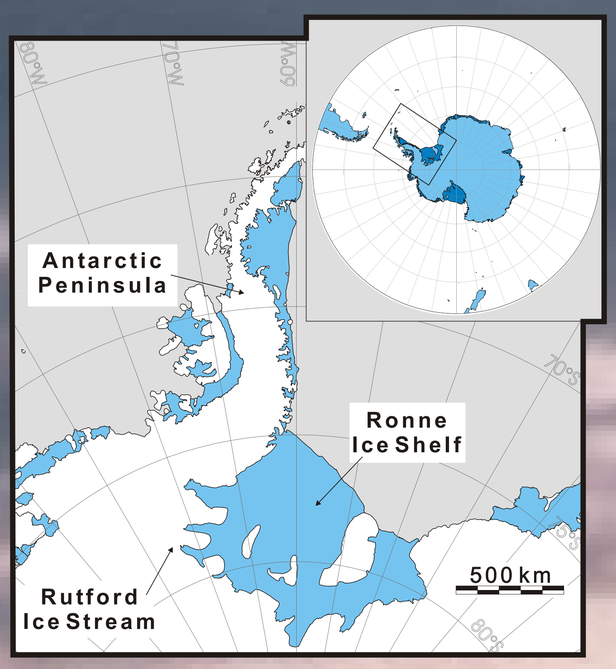
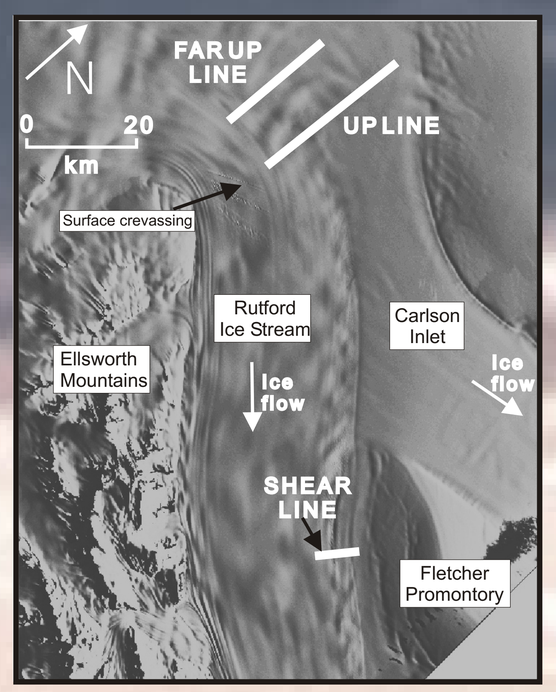
Onset regions, Shear margins & Basal conditions: Observations from Rutford Ice Stream

*Andy Smith**
Ed King
John Woodward

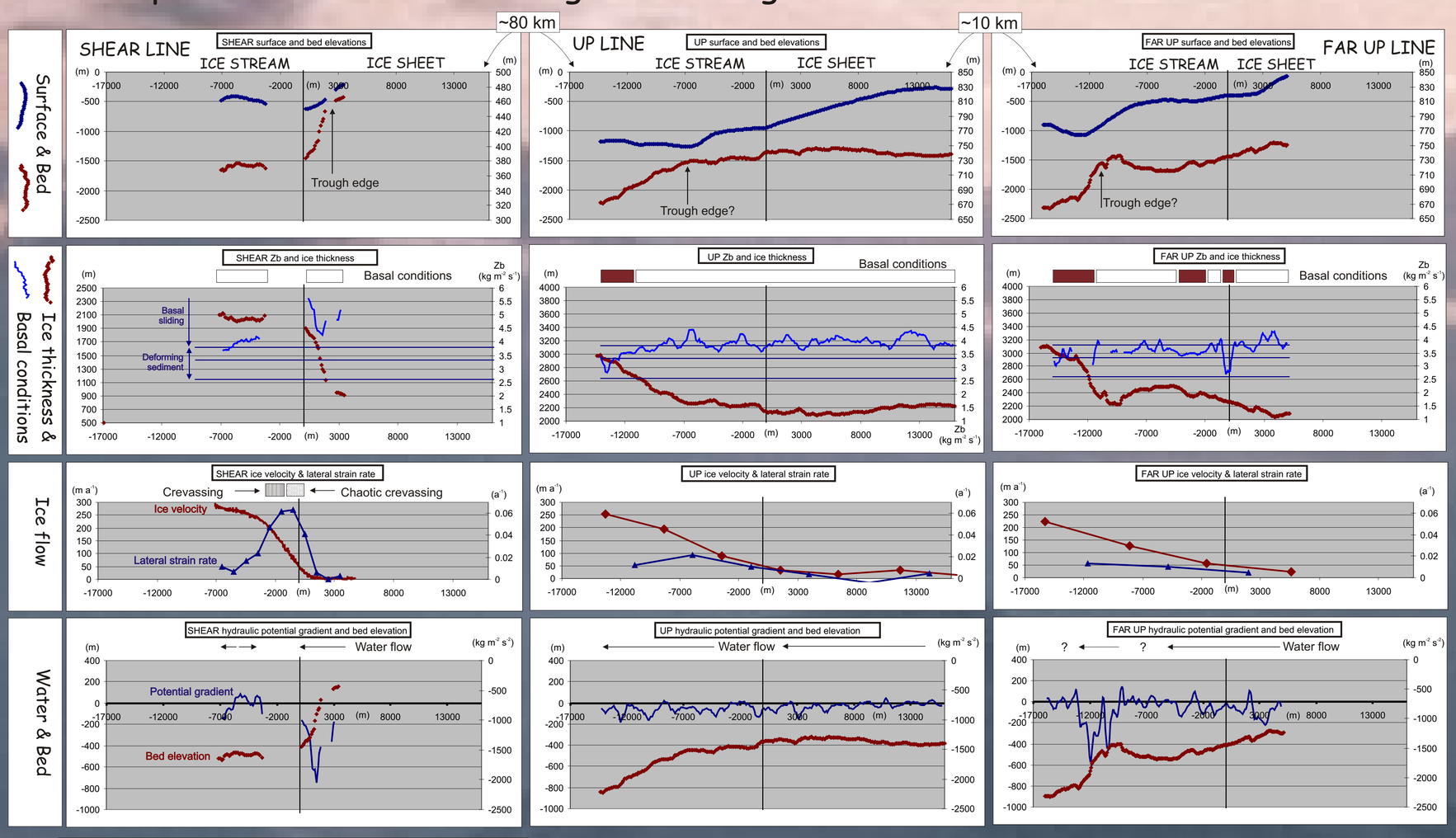
British Antarctic Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL



Ice streams control ice sheet evolution
Why are onset regions where they are?
Why do shear margins form where they do?
How do shear margins evolve?
What role do basal conditions play?

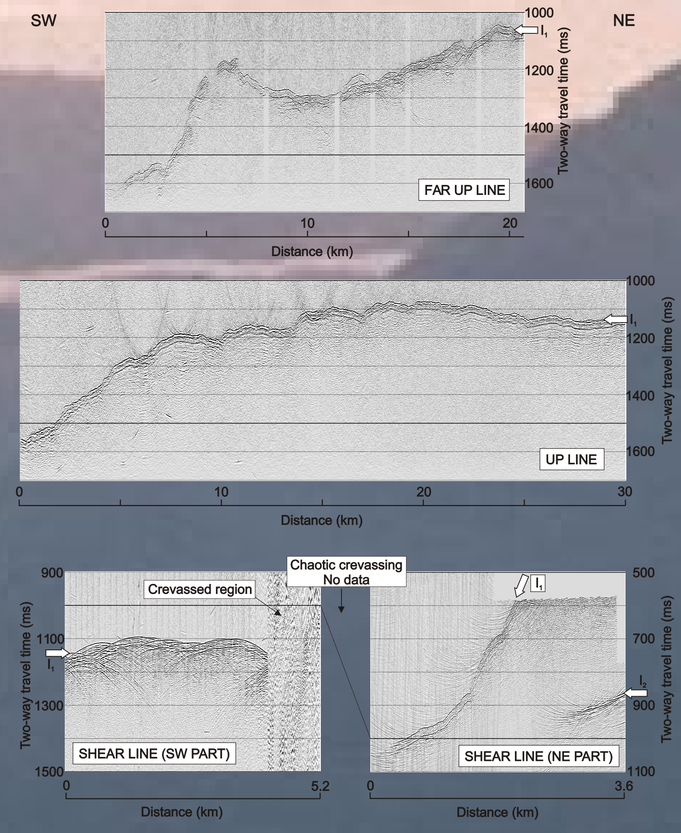


Compilation of data straddling shear margin at successive downstream locations

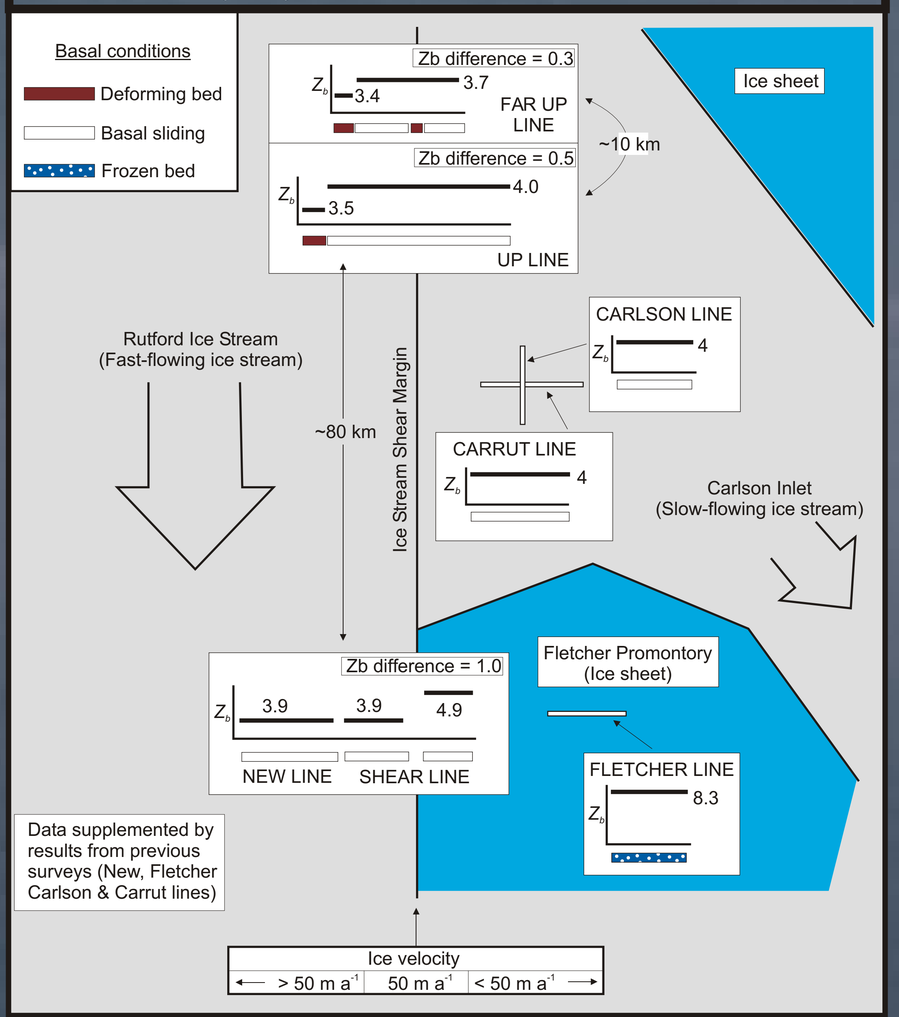


Key to basal conditions: Deforming bed | Basal sliding

Seismic data: Basal conditions & variability



Schematic summary of acoustic impedance (Zb) & basal conditions

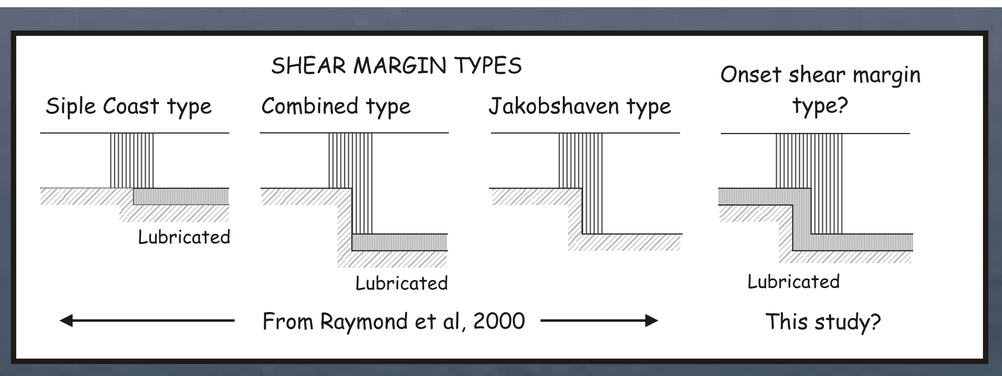


PRELIMINARY OBSERVATIONS:

1. Bed on both sides of shear margin is wet sediments (no bedrock, permafrost or free water)
2. Change in flow across shear margin associated with friction change at the bed (but not with frozen bed on ice sheet side)
3. Friction difference across shear margin increases downstream
4. Within ice stream, friction increases downstream (but earlier work suggests decrease from here onwards)

NOW WHAT?

1. Compare with shear margin models
2. Compare with predictions of onset regions



*Contact amsm@bas.ac.uk