Sedimentary Basins of W. China

Troy Hudson

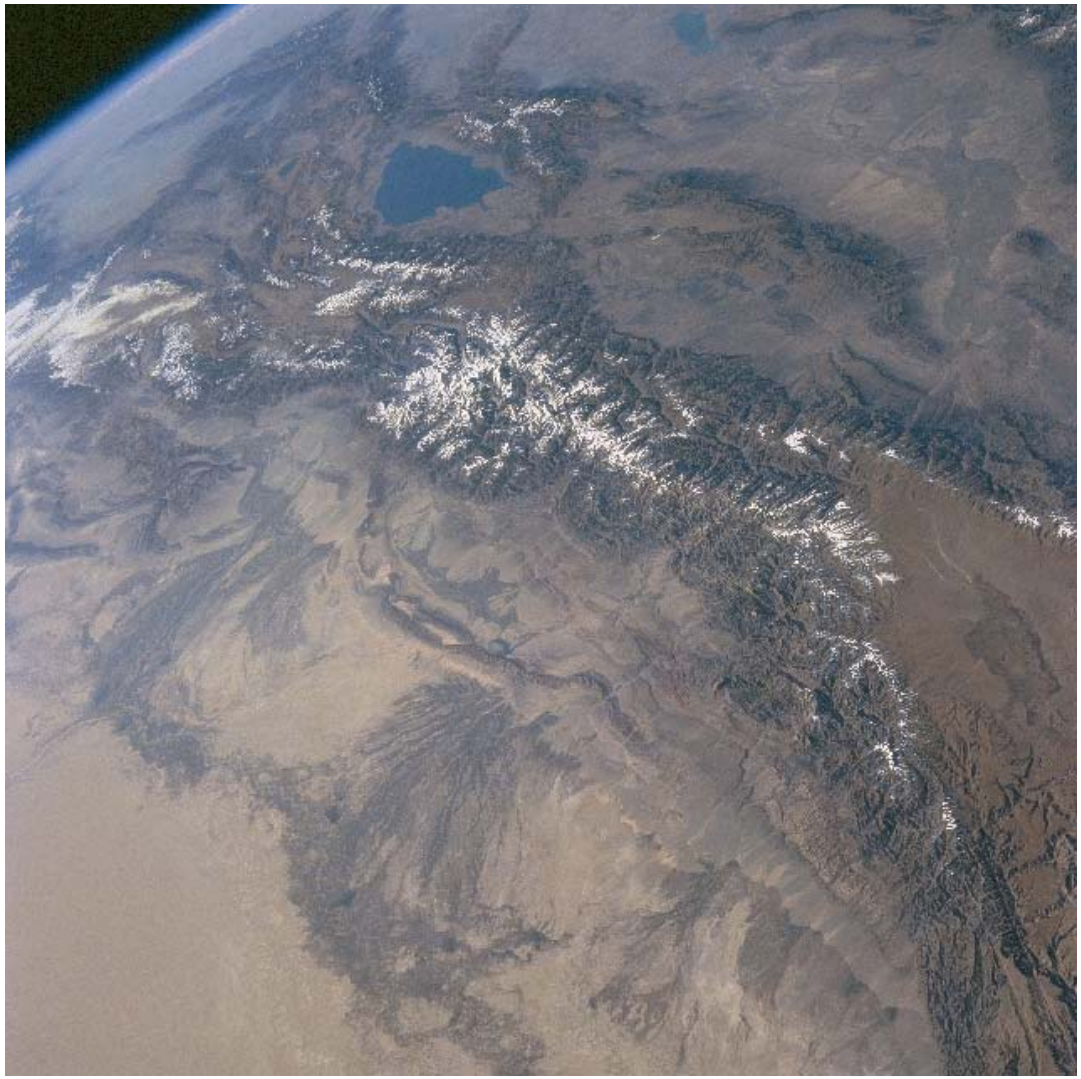
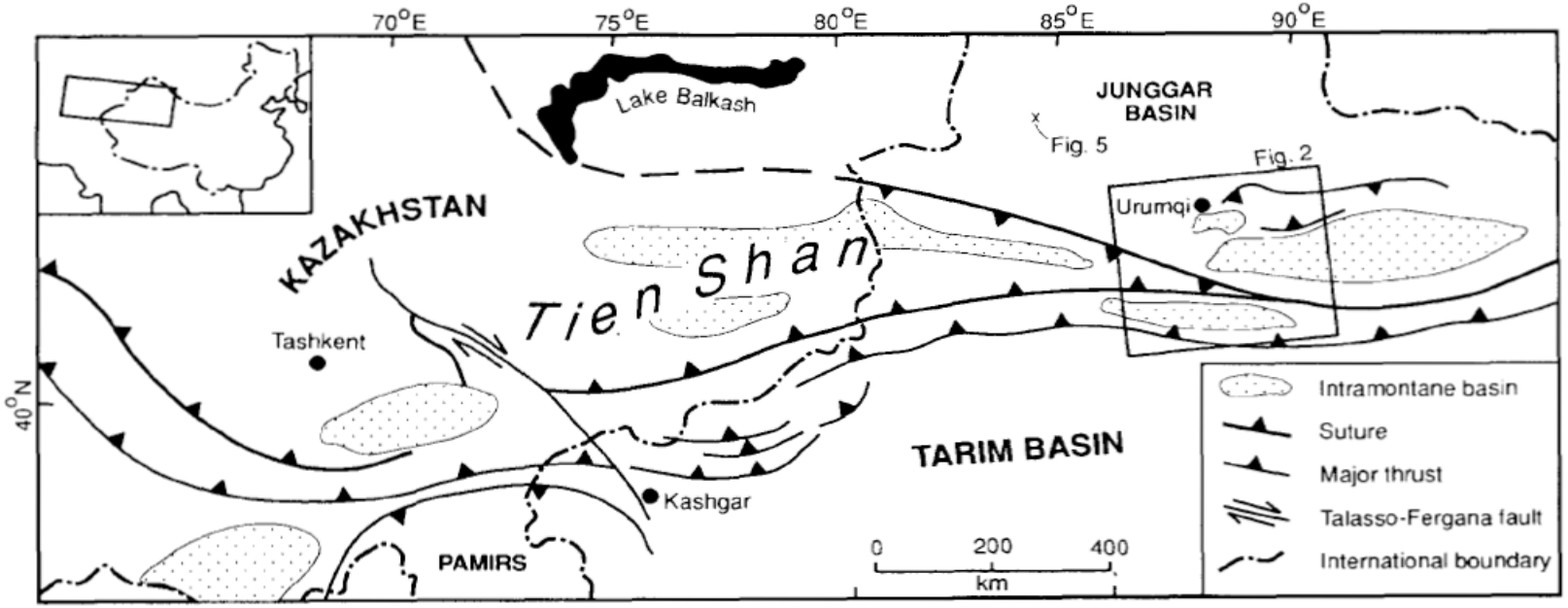


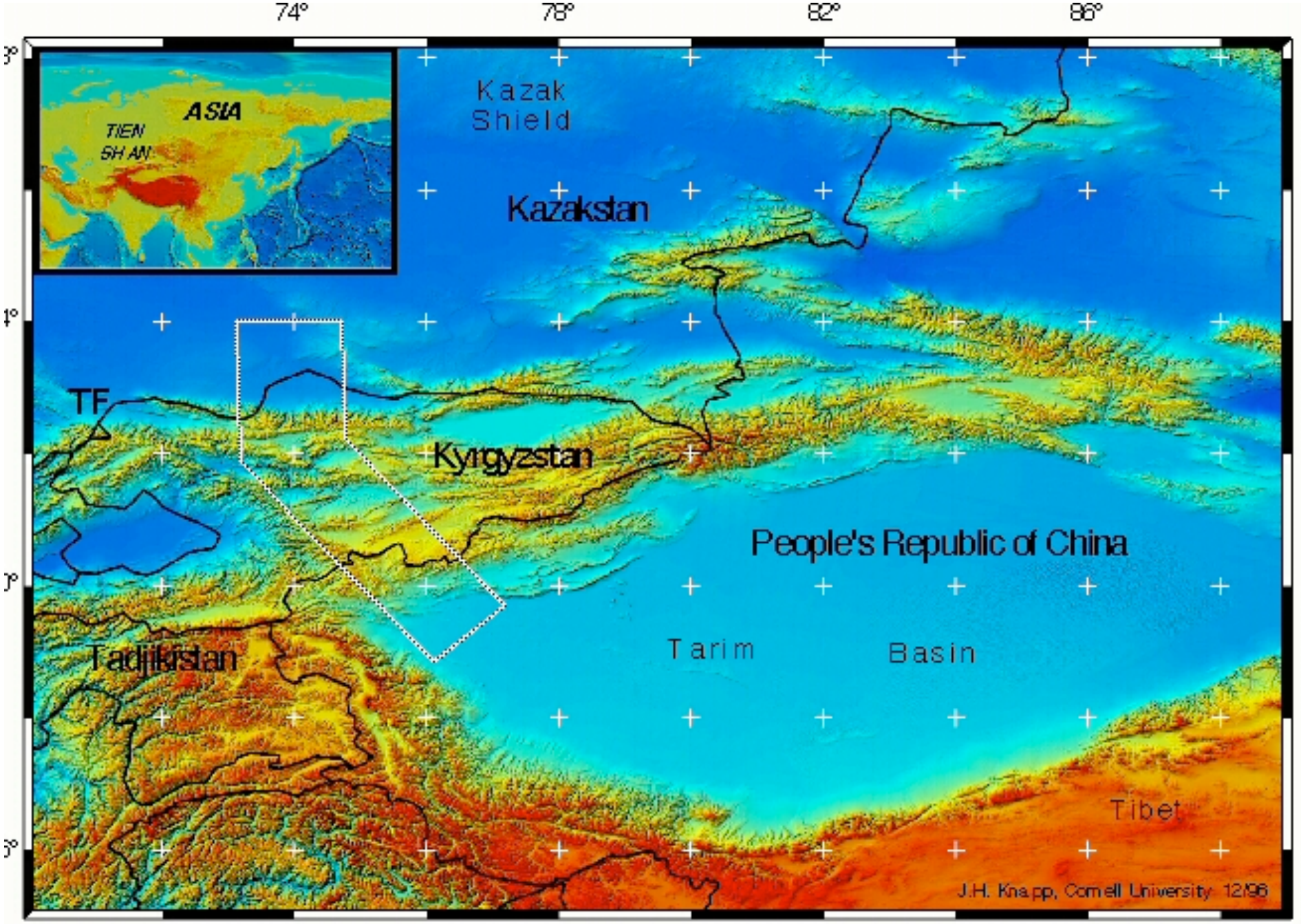
Photo: NASA

Basin Locations



- More than 600 Meso-Cenozoic sedimentary basins in China.
  - Tarim: S. of Tien Shan, Taklimakan desert
  - Junggar: N. of Tien Shan
  - Turfan: E. of suture zone convergence
- Elevations range from over 7,000m to less than -150m

Allen et al. J.Geo. Soc. 1991



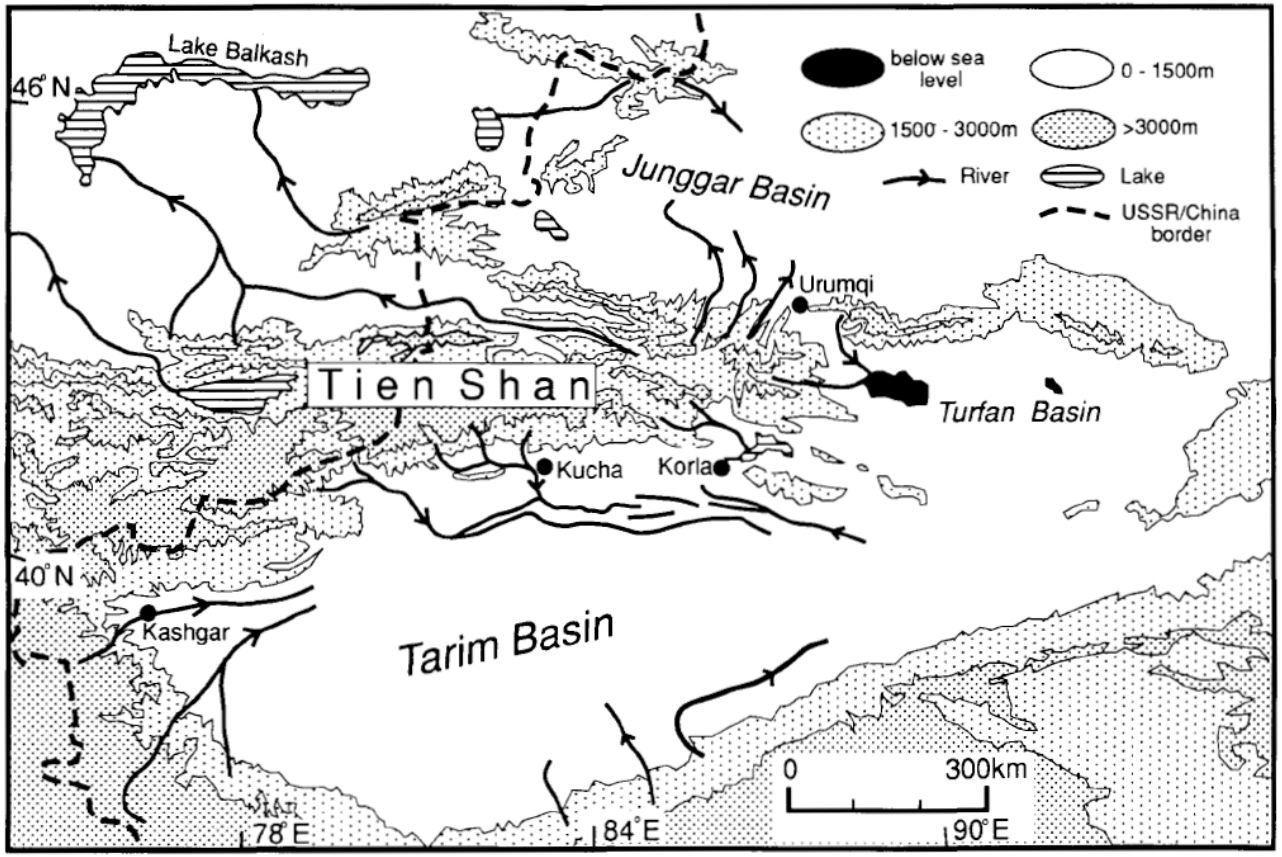
Charles Rubin, CWU

Importance of Basins

- Solid mineral resources: coal, iron, gypsum, salt, precious metals.
- Considerable petroleum accumulations.
- Loess and other sediment accumulations hold temporal climatic information, though it is difficult to interpret.

Habit

- Elongate, intramontane basins surrounded by high mountain ranges.
- Entirely internal drainage in Turfan basin - second lowest exposed land surface on earth (-150 m)
- Long term aridity causes build-up of large alluvial fans at mtn. fronts, but inhibits transport into basin interior.
- Large variations in topography and sediment thickness.



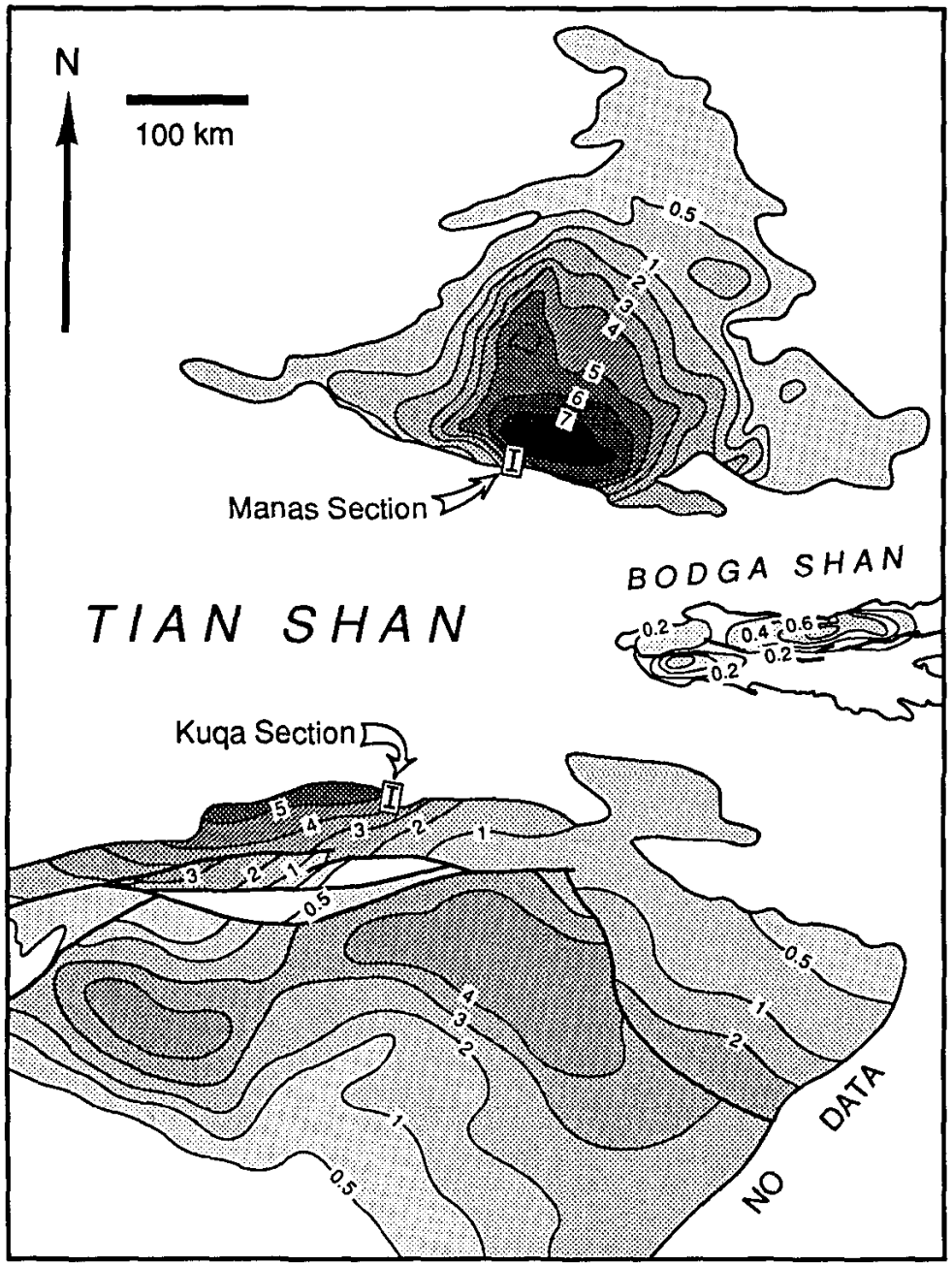
Basin Topography

Tien Shan: a positive physiographic feature partitioning Tarim and Junggar basins throughout Mesozoic and Cenozoic time.

Turfan basin: established as a discrete feature by Early Jurassic.

Allen et al. J.Geo. Soc. 1991

Tectonic Control of Basins



Hendrix et al. GSA Bull. 1992

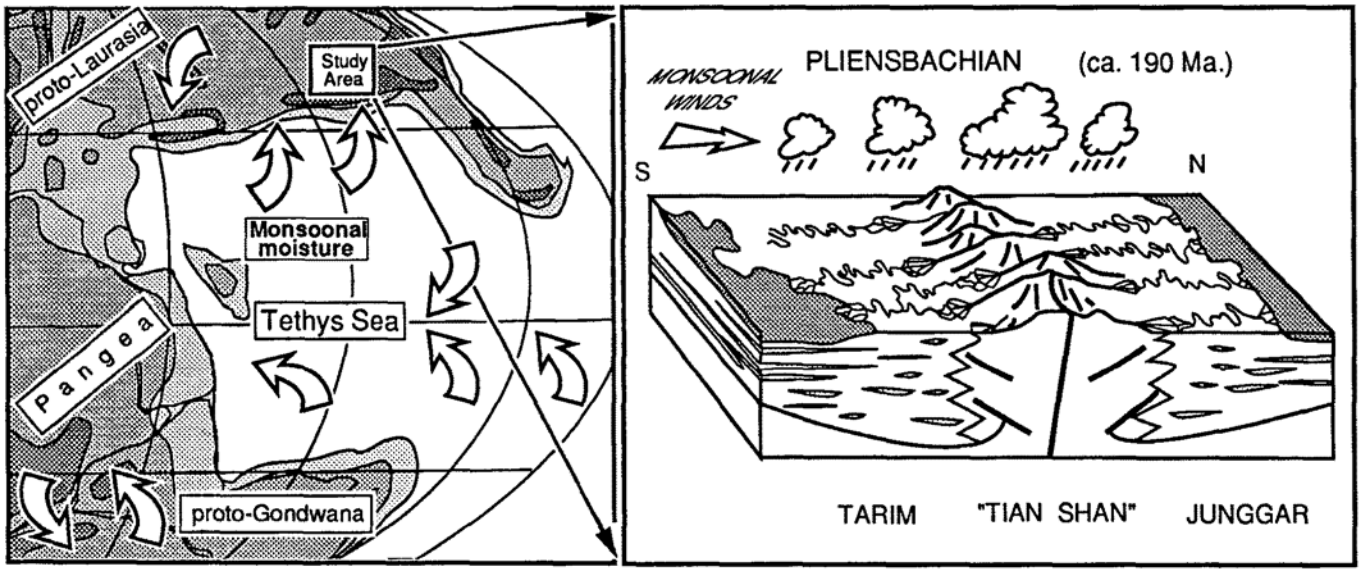
Figure shows isopachs of N. Tarim, S. Junggar, and Turpan basins.

Asymmetries of Mesozoic sediment accumulations indicates sediment distribution in foreland basins - deposition in actively subsiding troughs.

Timeline

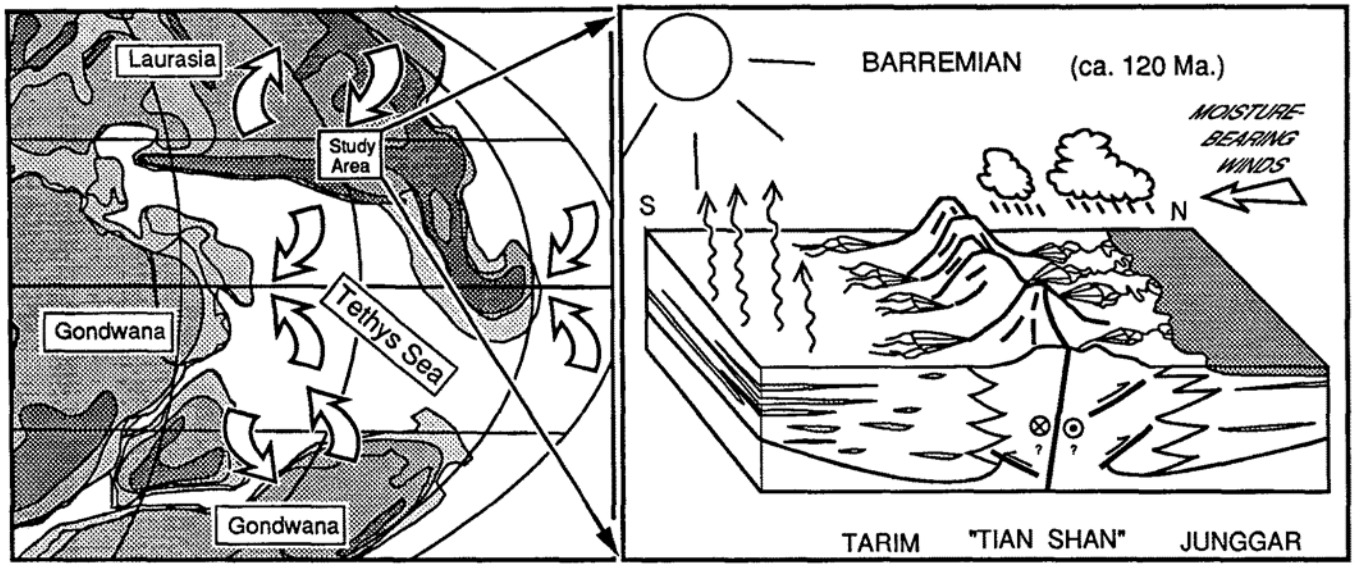
- Paleozoic:
  - Collision of large tectonic blocks - foreland basin N. of Tien Shan formed
- Permian:
  - extension across N. basins and basic magmatism
- Mesozoic:
  - Jurassic: thermal subsidence - low-energy non-marine clastic deposition
- Cenozoic:
  - Compression (India/Asia collision)
  - higher-energy sedimentation.
  - Coarse clastic rocks
  - Sporadic evaporite deposition

Paleo-Weather Patterns

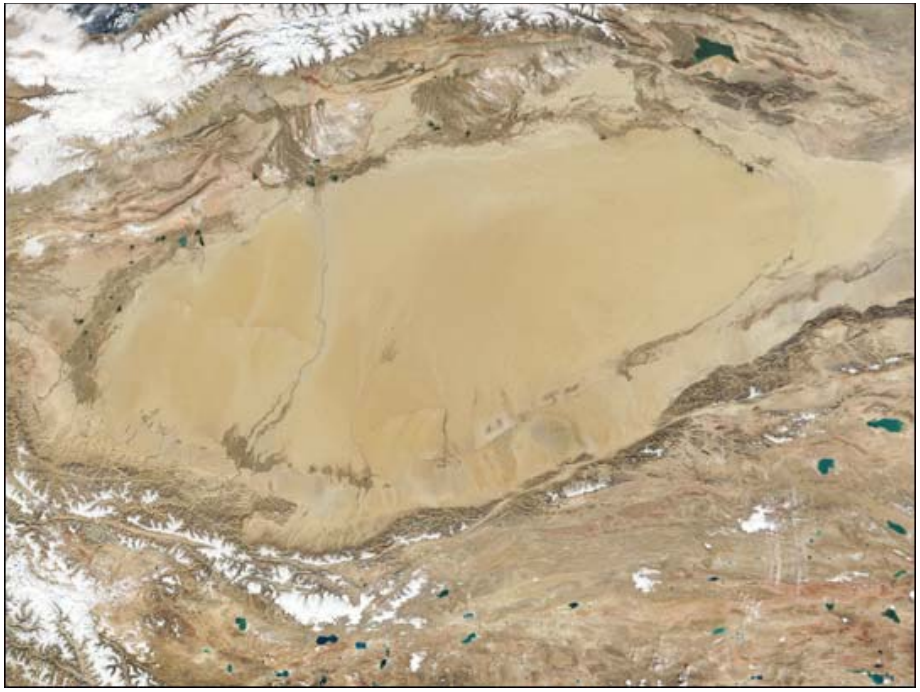


Breakup of Pangea disrupted monsoonal moisture.

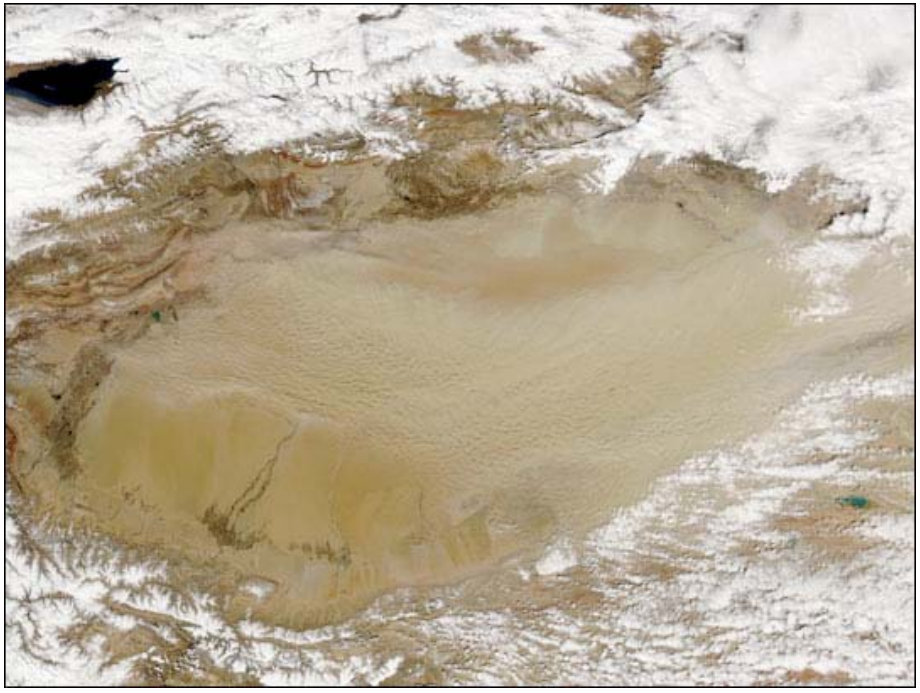
Southwest paleo-winds created a rain shadow in the Tarim, while Junggar had extensive, well oxygenated paleo-lakes



Hendrix et al. GSA Bull. 1992



Taklimakan from MODIS/NASA Earth Observatory



Loess and Dust Storms

Taklimakan ('Enter and Never Leave') desert - world's second largest, divided N. and S. routes of The Silk Road.

Intense storms originate on the western rim and quickly cover the whole desert.

Tien Shan nivial & sub-nivial environments control of seasonal rivers responsible for modern loess deposition in China.

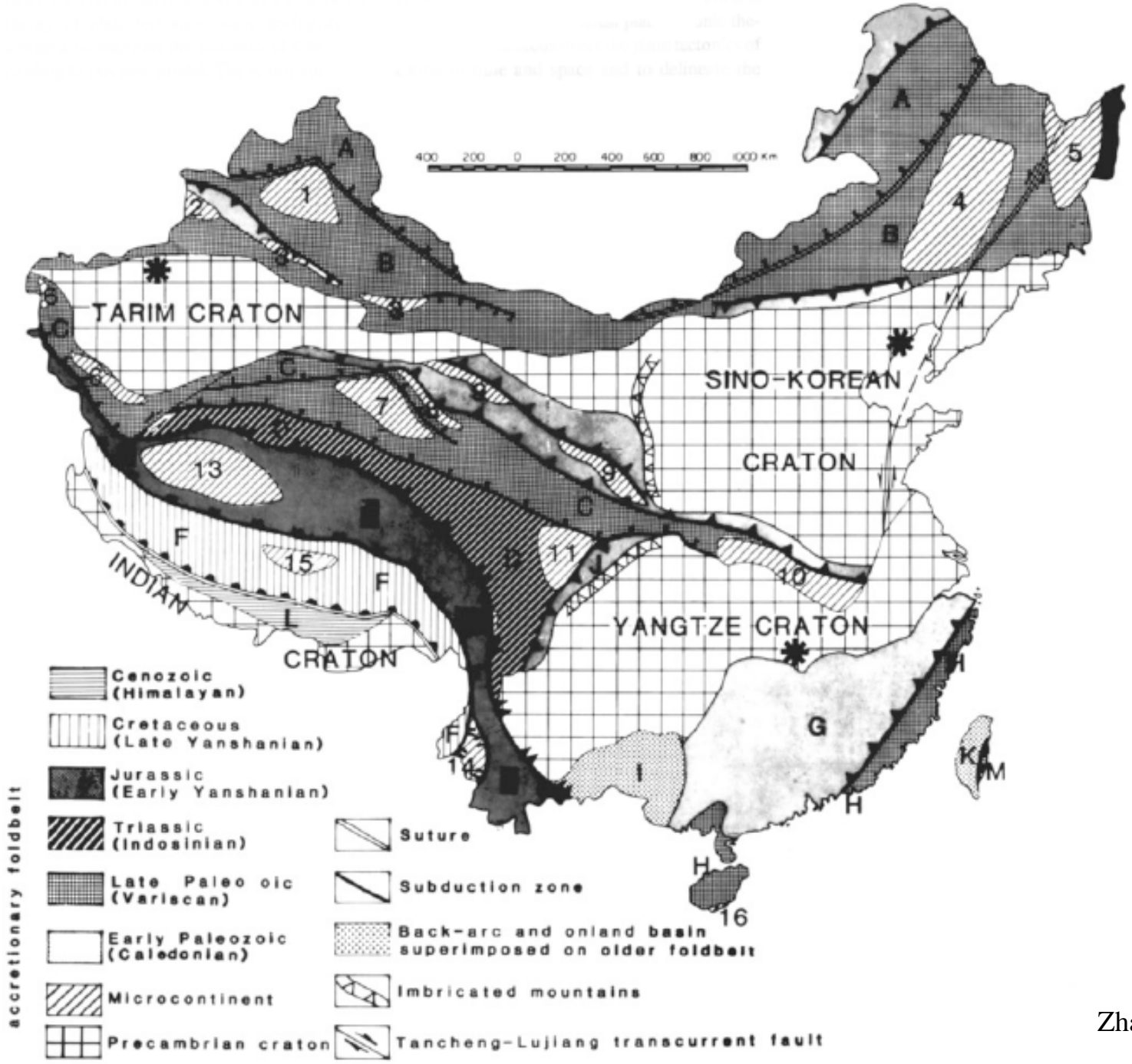
And now for something completely different…
Uyghur Language

- Turkic language family
- 8 vowel sounds:
  - e - ‘bet’, i - ‘bill’
  - a - ‘father’, ä - ‘hat’
  - o - ‘go’ ö - ‘her’
  - u - ‘put’ ü - ‘bit’
- Consonants:
  - ‘gh’, ‘kh’ - ‘loch’
- ‘yakhshimu siz’ - How are you?
- ‘yakhshi (siz chu?)’ - Fine (and you?)
- ‘yaq’

Uyghur Greetings

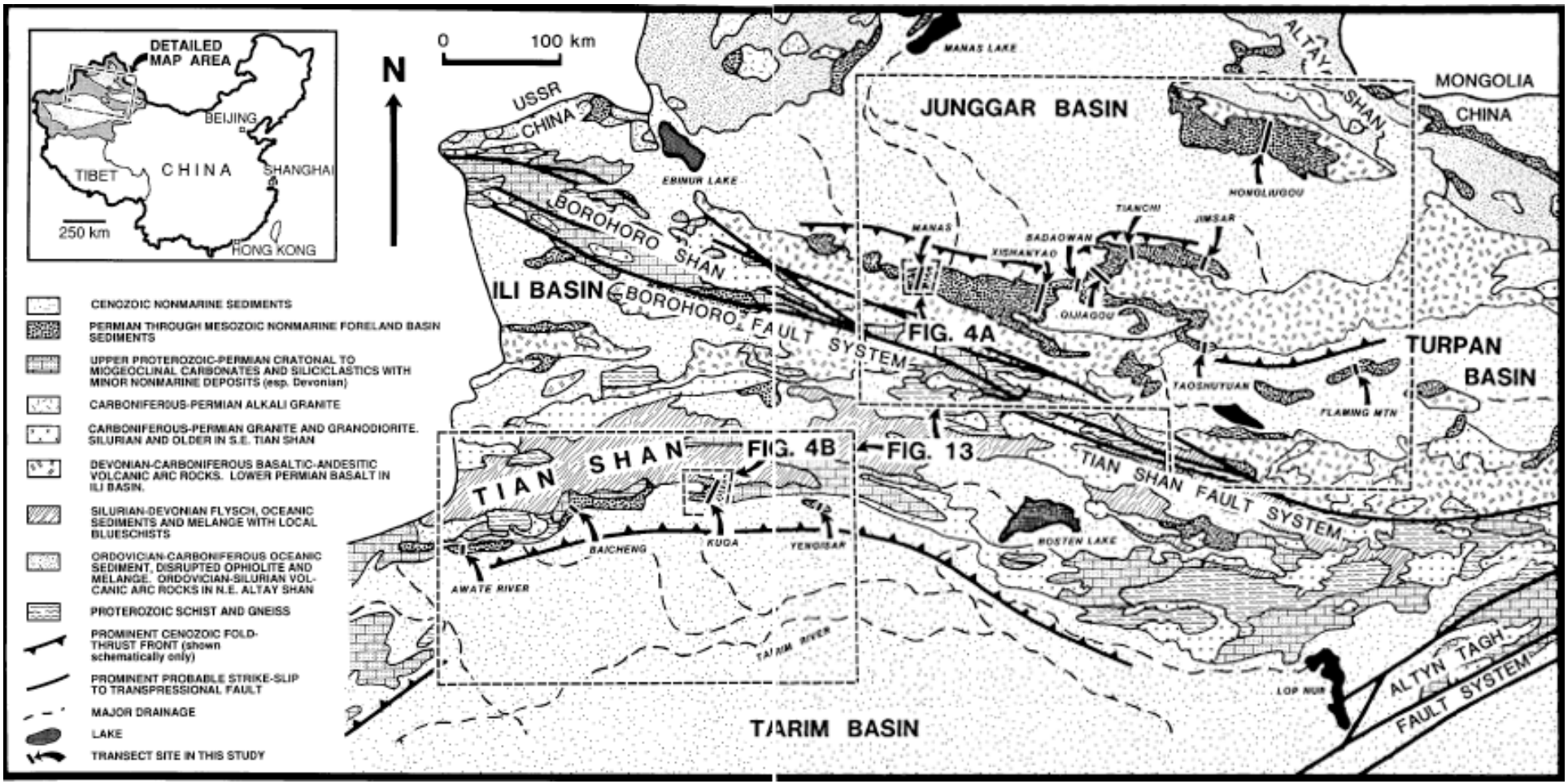
- Greeting: right hand over heart, bow slightly.
  - *Yakshimu siz* or *ässalamu äläykum*
  - Respond: *yakhshi* or *w*ä*'äläykum ässalam*
- Shaking hands: (Men only)
  - Hold hands out close together, slide hands together with right-hands inside. Bring hands back palm-open, draw towards face and stroke down.
  - Same gesture is used when completing a meal or finishing studying the Koran.
- 'Yes' - hä'ä, 'No' - yaq
  - Yaq can be said with a whine and a grimace
- 'Thank you' - rakhmät
  - Hold right hand over heart, modest bow.
- 'Goodbye' - hosh
  - Literally: 'happiness'
  - Also said w/ heart-holding and bow

Extra Slides below this Slide



Zhang et al. GSA Bull. 1984

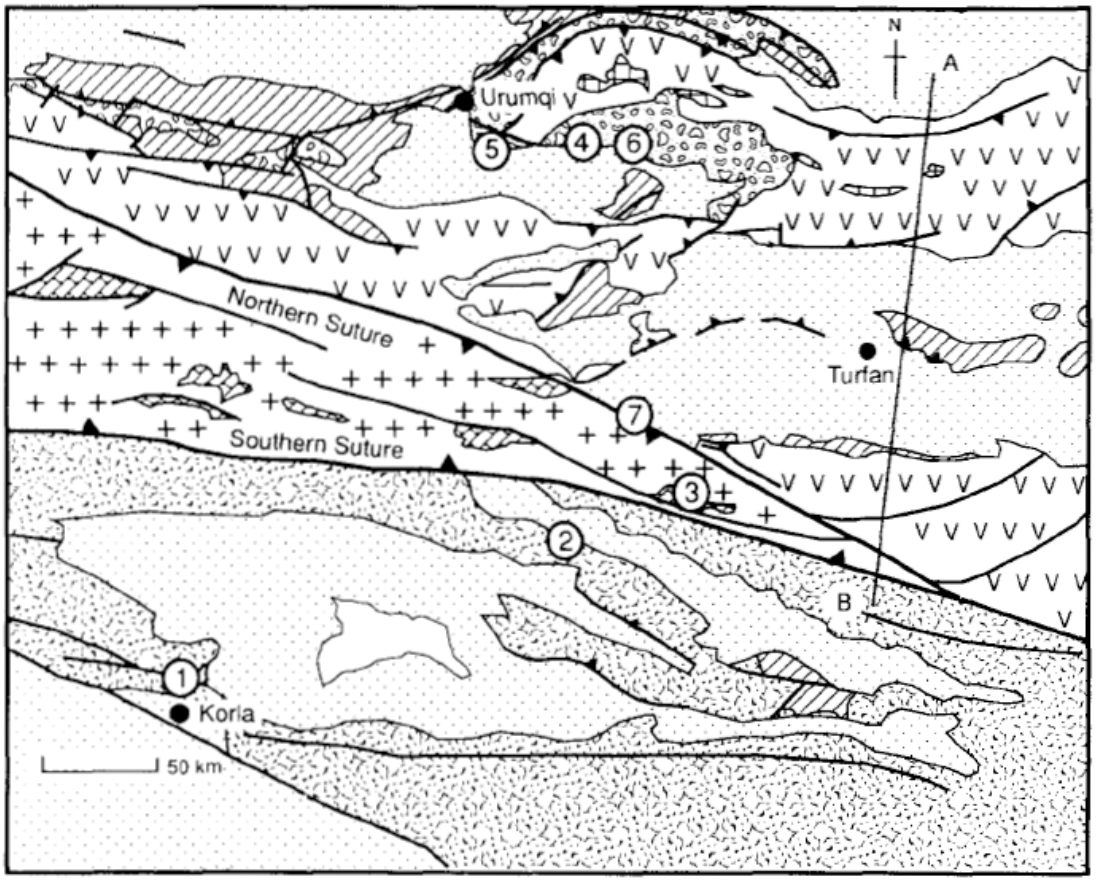
Geologic Map

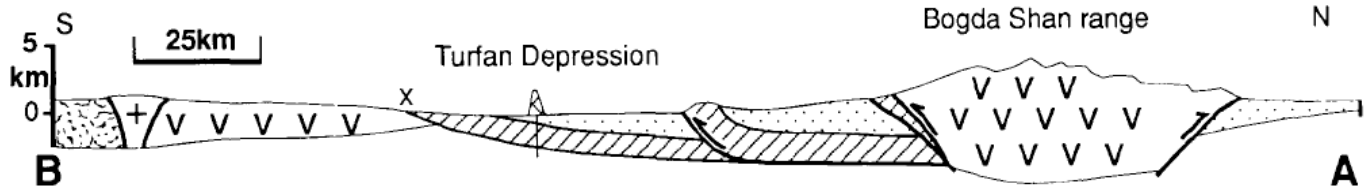


Hendrix et al. GSA Bull. 1992

Tectonic Formation of Basins

Permian collision uplifted Sino-Korean-Tarim plate, resulting in broad continental basins in N. China. Separated from S. China marine sed. Environment by Kunlun-Qinling mountains.





Allen et al. J.Geo. Soc. 1991