

Active deformation of the Shargyn Basin, western Mongolia

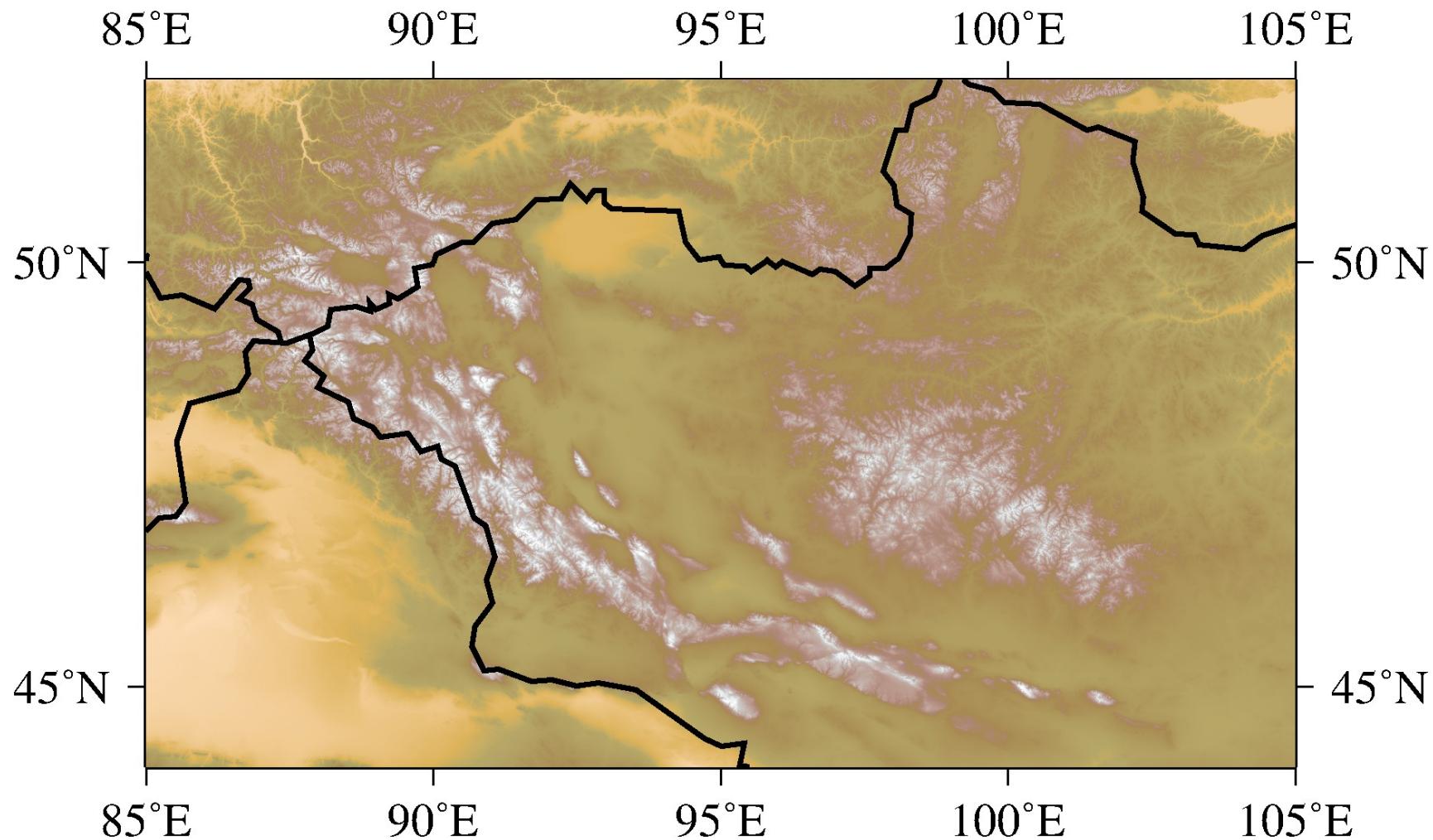
By: Ben Thompson

Advisor: Prof. Oliver Jagoutz, Claire Bucholz

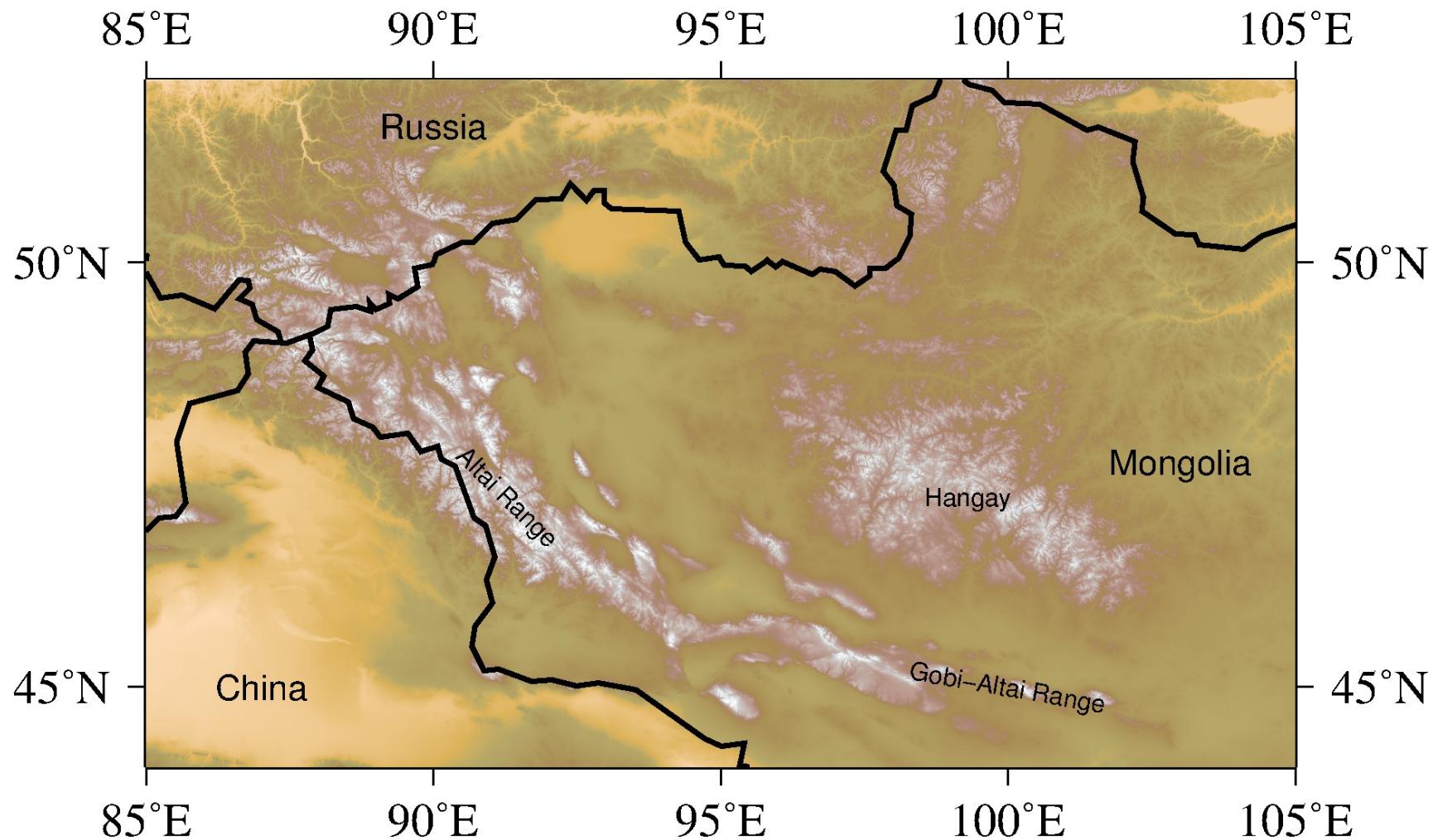


Bayarsahan 1996

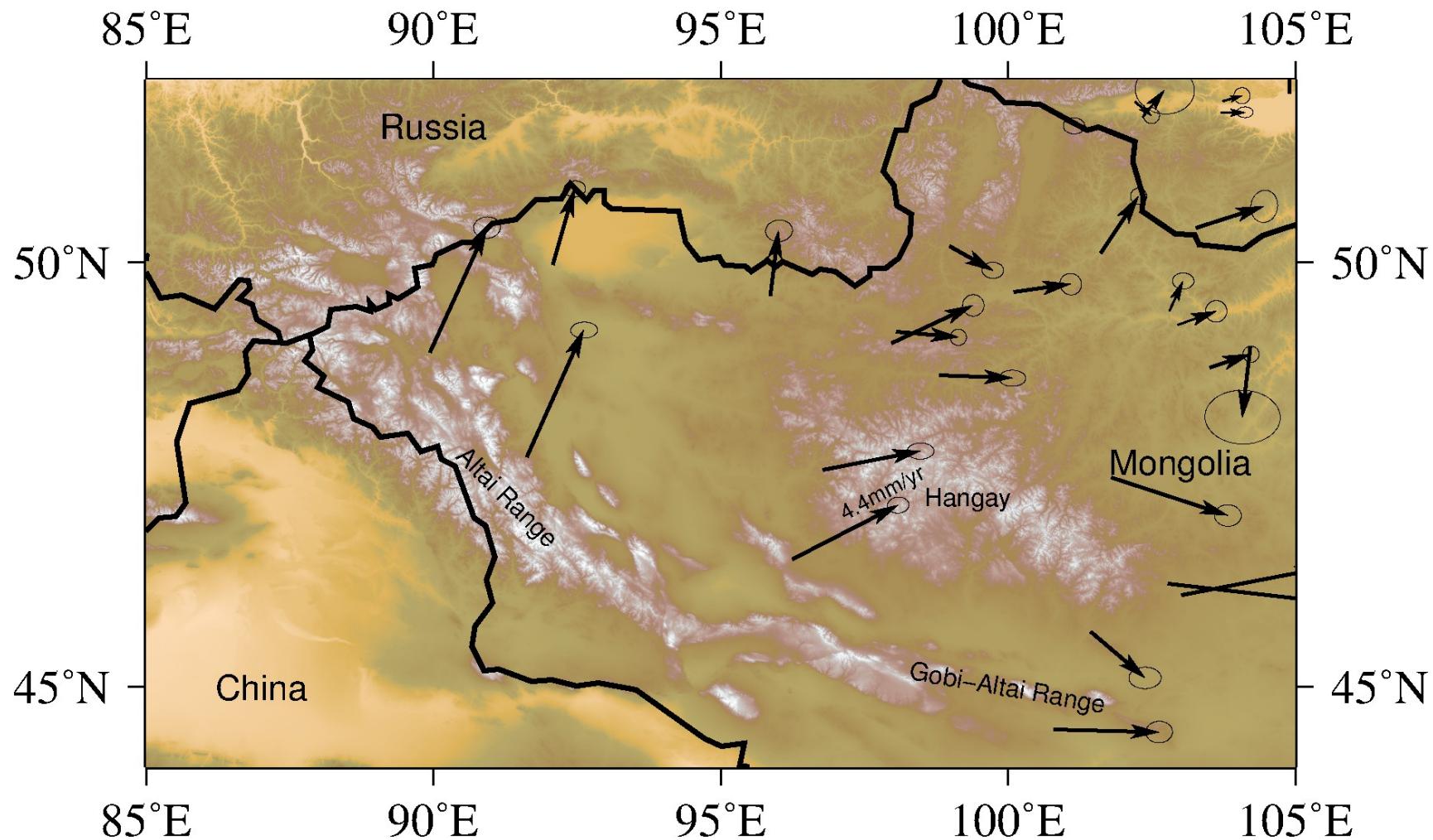
Mongolian deformation = transpressional conjugate strike-slip pair



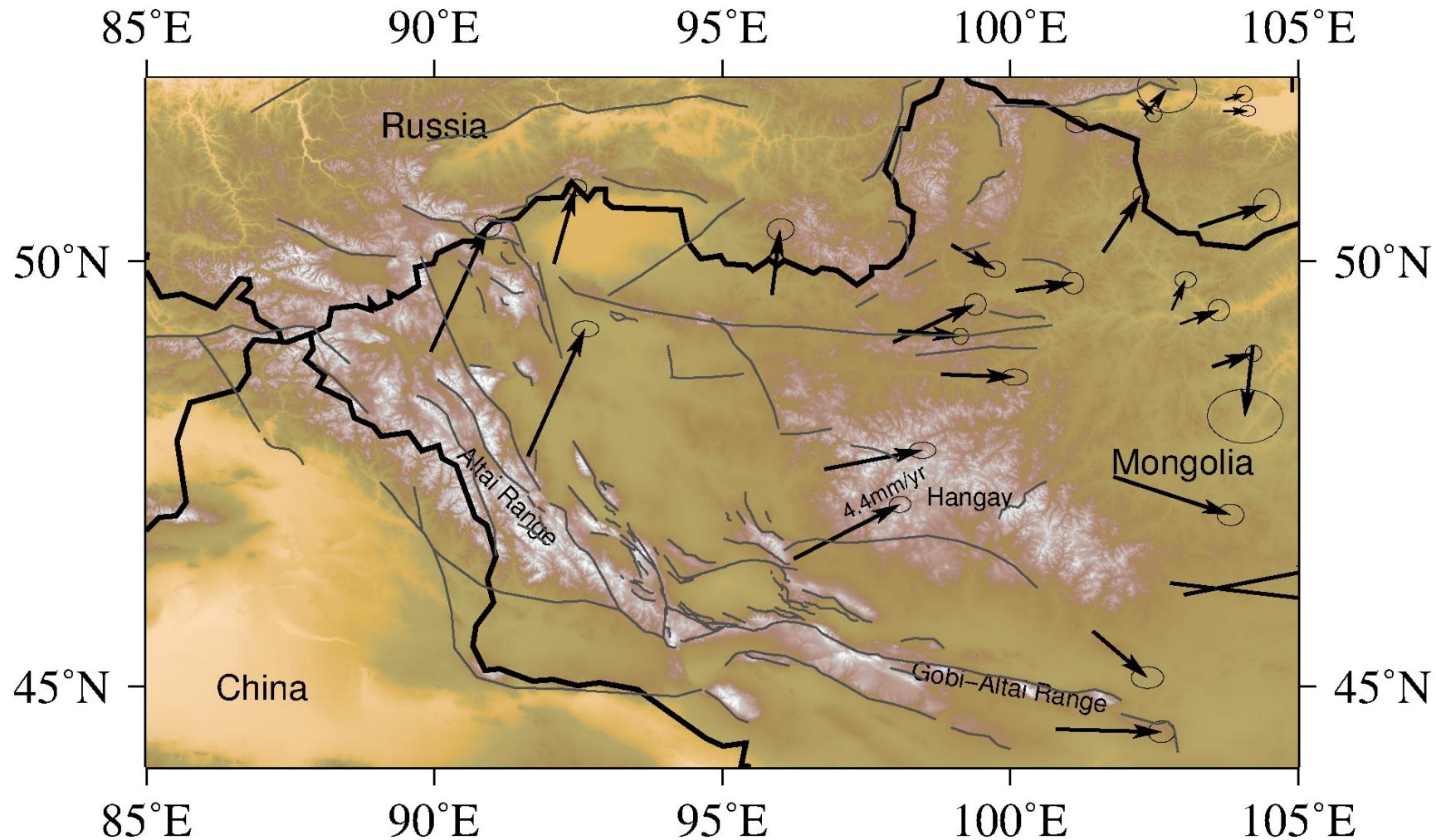
Mongolian deformation = transpressional conjugate strike-slip pair



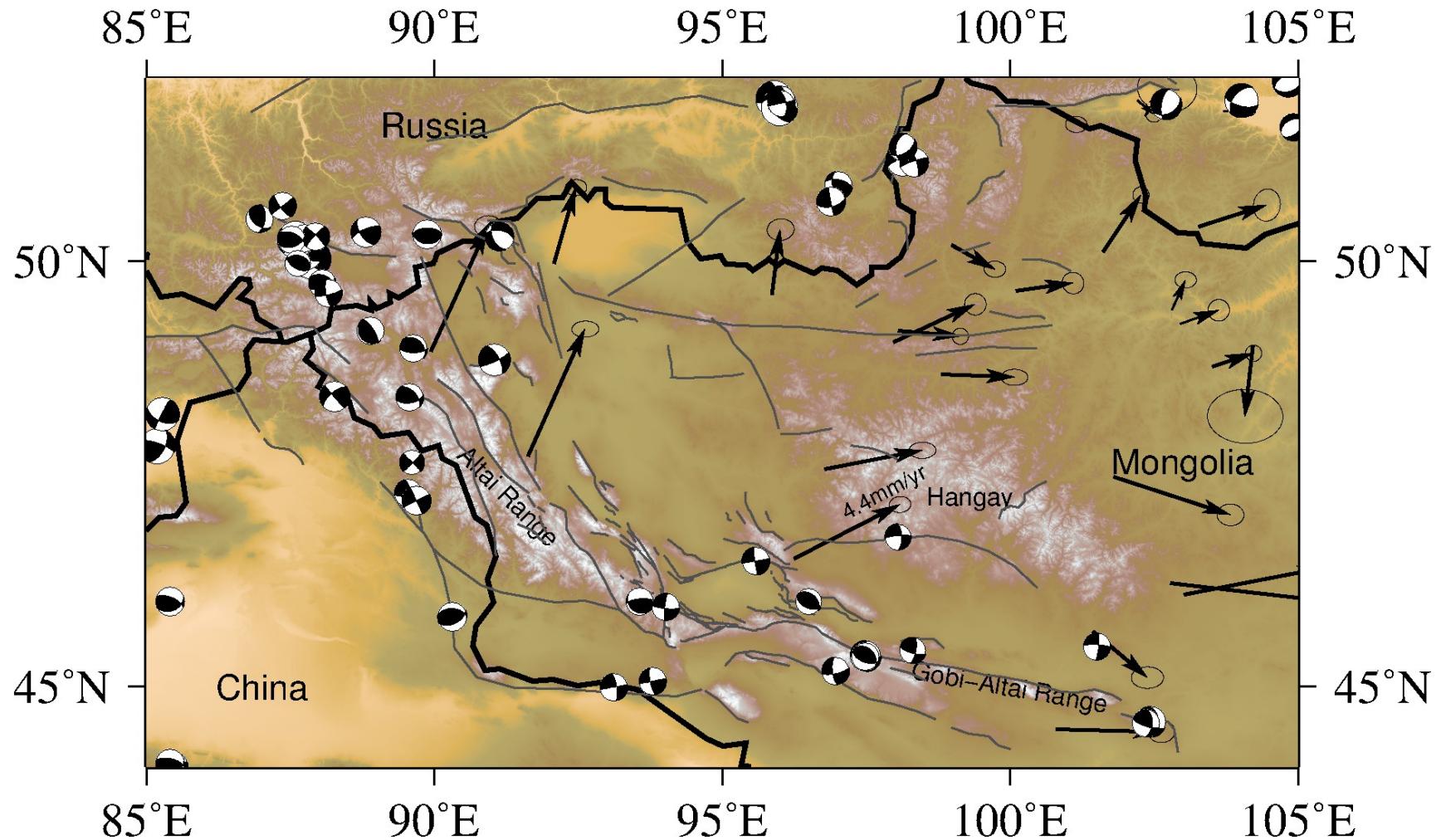
Mongolian deformation = transpressional conjugate strike-slip pair



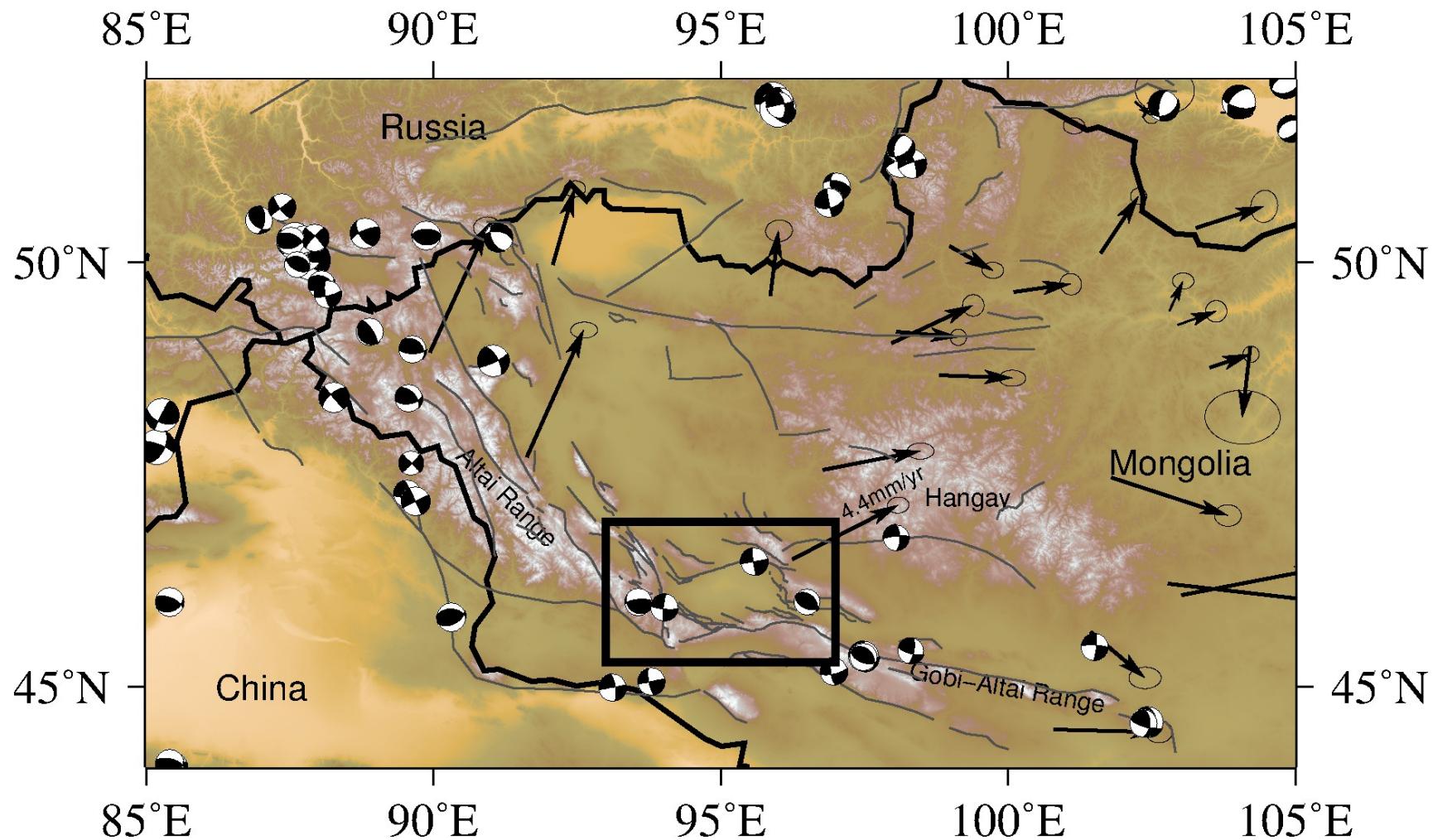
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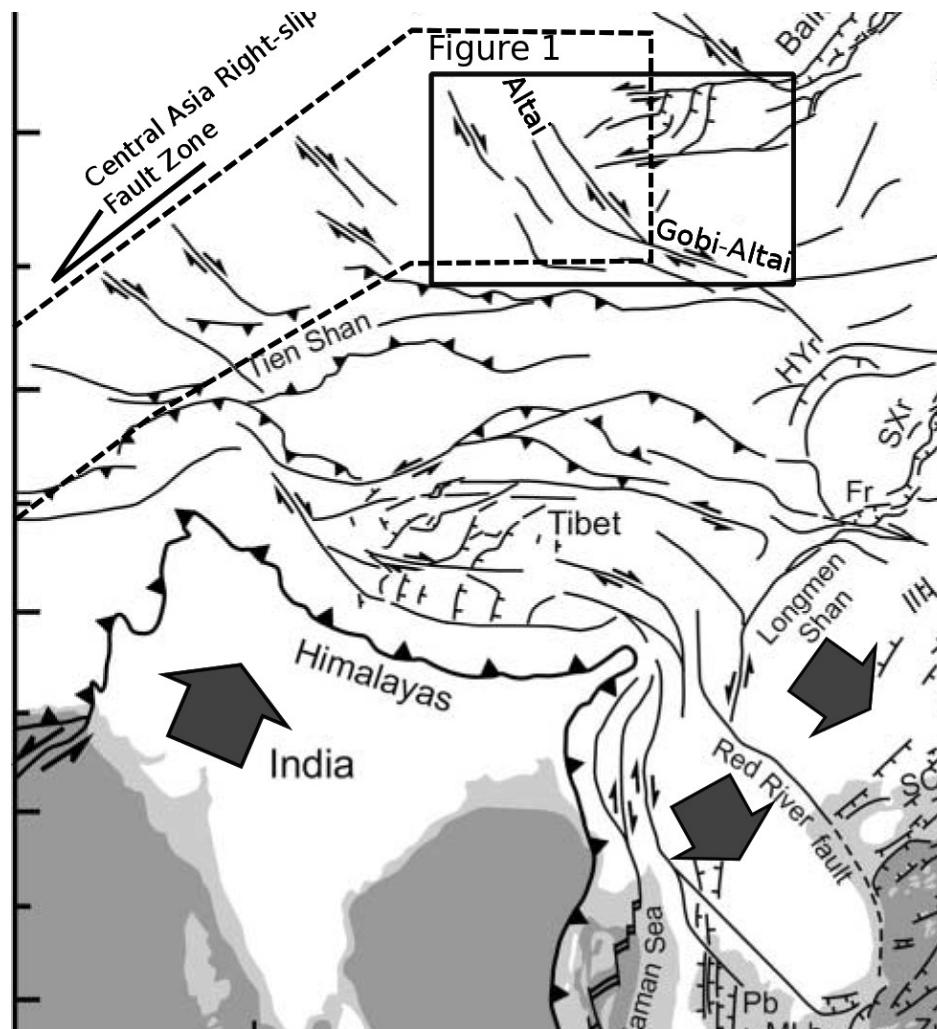
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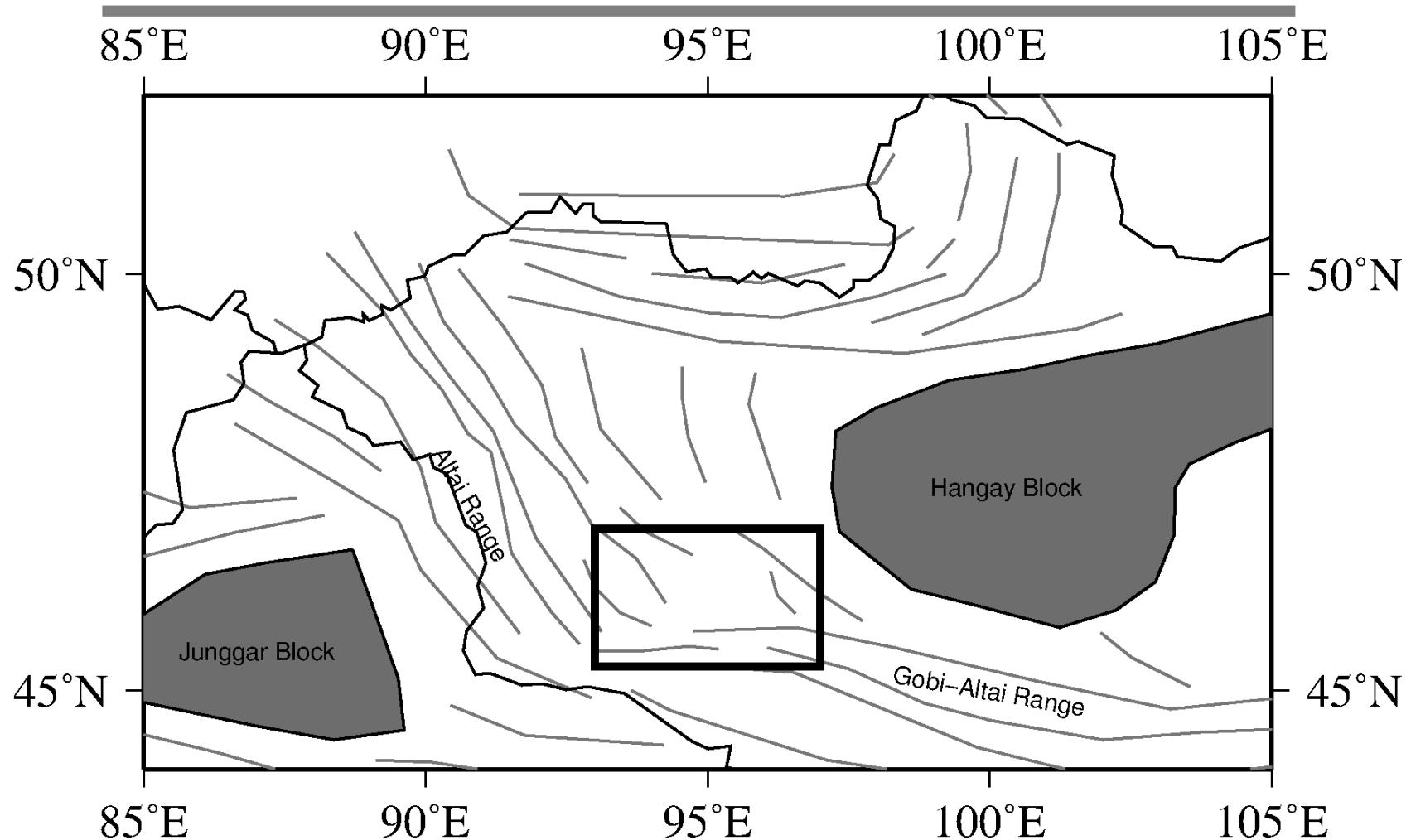
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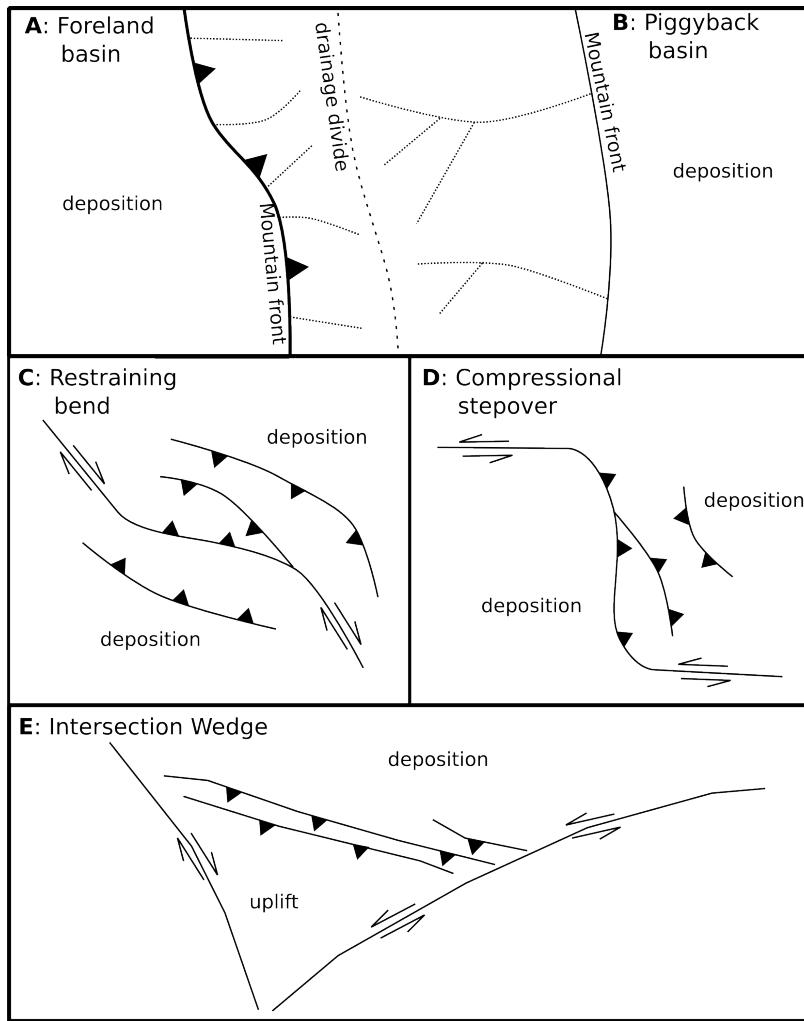
Mongolian deformation: Indo-Eurasian orogeny



A complex tectonic history controls the location of active faults

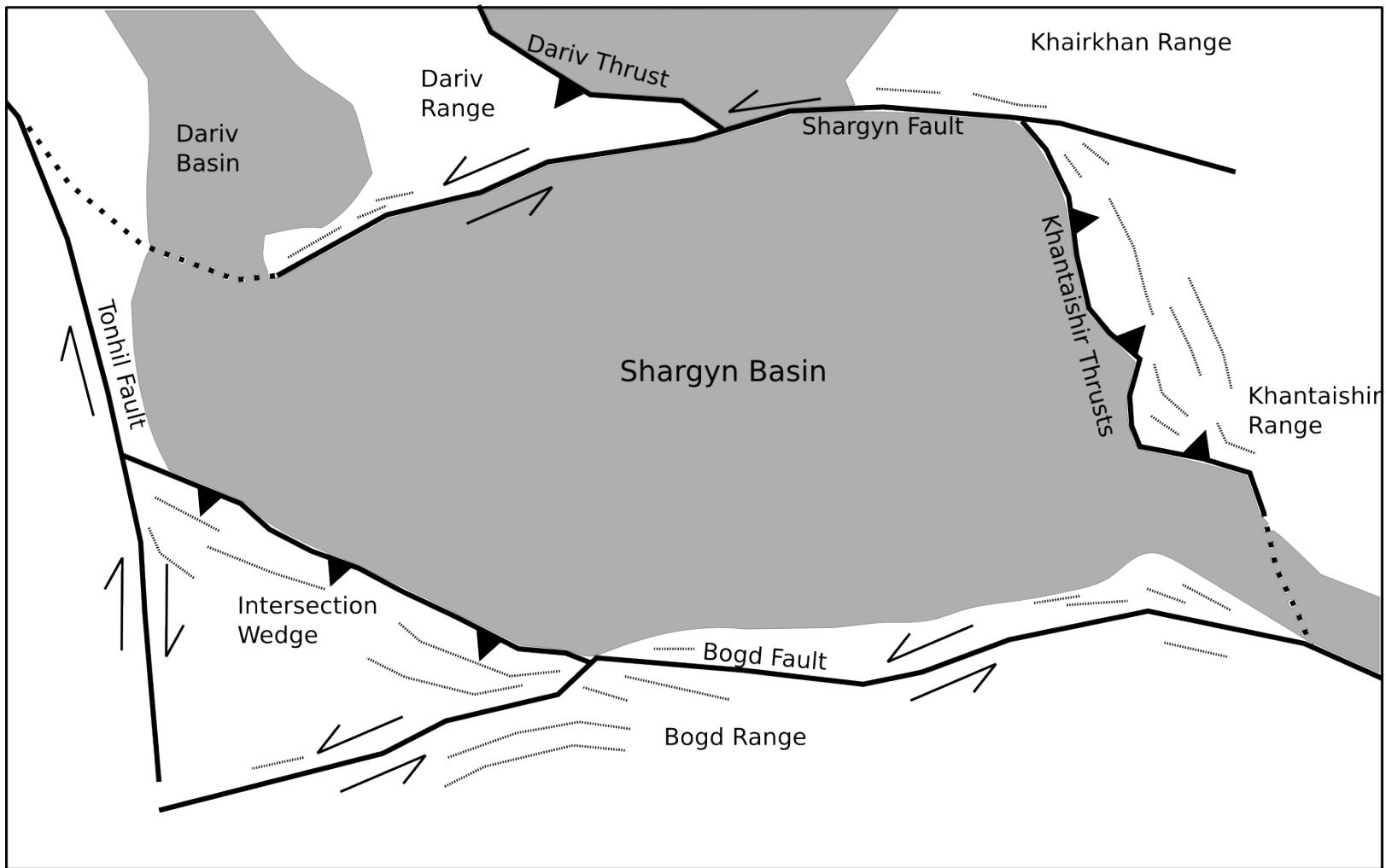


Transpressional strike slip can create a variety of features

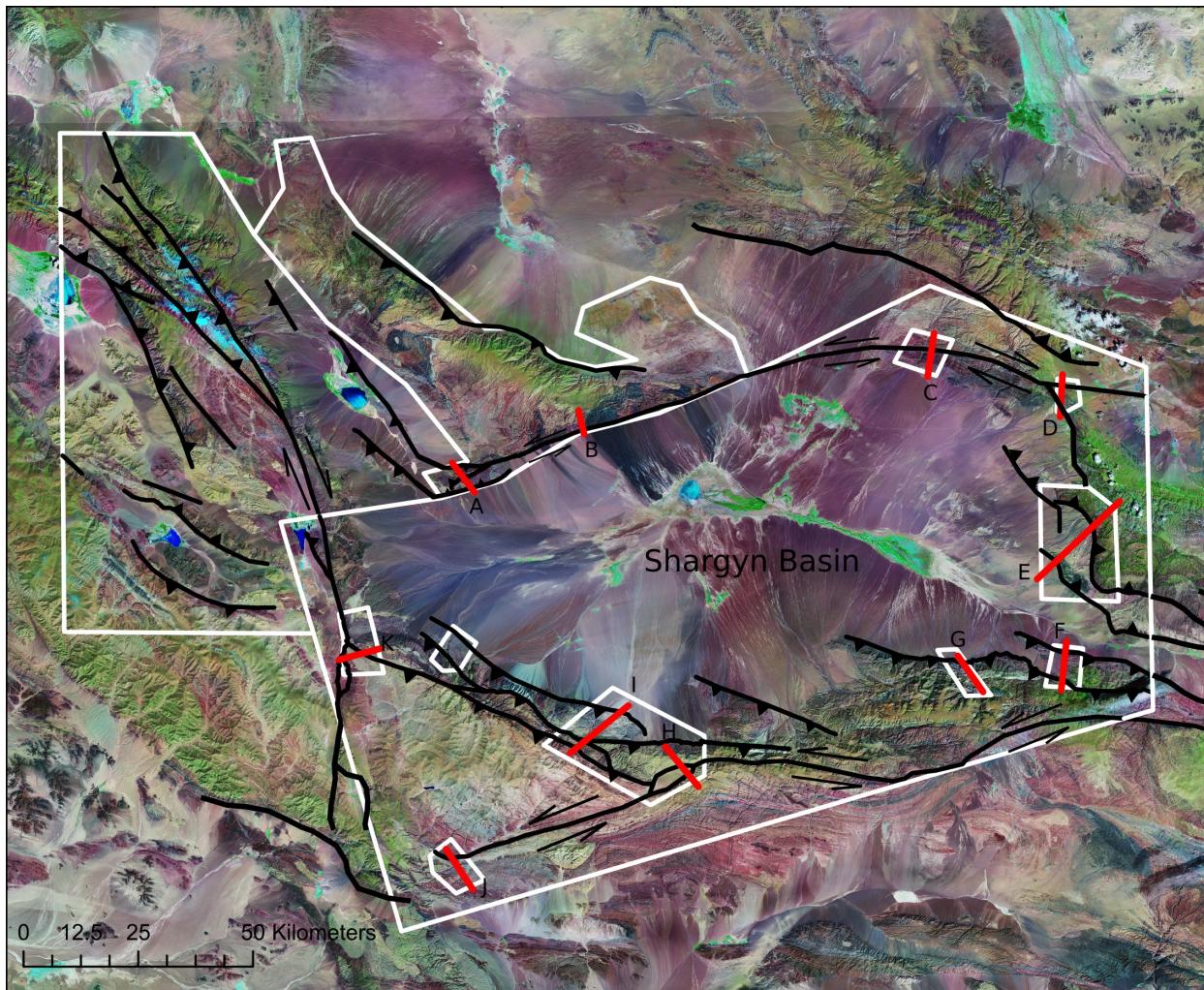


- All of these features are visible around the Shargyn Basin
- The Shargyn Basin is primarily a combination of an intersection wedge and a compressional stepover.

Compressional stepover and intersection wedge

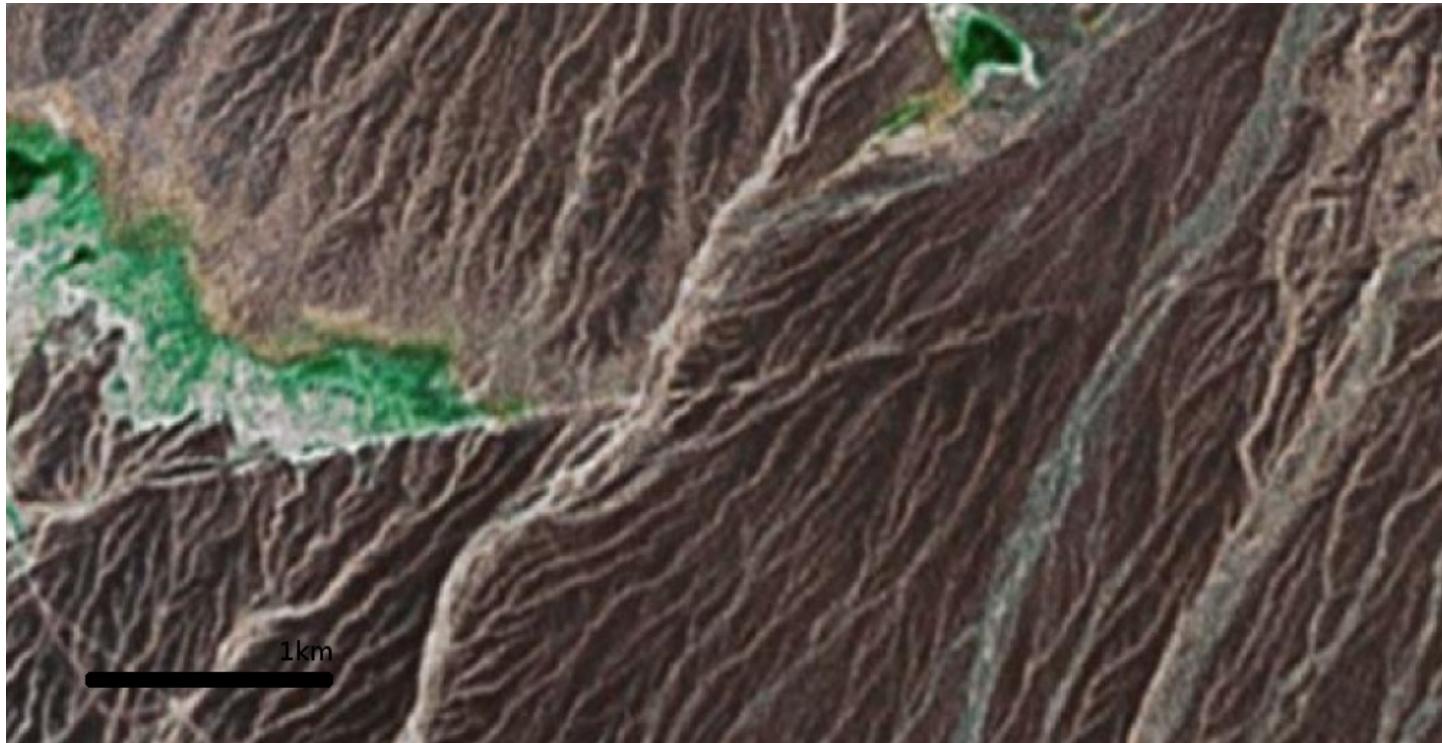


Nearby: Dariv Basin = piggyback basin
Sutai Range = restraining bend



Some faults are visible on satellite imagery.

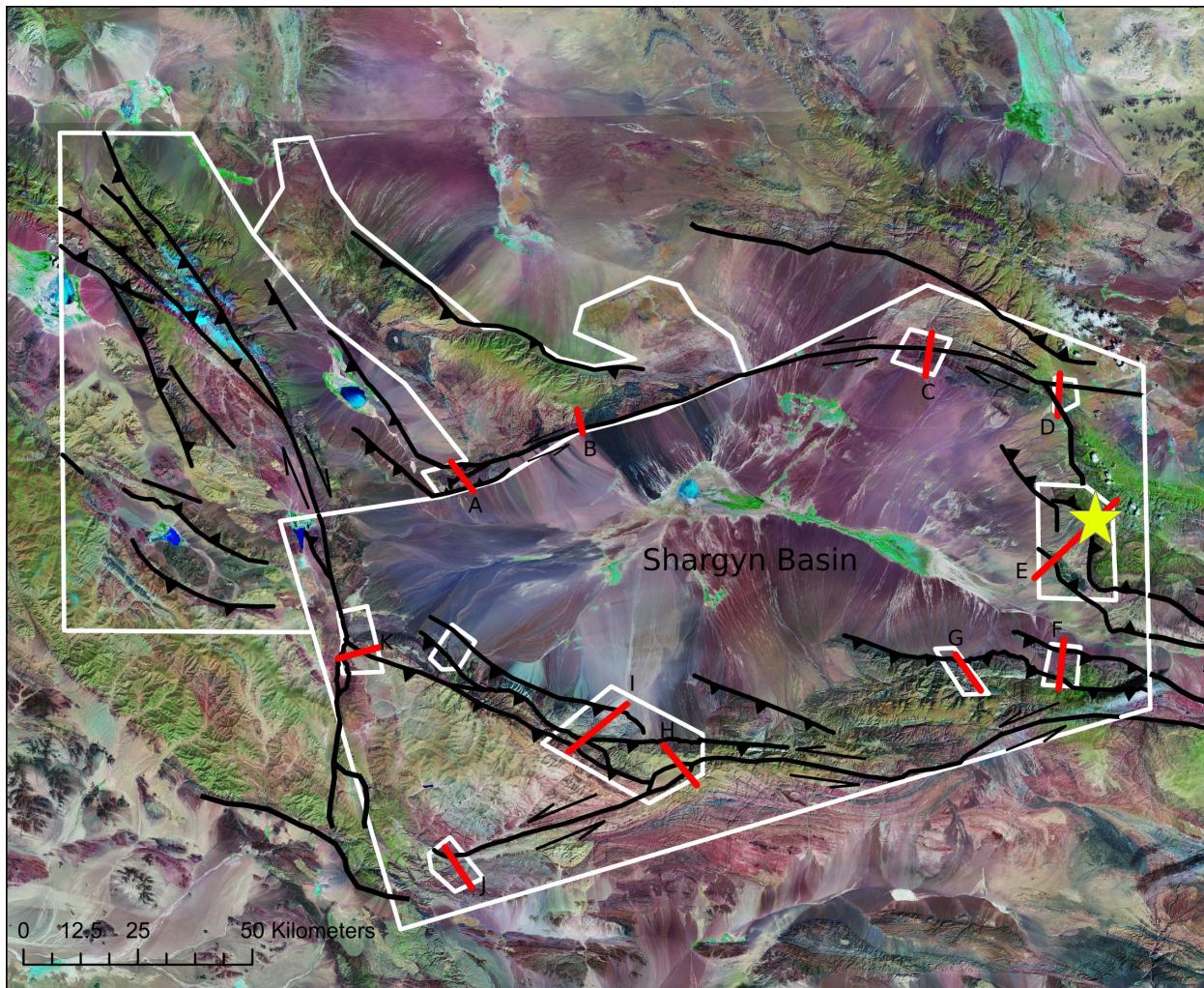
In this photo, the Shargyn fault is offsetting stream beds.



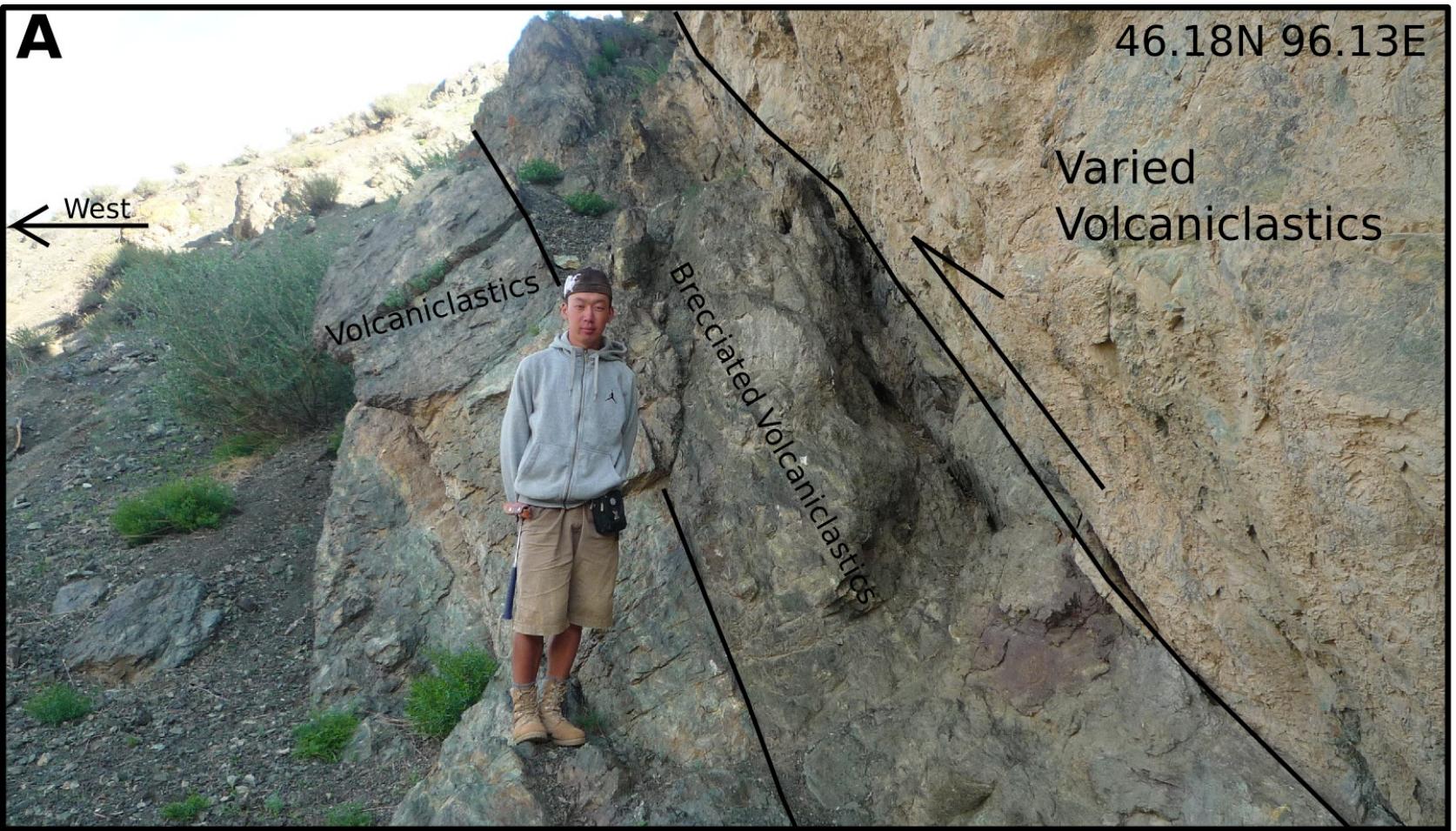
Mongolia 2012 Fieldwork



Khantaishir Fault Exposure



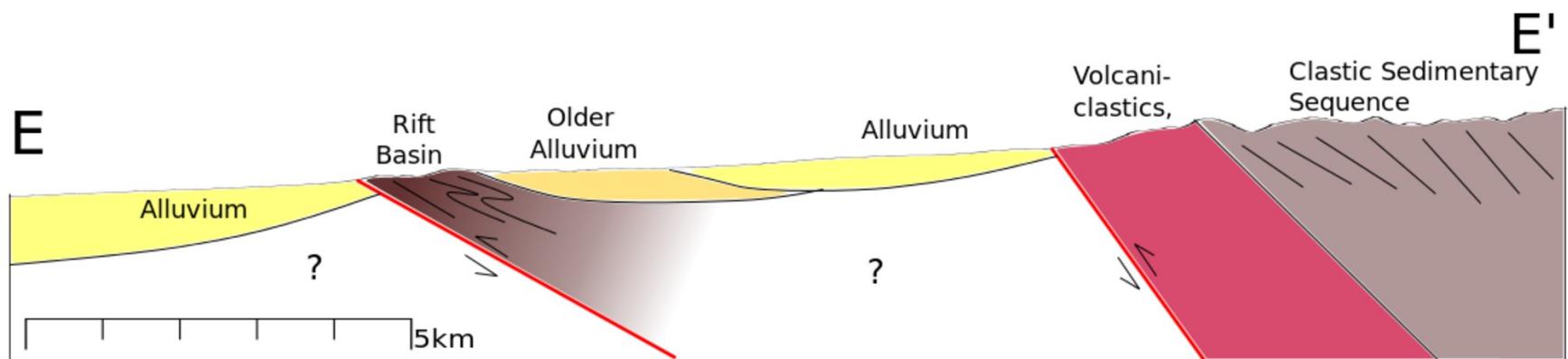
Khantaishir fault exposure



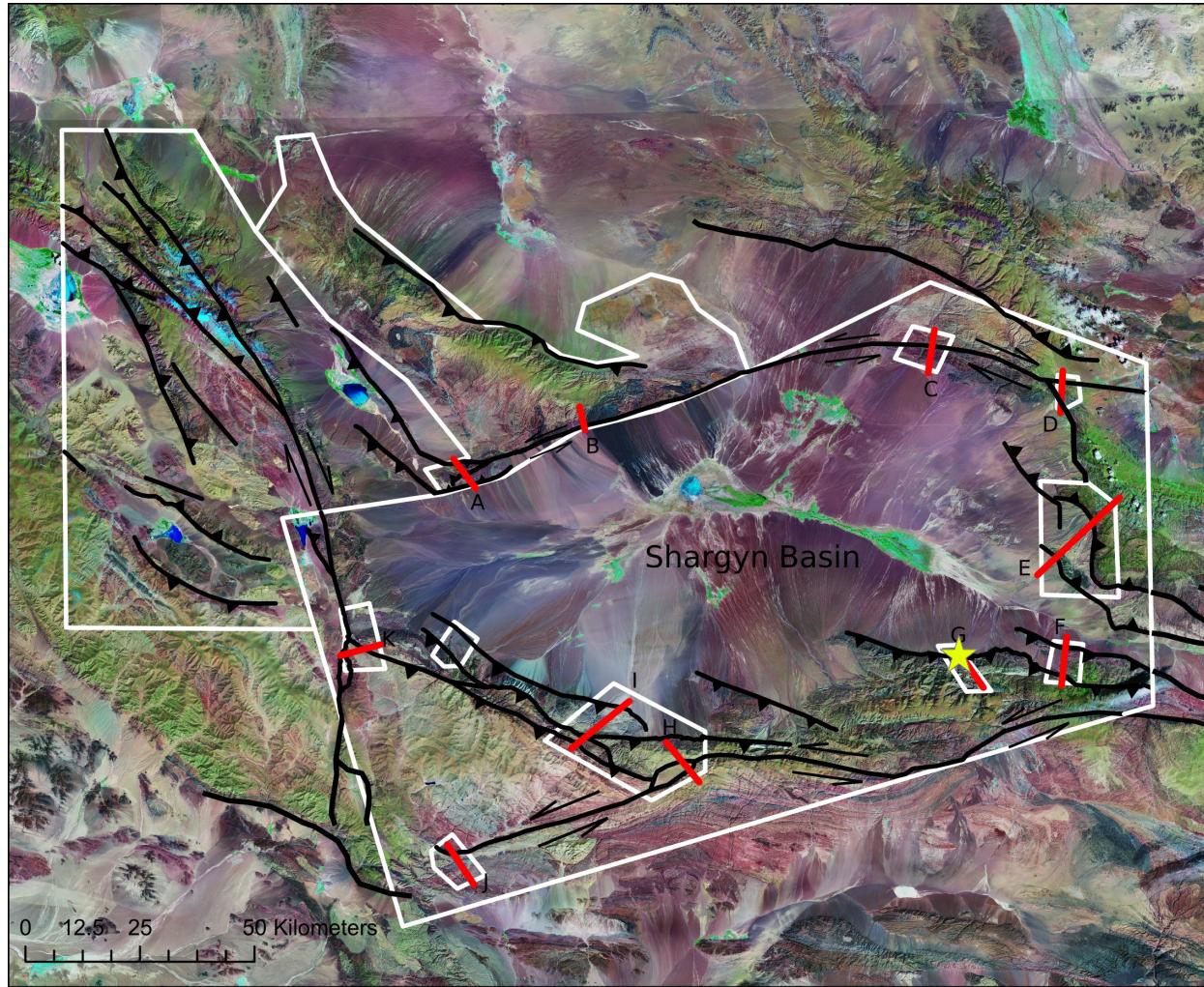
Khantaishir

The thrust portion of the compressional stepover.

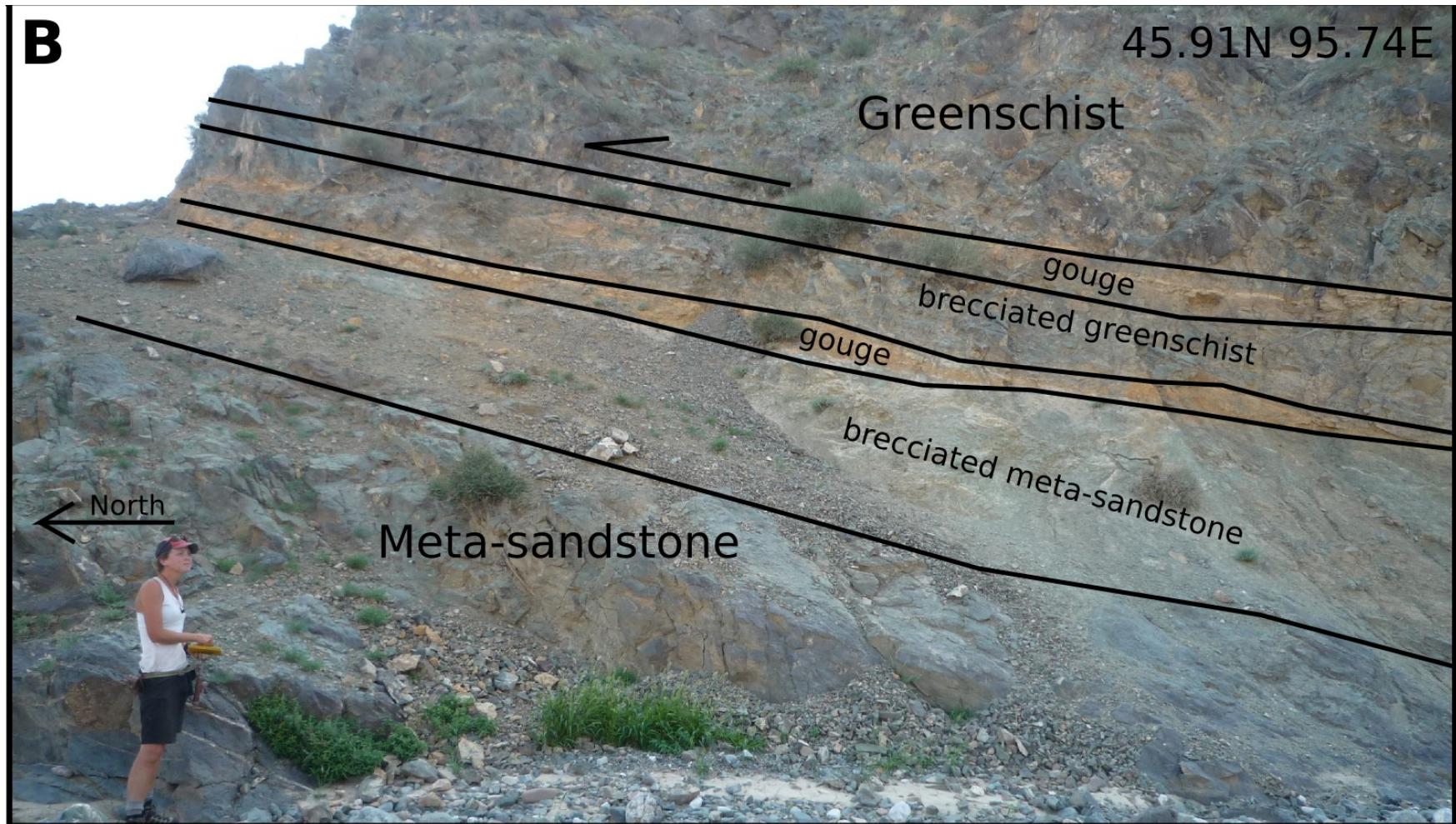
Two thrusts of different ages



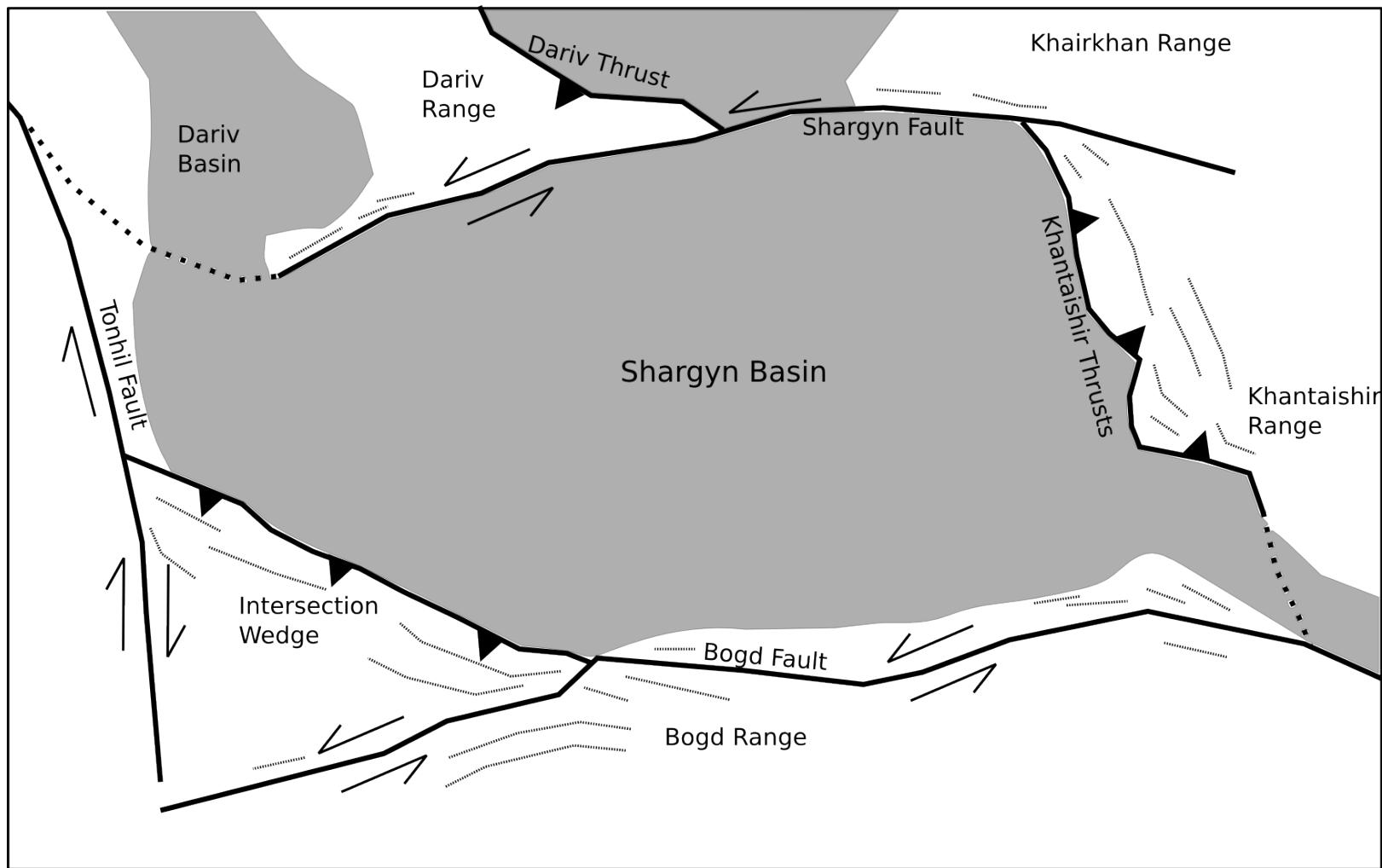
Combination compressional stepover and intersection wedge A variety of nearby fault interactions



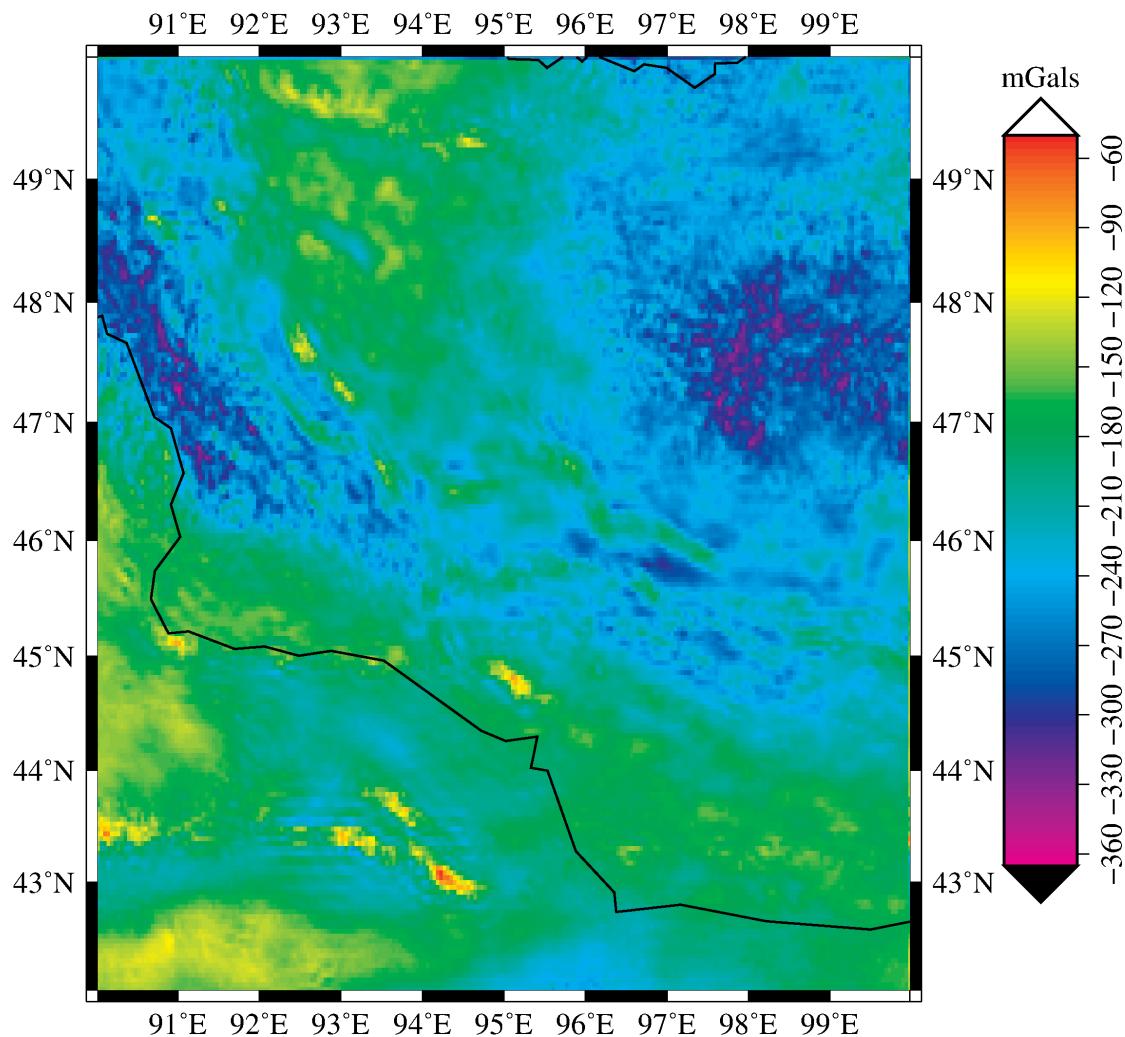
Thrust splay fault exposure



Lack of faulting indicates that the Shargyn Basin is strong

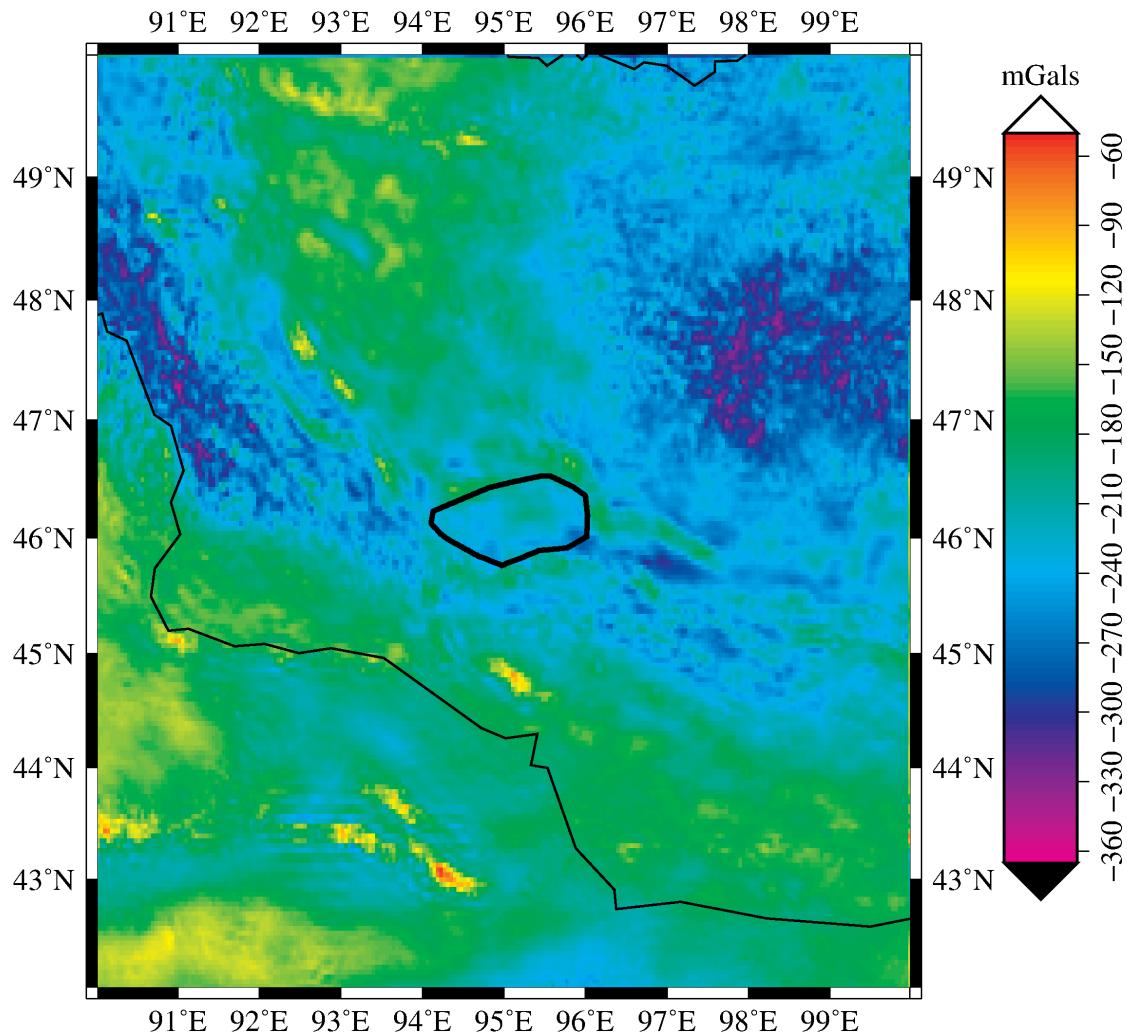


Gravity anomaly beneath the Shargyn Basin – is it denser?



Bouguer
Anomaly

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Bouguer
Anomaly

Conclusions

- Faulting around the Shargyn Basin creates:
 - Compressional stepover with motion stepping north from the Bogd Fault to the Khantaishir Thrusts and the Shargyn Fault.
 - Intersection wedge between Bogd and Tonhil Faults in the western part.
 - Strike slip faults terminate in thrust splays.
- Faulting is controlled by pre-existing Paleozoic structures.
 - Foliation parallel to the basin margins and active faults
- Faulting is controlled by a unique crustal block
 - Indicated by lack of faulting and potential density anomaly