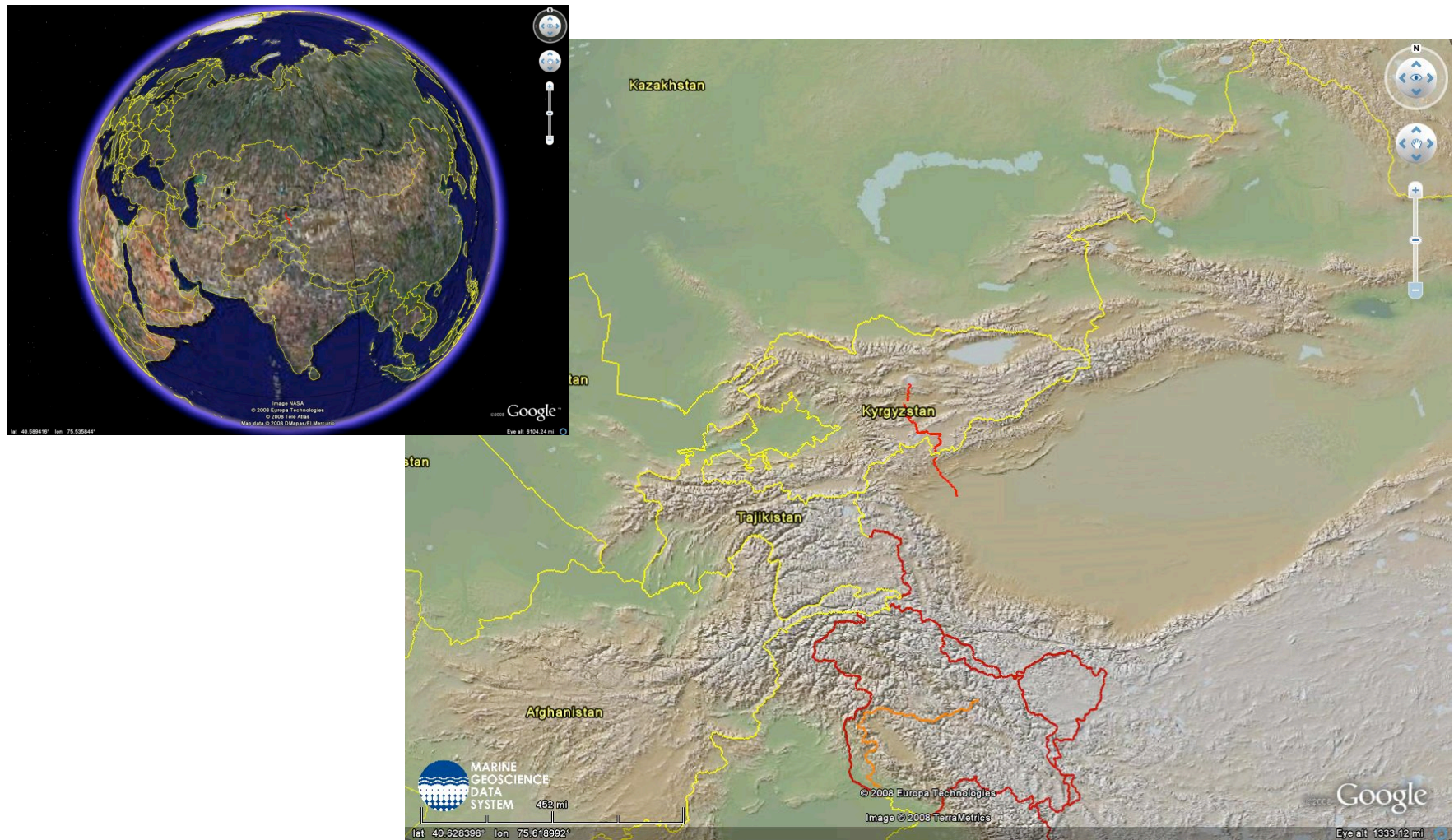


Preliminary Results From An Integrated Seismic Transect
in the Tien Shan of Kyrgyzstan and China

The Middle AsiaN Active Source (MANAS) Profile

J.H. Knapp, S.W. Roecker, S.K. Park, G. Schelochkov, R. He

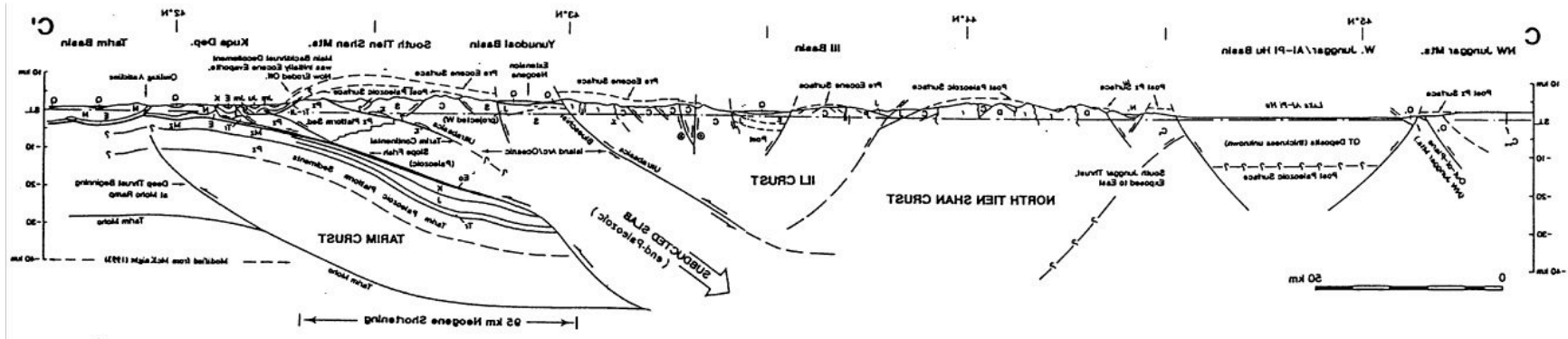
Central Asia



Intracontinental Subduction

S

N



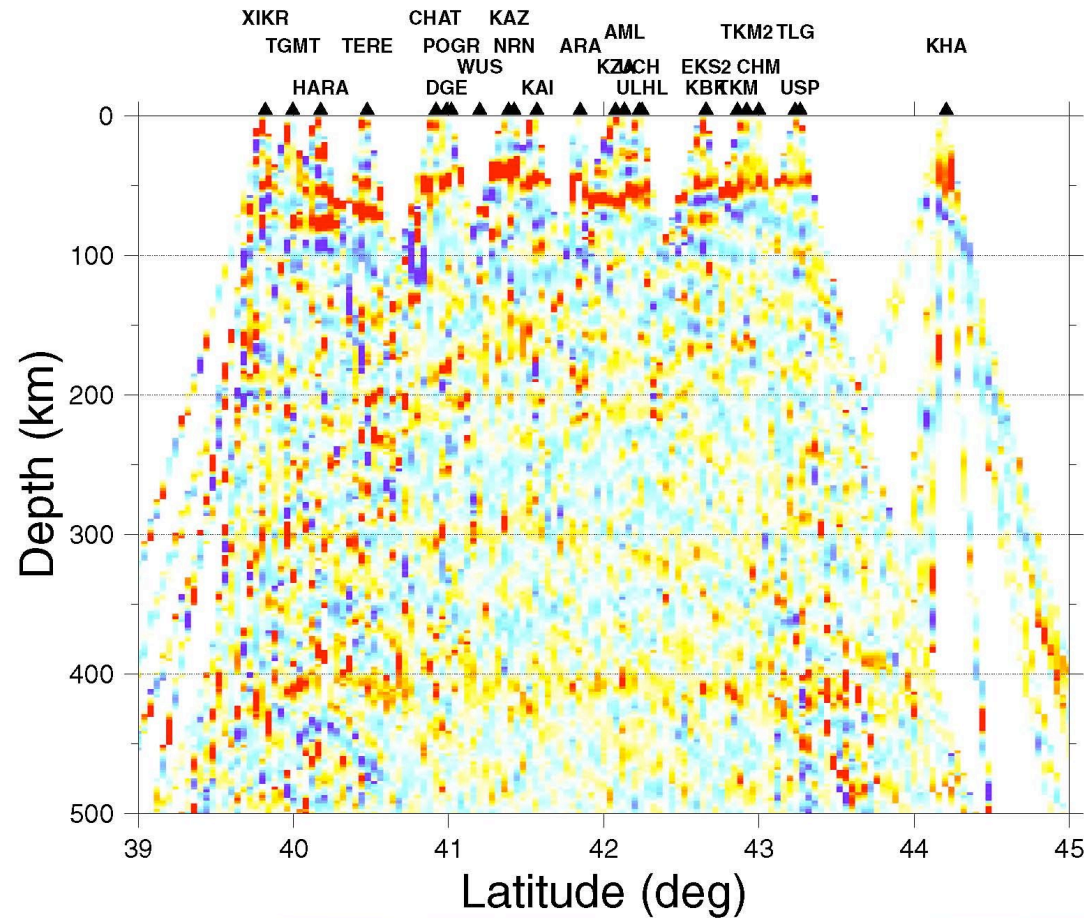
after Berry and Nishidai, 1984

Scientific Objectives

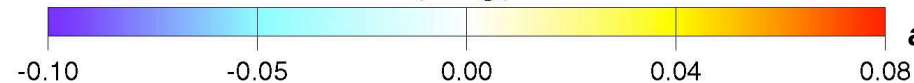
- Crustal geometry and mode of intracontinental shortening
- Role of lower crust in accommodating shortening
- Explanation of variations in crustal thickness
- Origin of intracontinental deformation

Stacked receiver functions

S



N

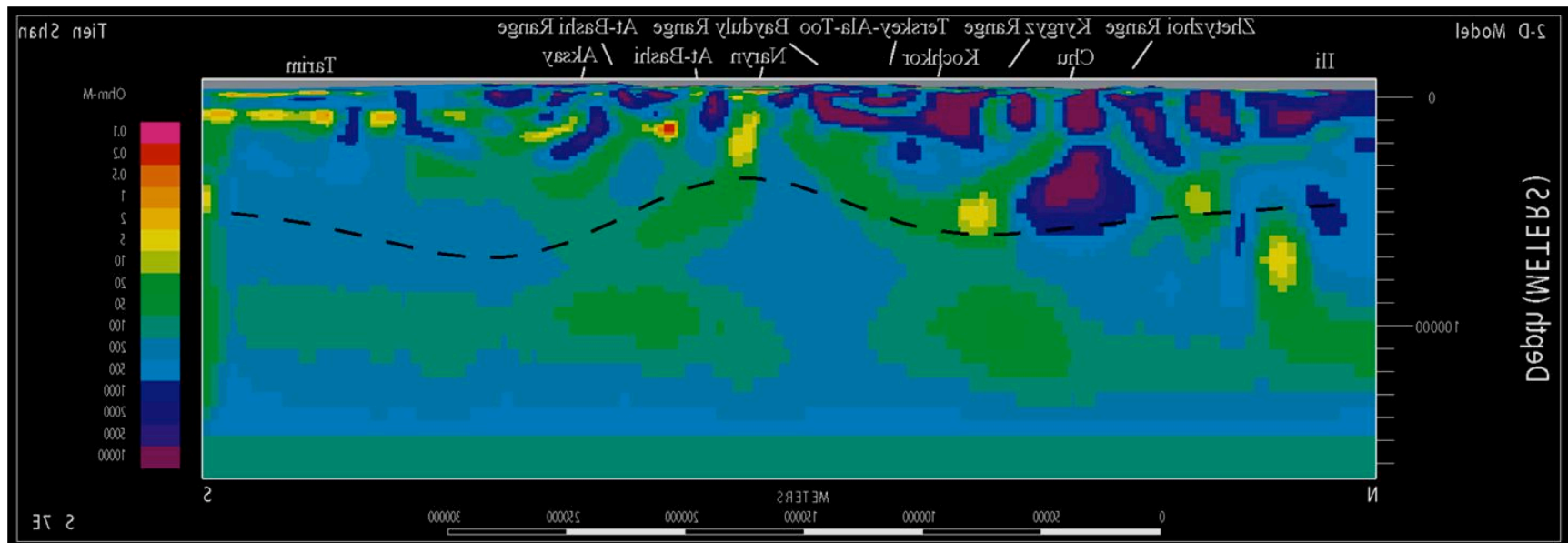


after Roecker et al, 1984

MT Cross Section

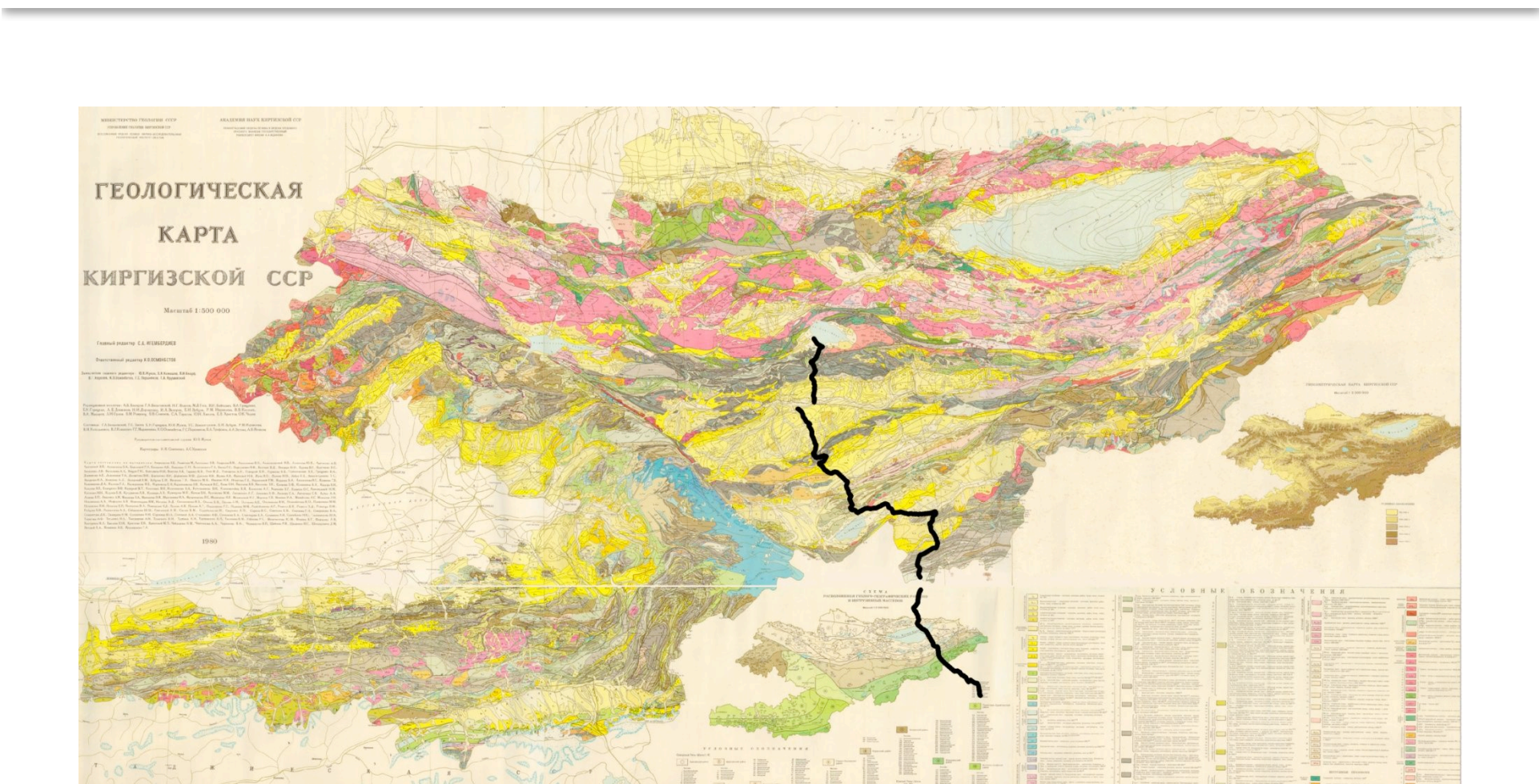
S

N



after Bielinski et al 2003

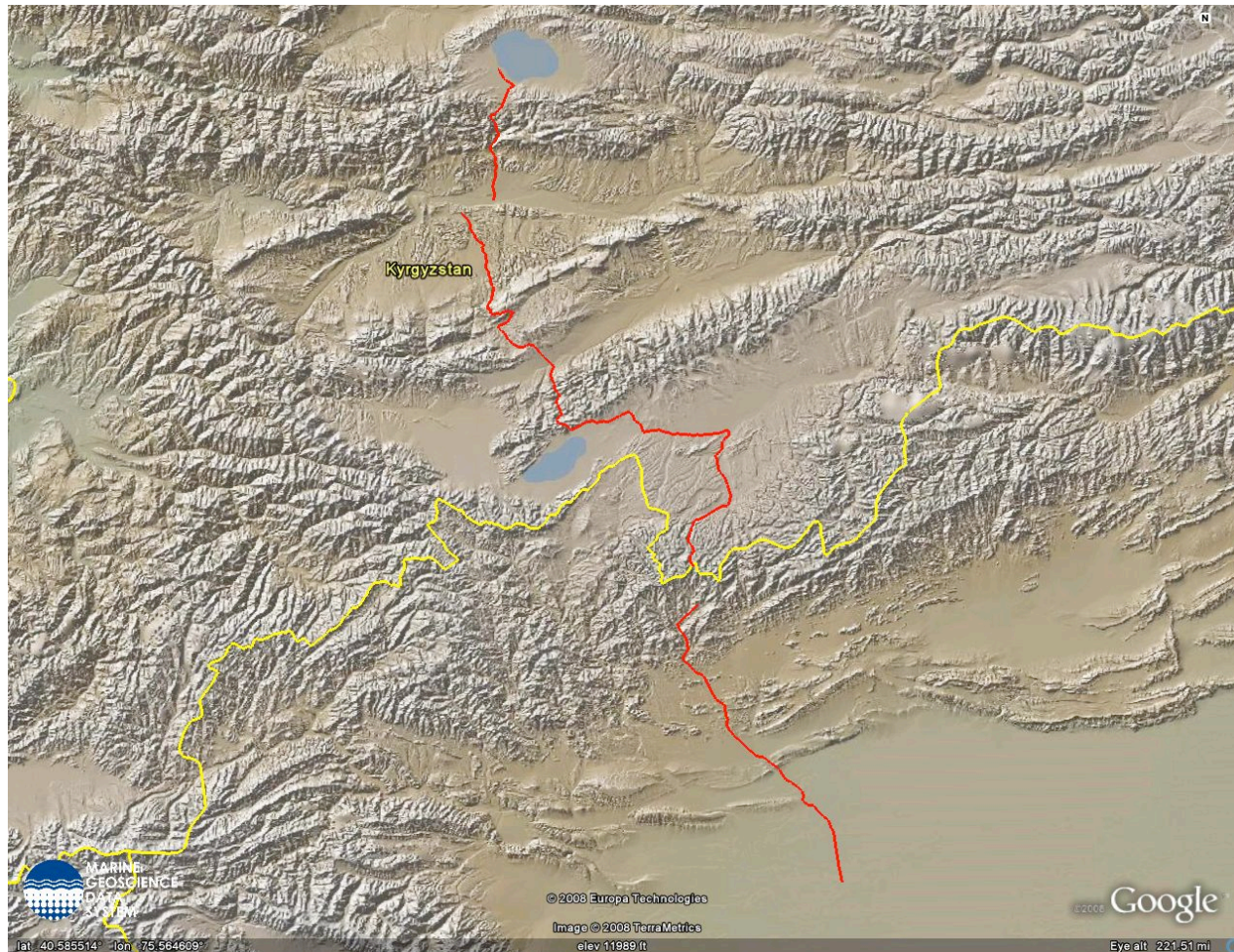
Geology of the Tien Shan



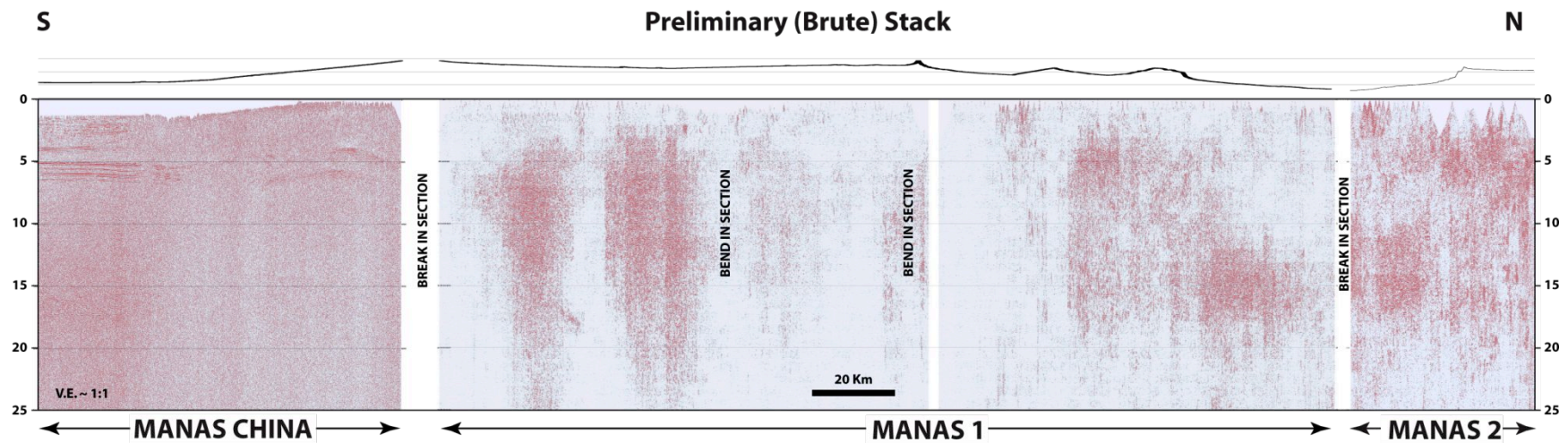
MANAS Highlights

- ~ 380 km deep seismic transect ($\sim \frac{3}{4}$ of orogen)
- Acquired with Texan seismometers
- 40 kg shots, 36 km active spread
- ~18 km / day production
- 6 week field program summer 2007
- Coincident broadband, active-source, and MT across orogen

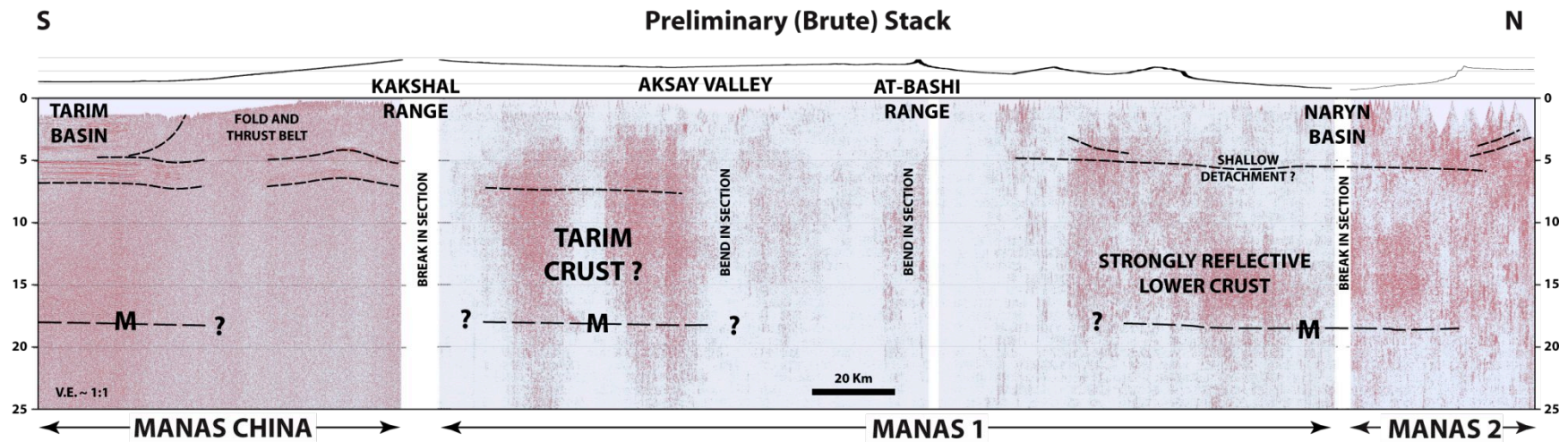
MANAS Transect



Preliminary Results



Preliminary Interpretation



Primary Features

- Highly reflective middle and lower crust along profile
- Downward termination of reflectivity interpreted as base of crust
- Tarim crust extends >100 km beyond deformation front
- Surface structures are detached in upper crust

Future work

- Completion of transect to north
- Integration with surface geological data
- Joint processing of seismological data

Conclusions

- Crustal thickness estimates vary markedly by technique
- No obvious N termination to Tarim crust
- Surface structures appear to be terminated in upper to middle crust
- Strongly reflective middle and lower crust w/ subhorizontal layering suggests lower crust is not flowing

Acknowledgements

- NSF Continental Dynamics Program
- Russian Academy of Sciences
- Chinese Academy of Geological Sciences
- MANAS Field Acquisition Team
- IRIS PASSCAL