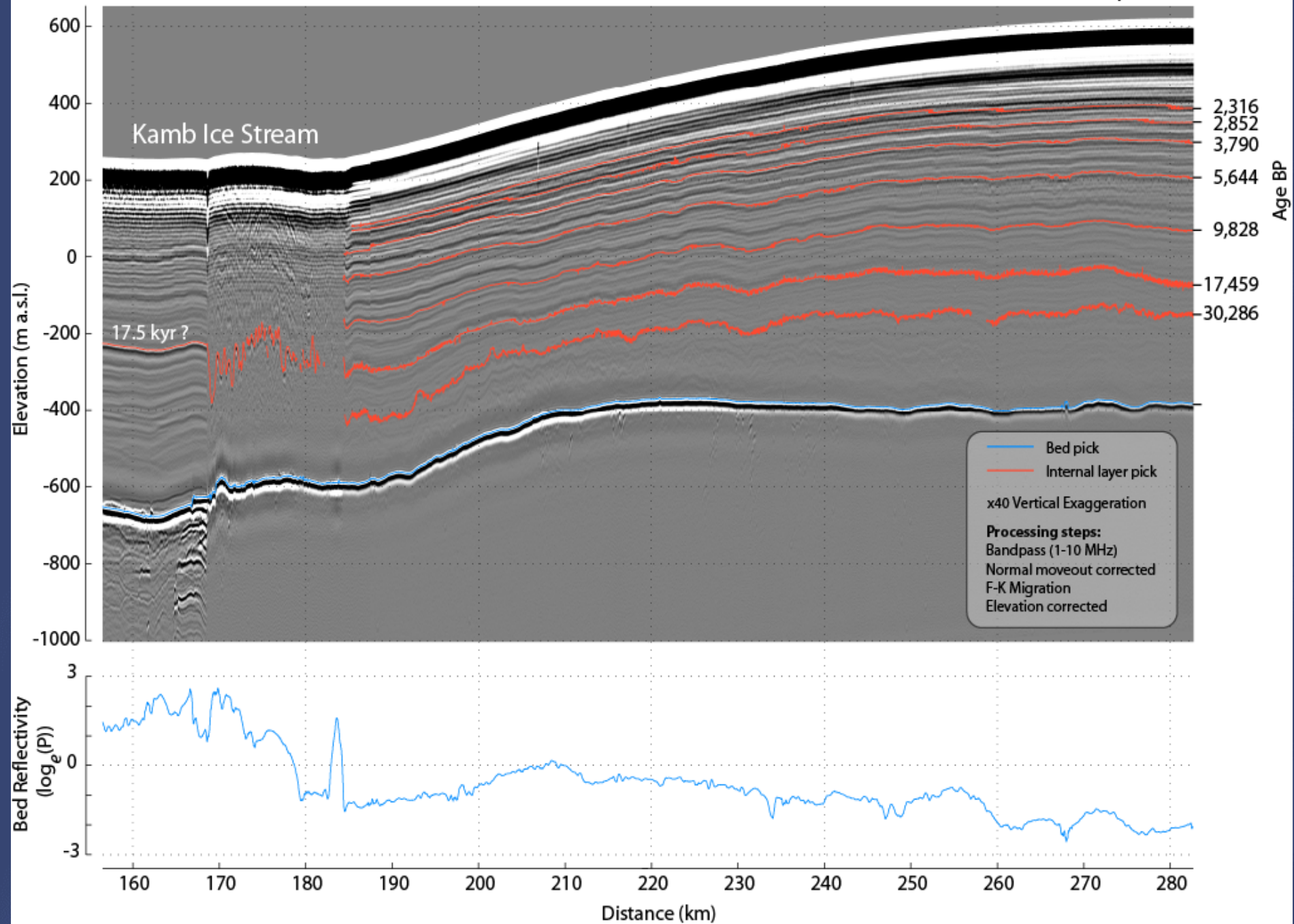
- High reflectivity
- Transition
- Low reflectivity

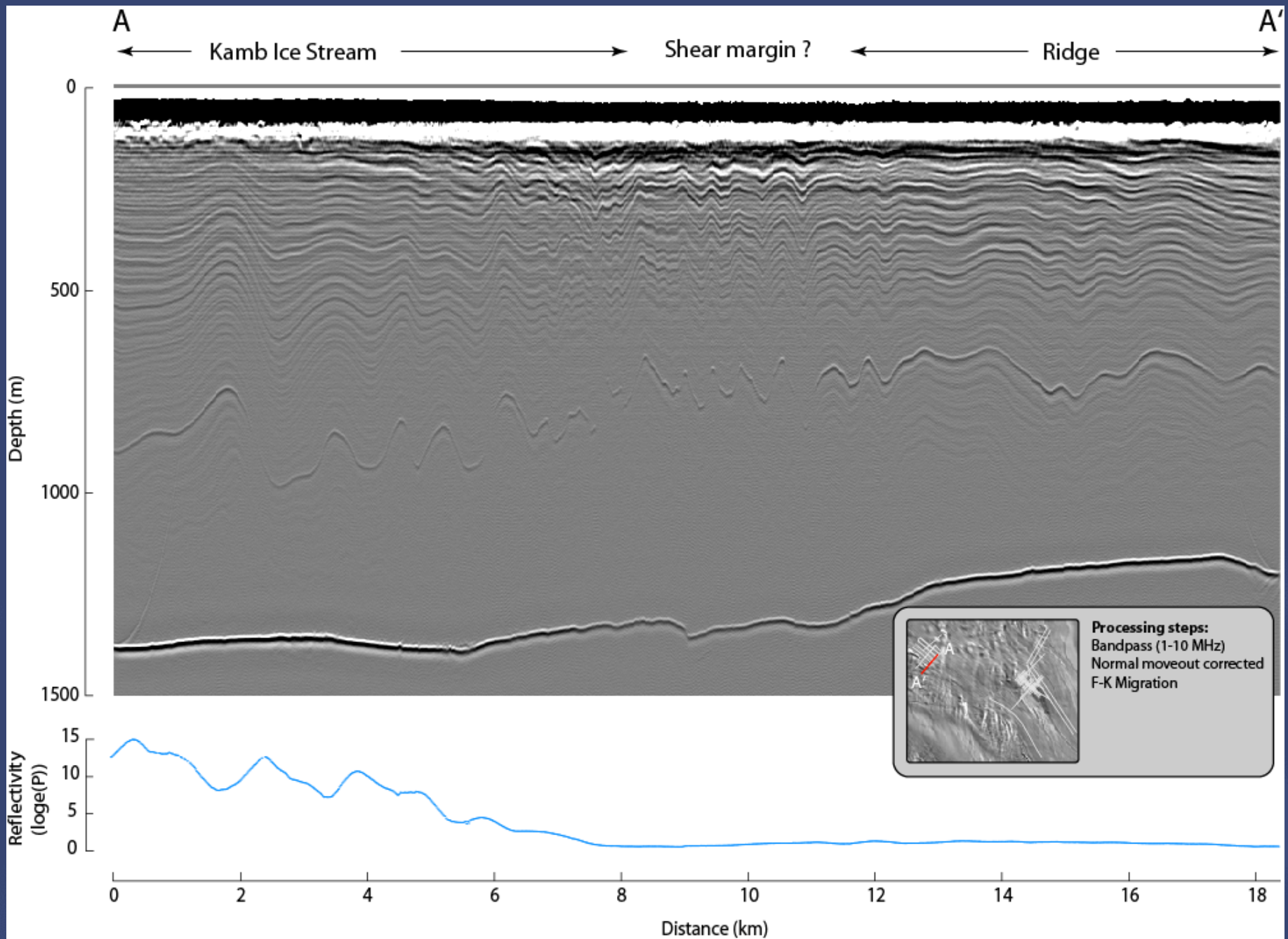
0 50 km

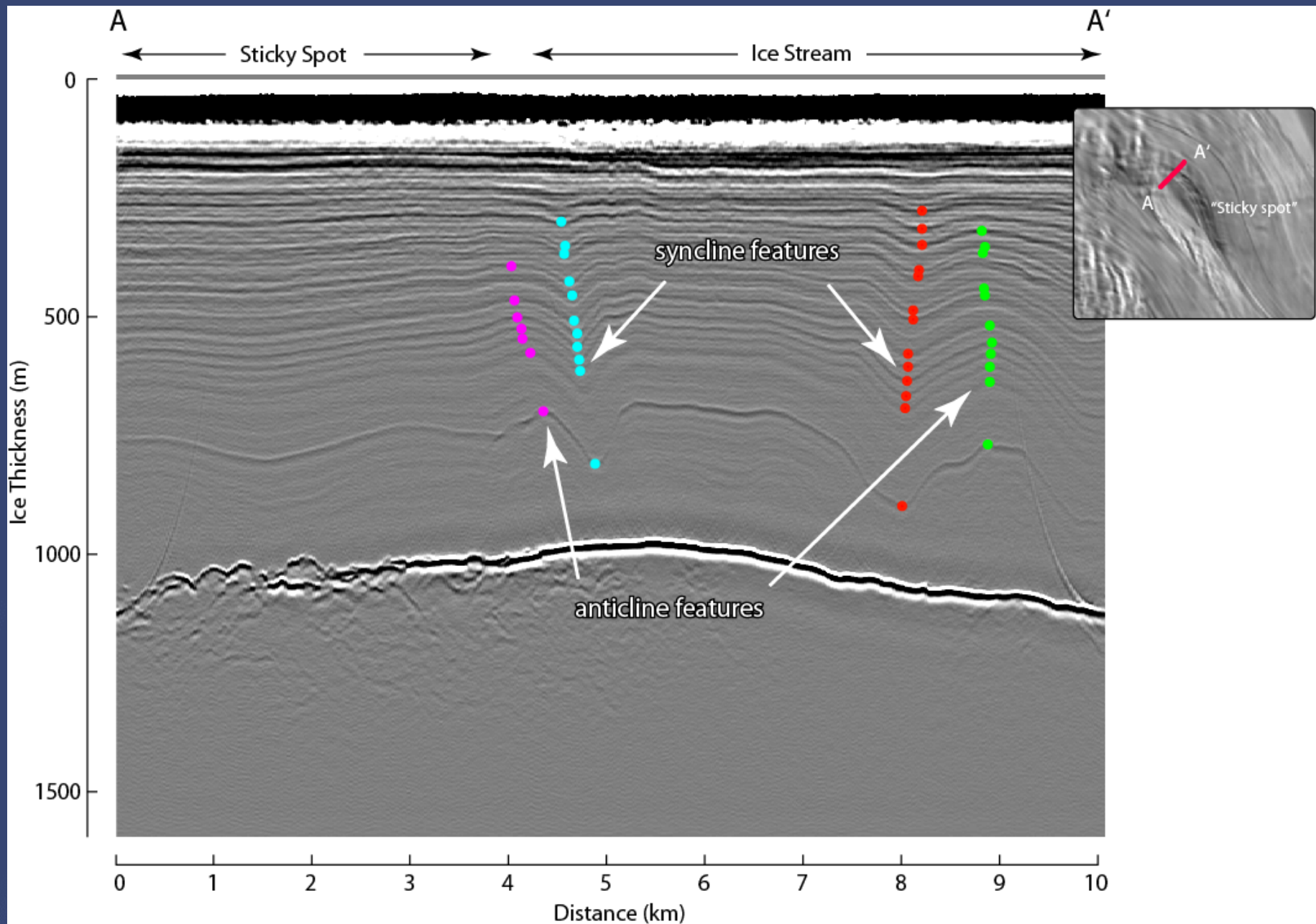
"Sticky spot"



Siple Dome







Anticline curving
to North of Sticky Spot

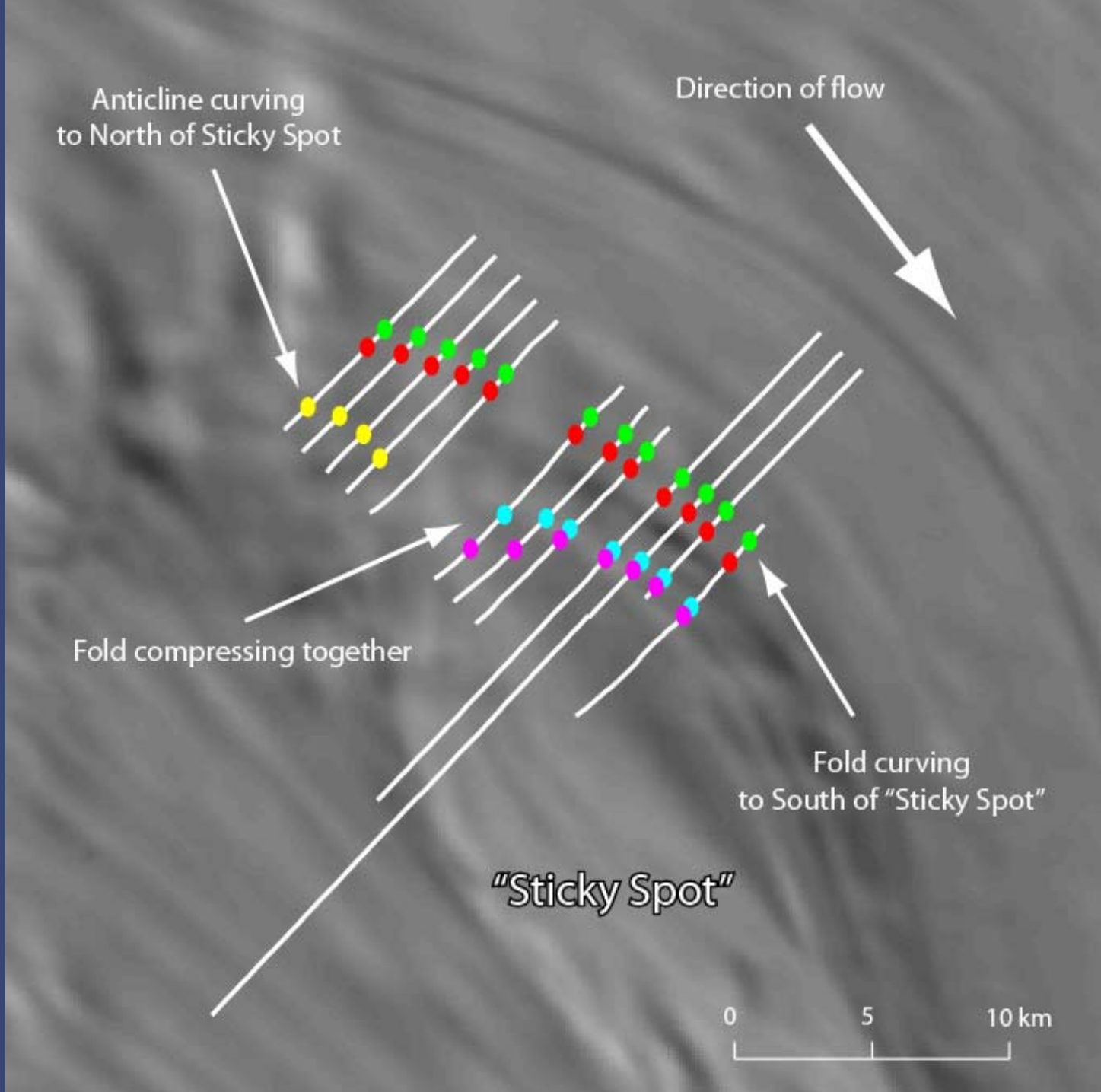
Direction of flow

Fold compressing together

Fold curving
to South of "Sticky Spot"

"Sticky Spot"

0 5 10 km



Summary

- ~1600 km of radio-echo sounding data and four CMPs.
- Bed reflectivity is generally high in the ice stream and low at the “sticky spot” and beyond margins.
- Not able to convincingly tie the internal stratigraphy in the ice stream to the dated Siple Dome ice core.
- 3D mapping of internal folds around the “sticky spot”. Comparison with older data will allow us to depict strain history at these sites.