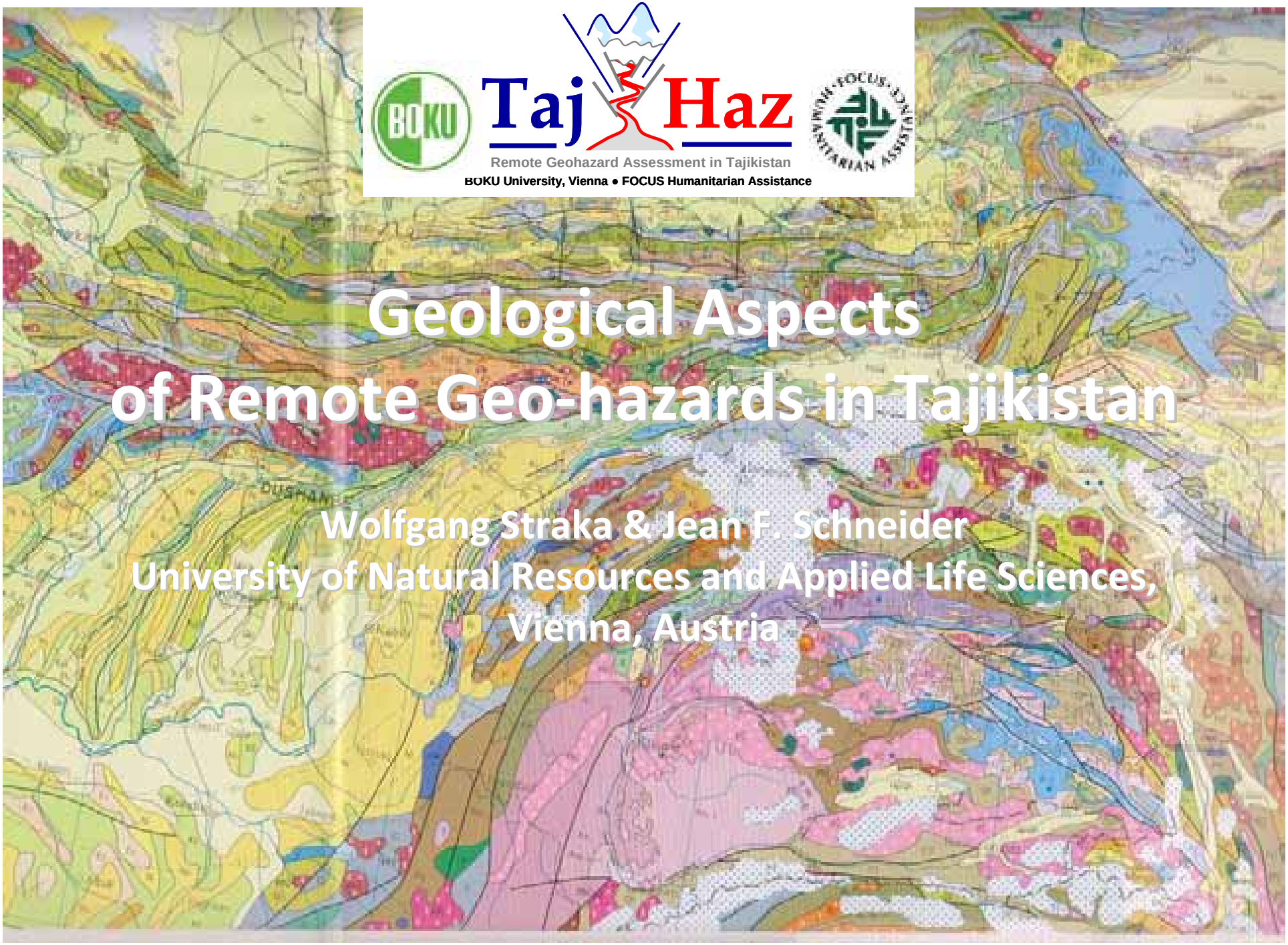
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Remote Geohazard Assessment in Tajikistan
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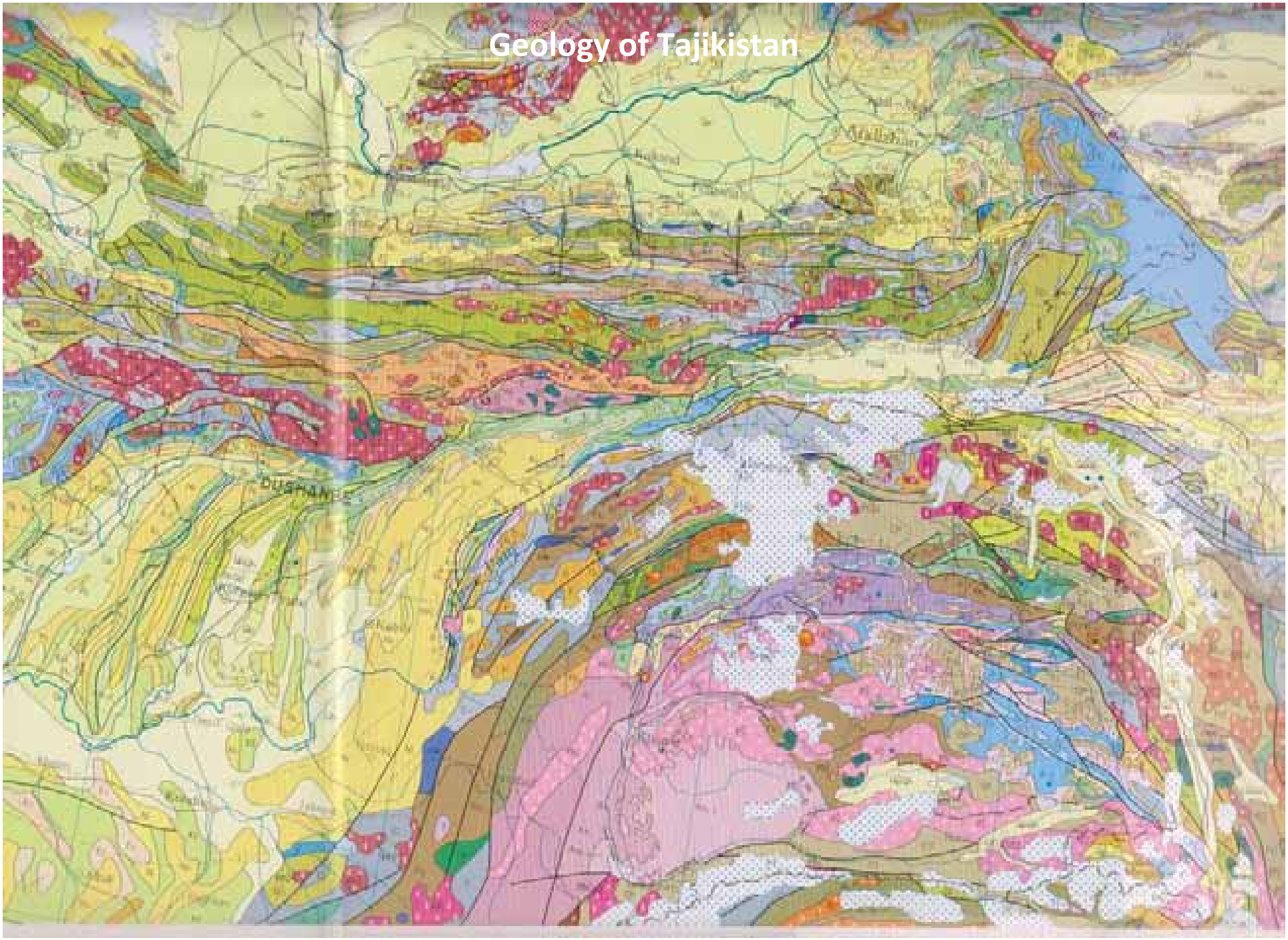
Geological Aspects
of Remote Geo-hazards in Tajikistan
Wolfgang Straka & Jean F. Schneider
University of Natural Resources and Applied Life Sciences,
Vienna, Austria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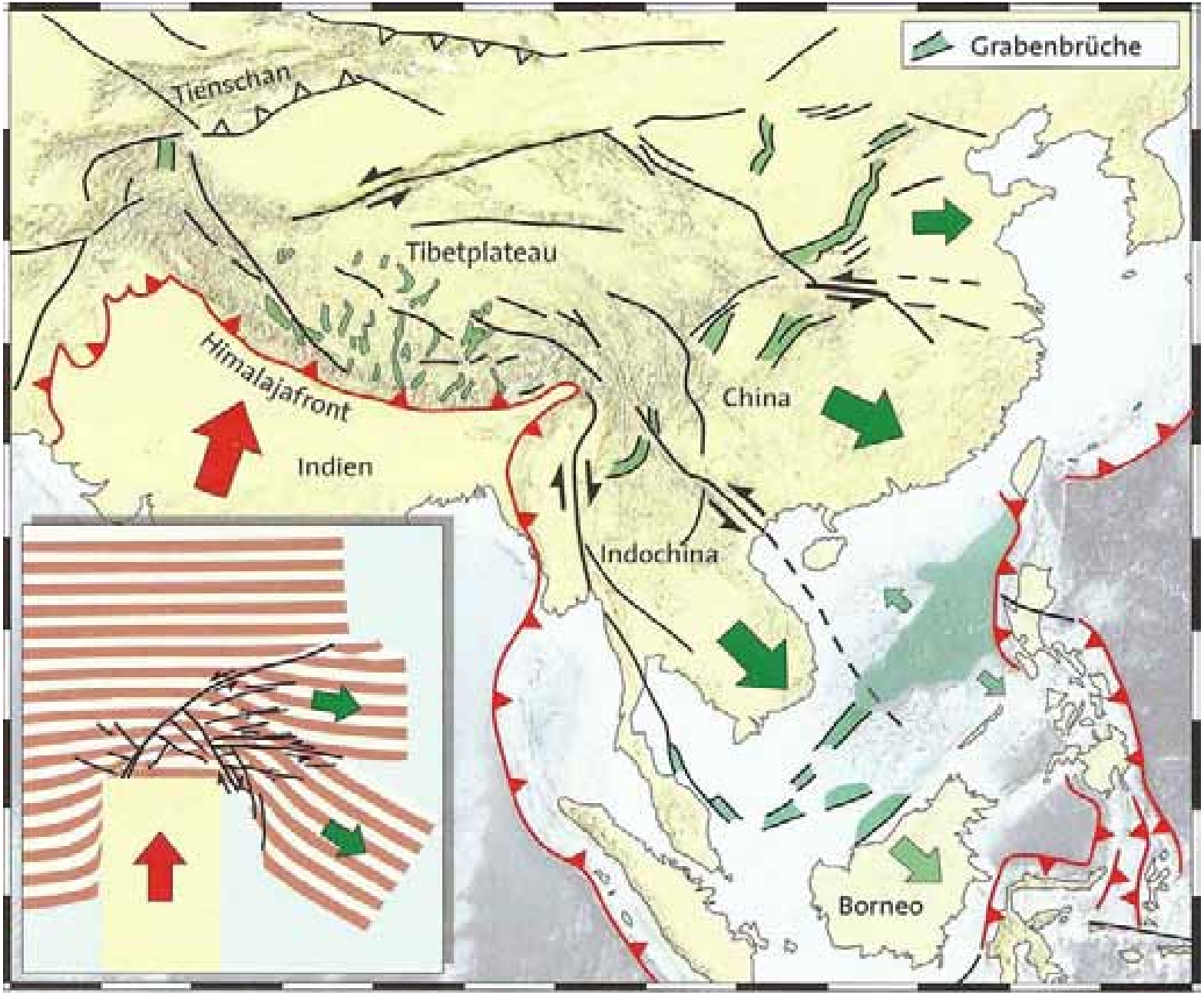
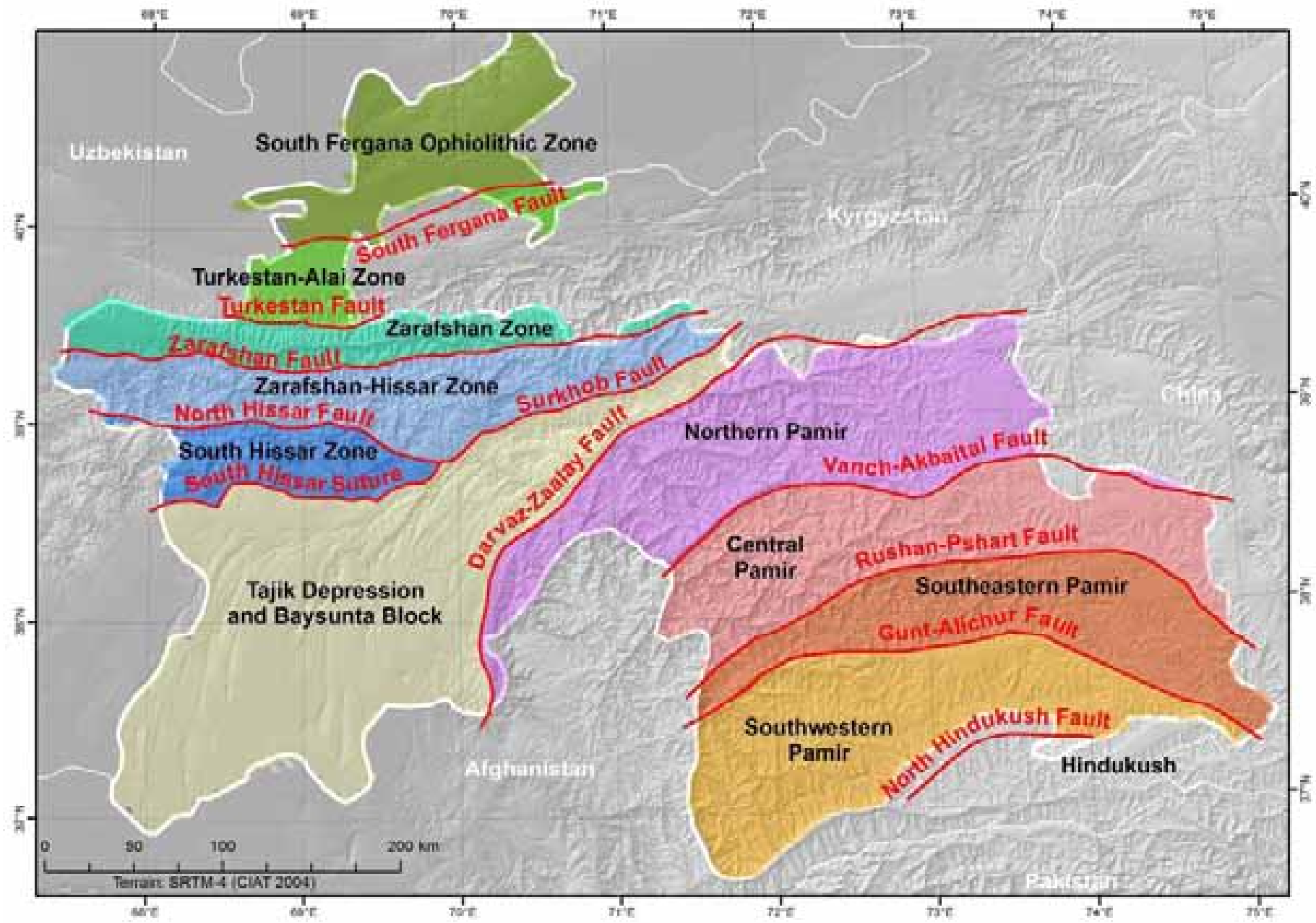
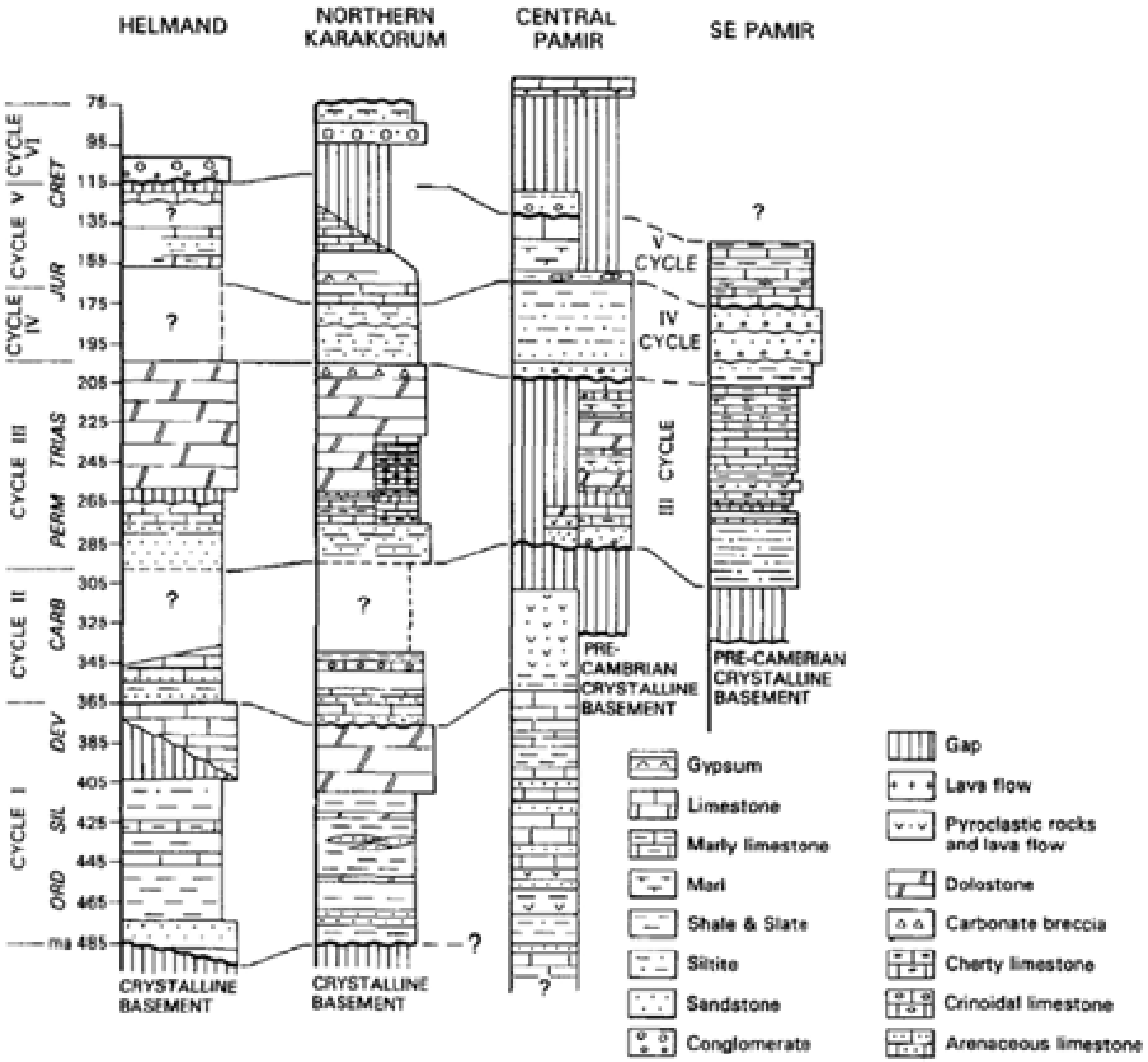
# Tectonics of S–E Asia



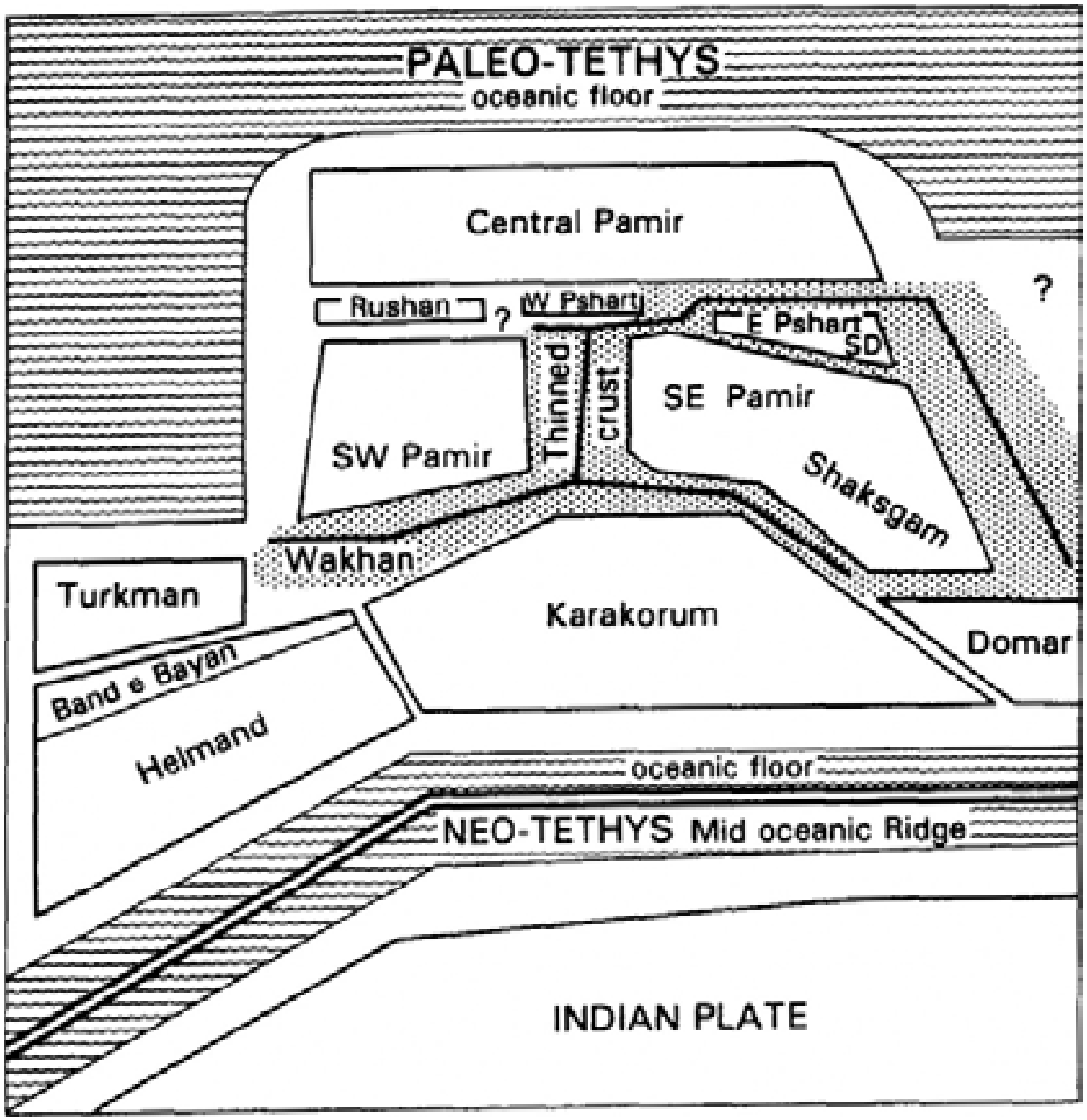
# Tectonic units of Tajikistan

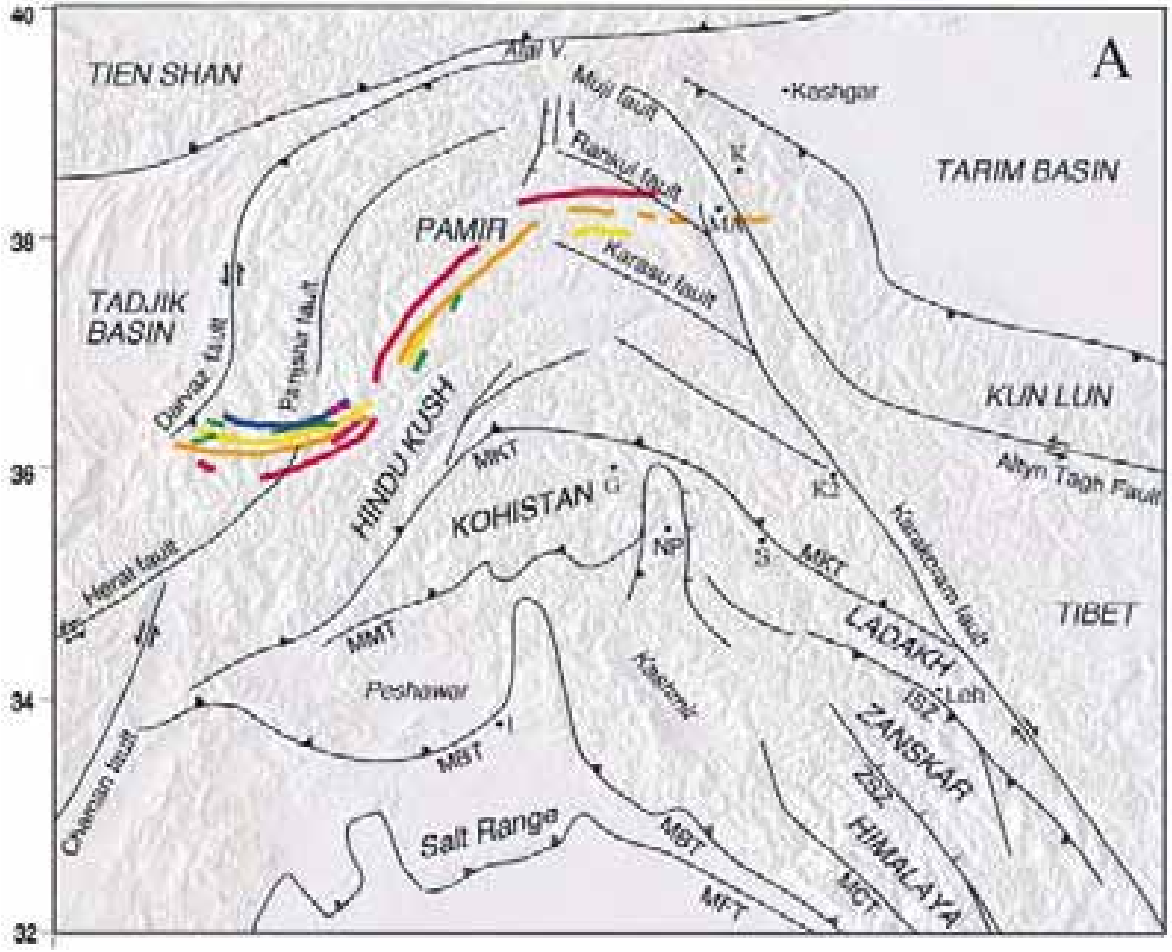


# Stratigraphy of the Pamirs

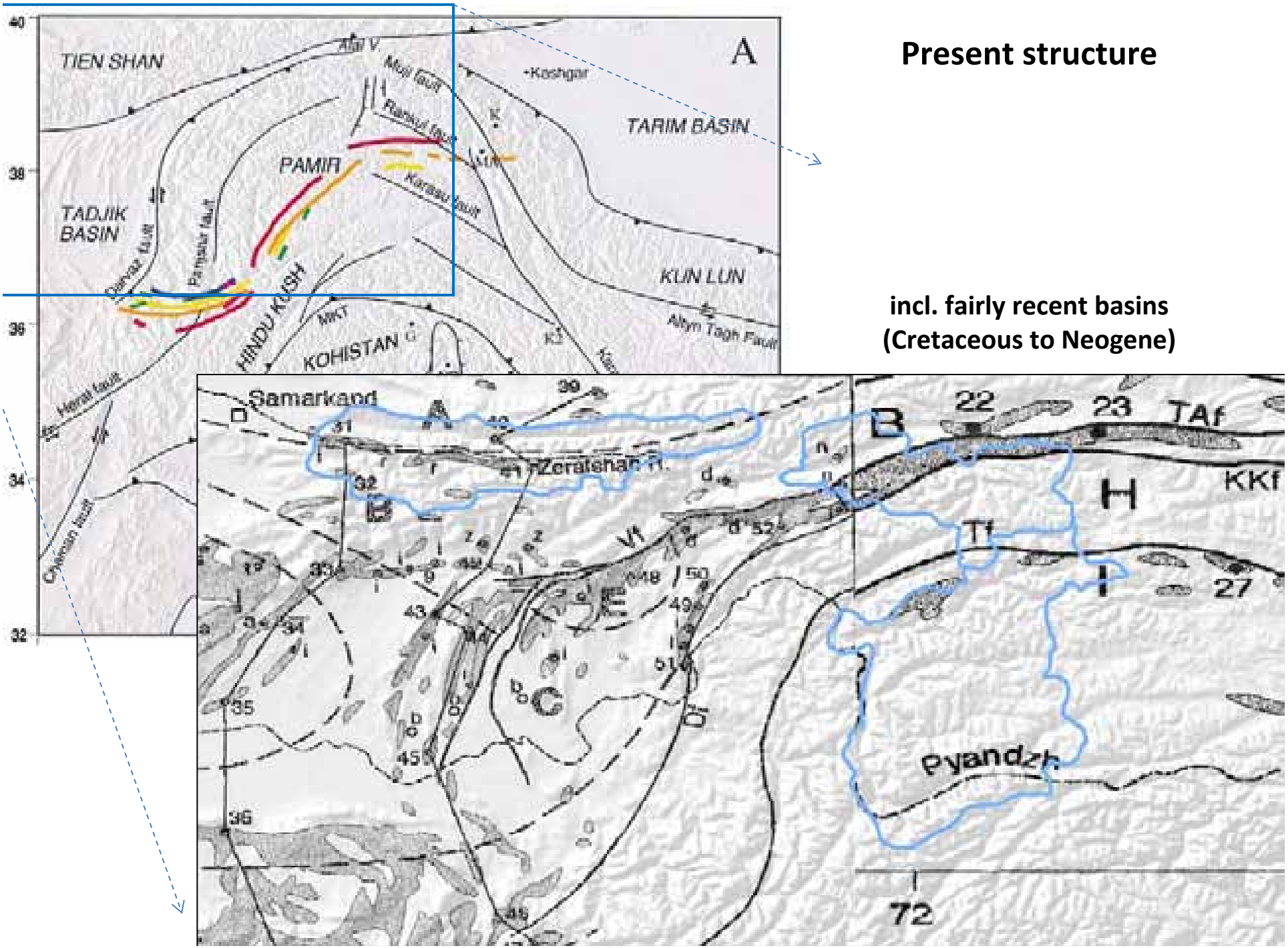


# Paleogeography of the Pamirs





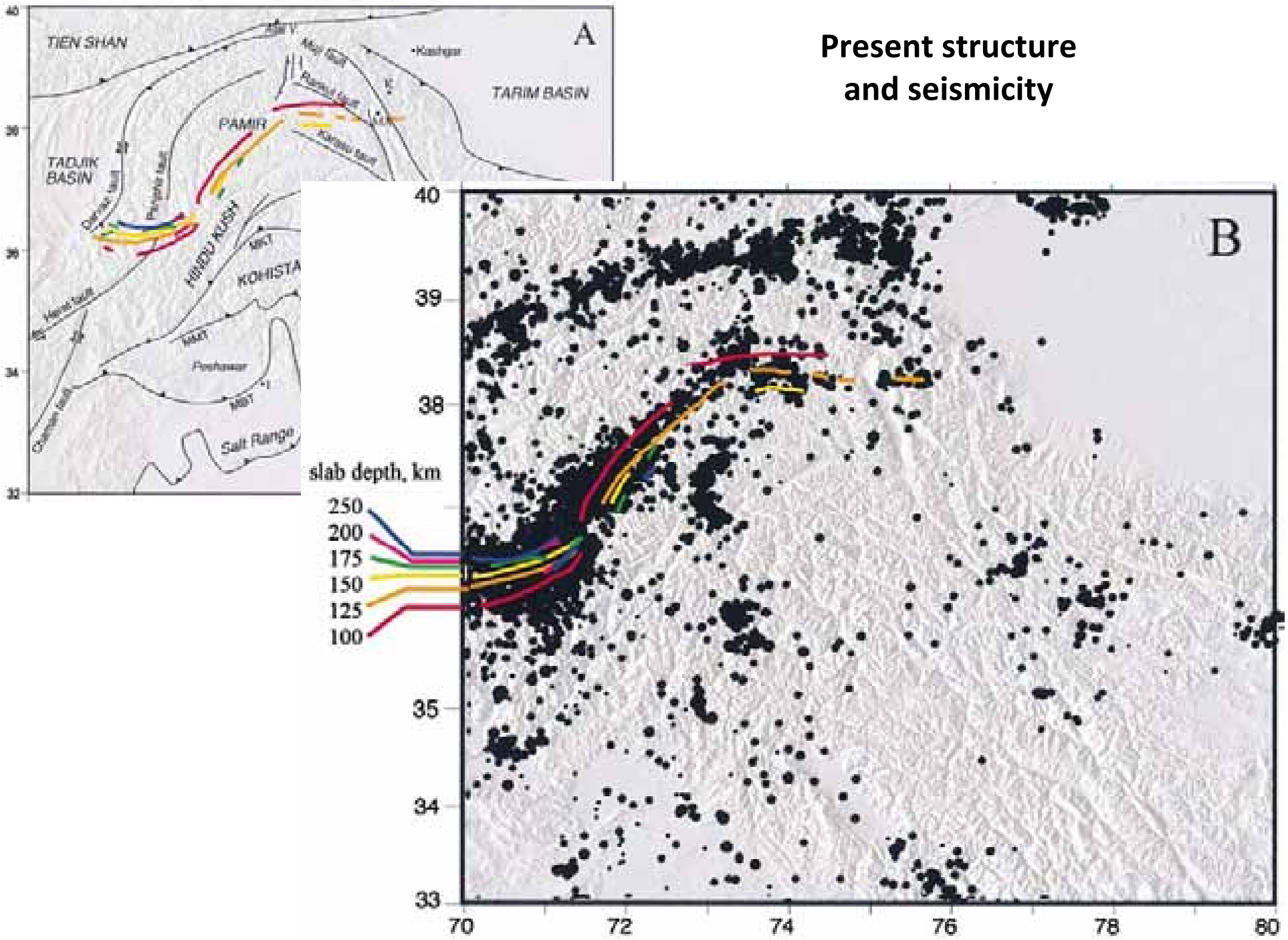

**Present structure**



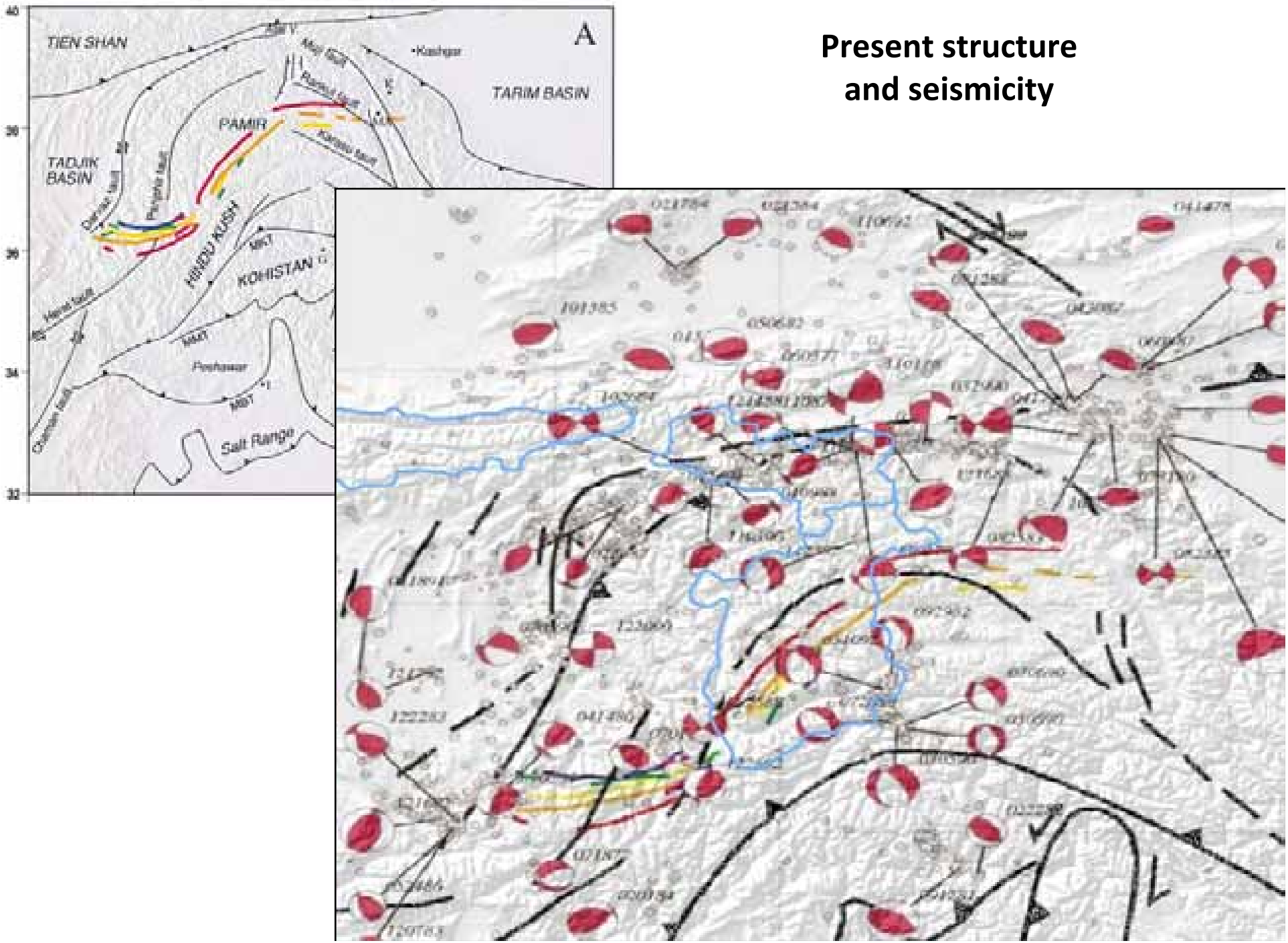

**Present structure**

**incl. fairly recent basins (Cretaceous to Neogene)**

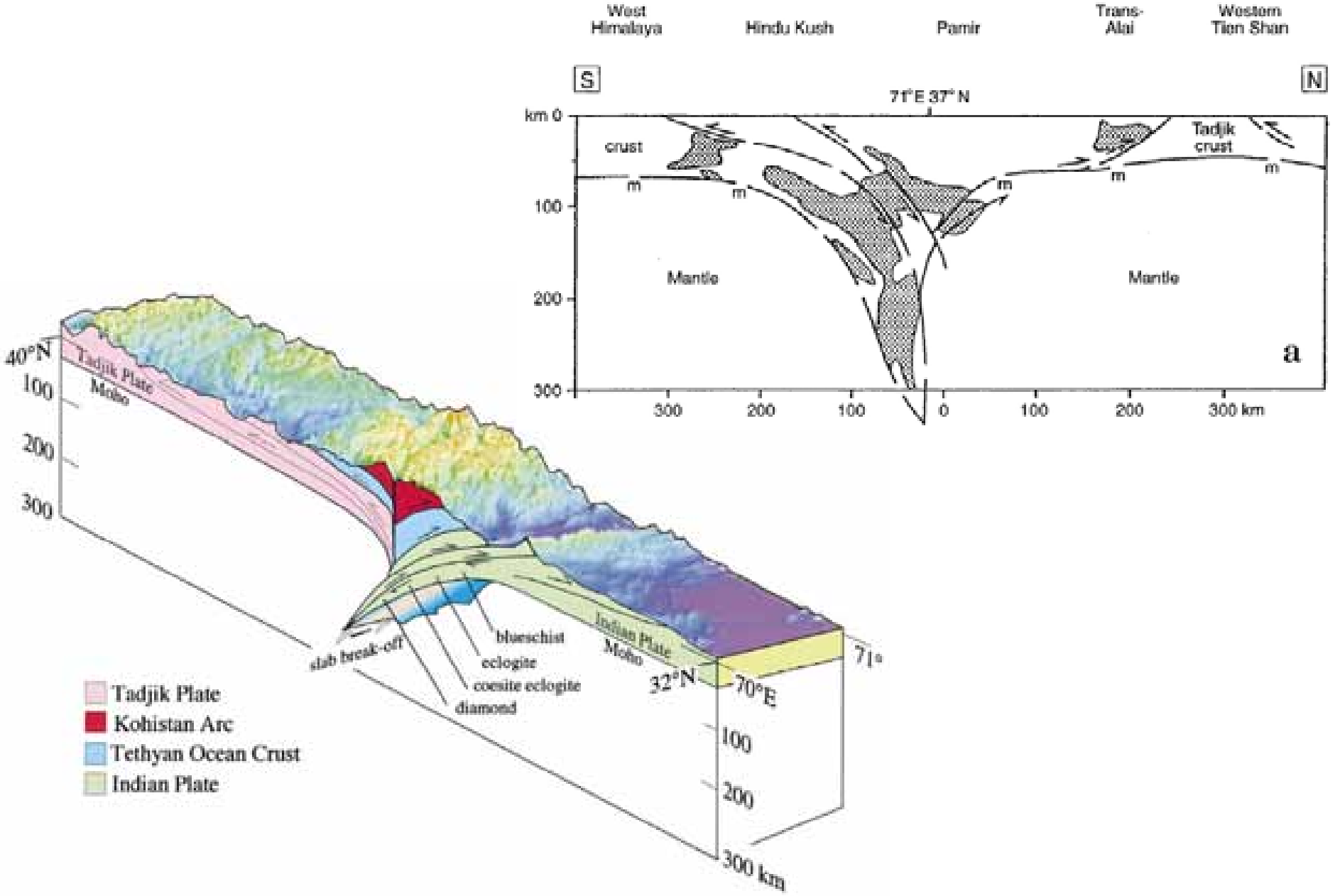
# Present structure and seismicity



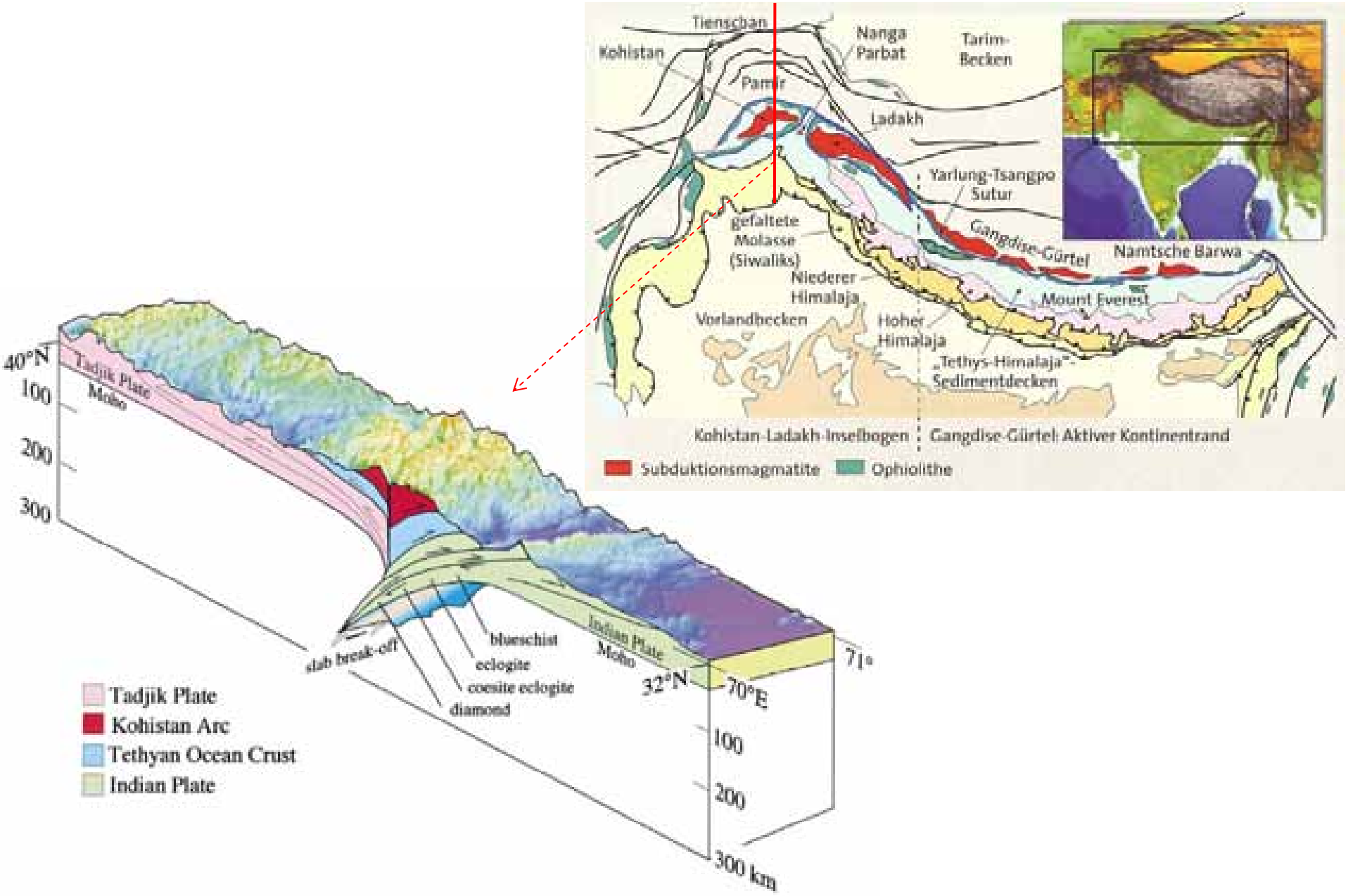
**Present structure and seismicity**



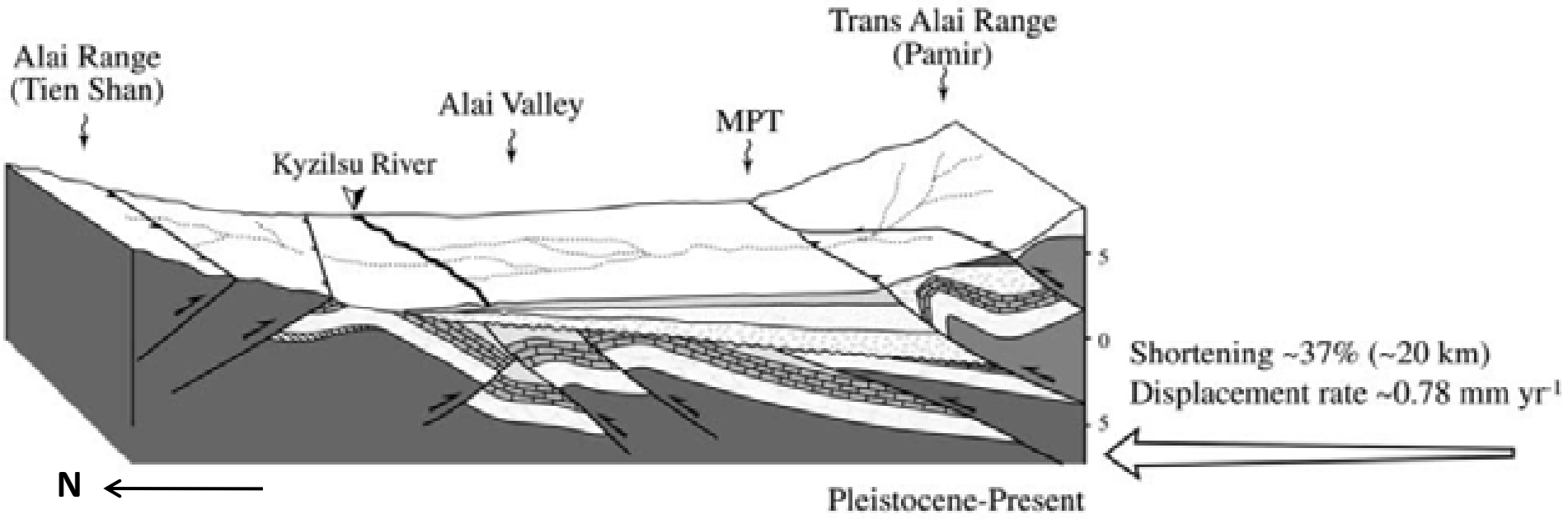
# Plate-Tectonic interpretation



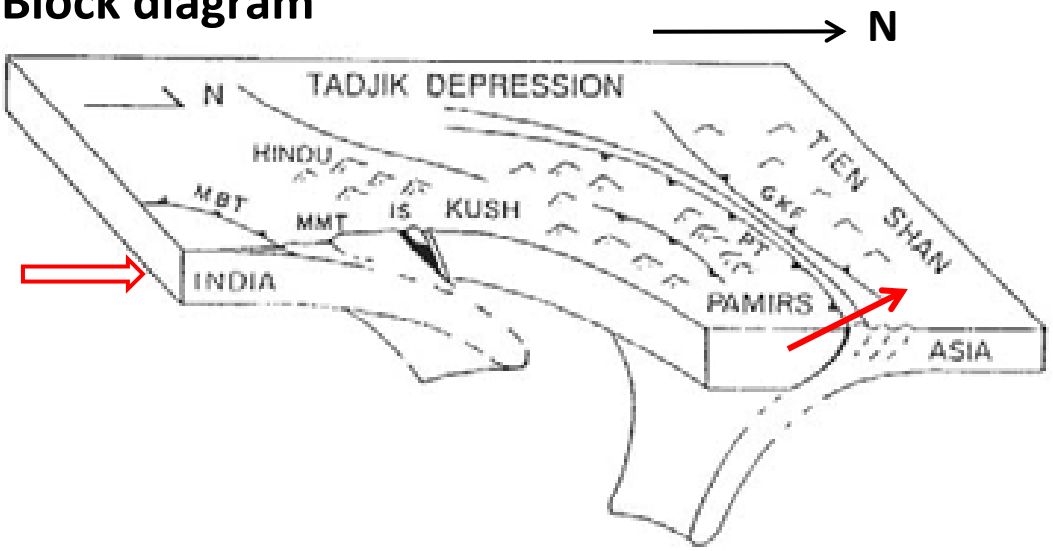
# Plate-Tectonic interpretation



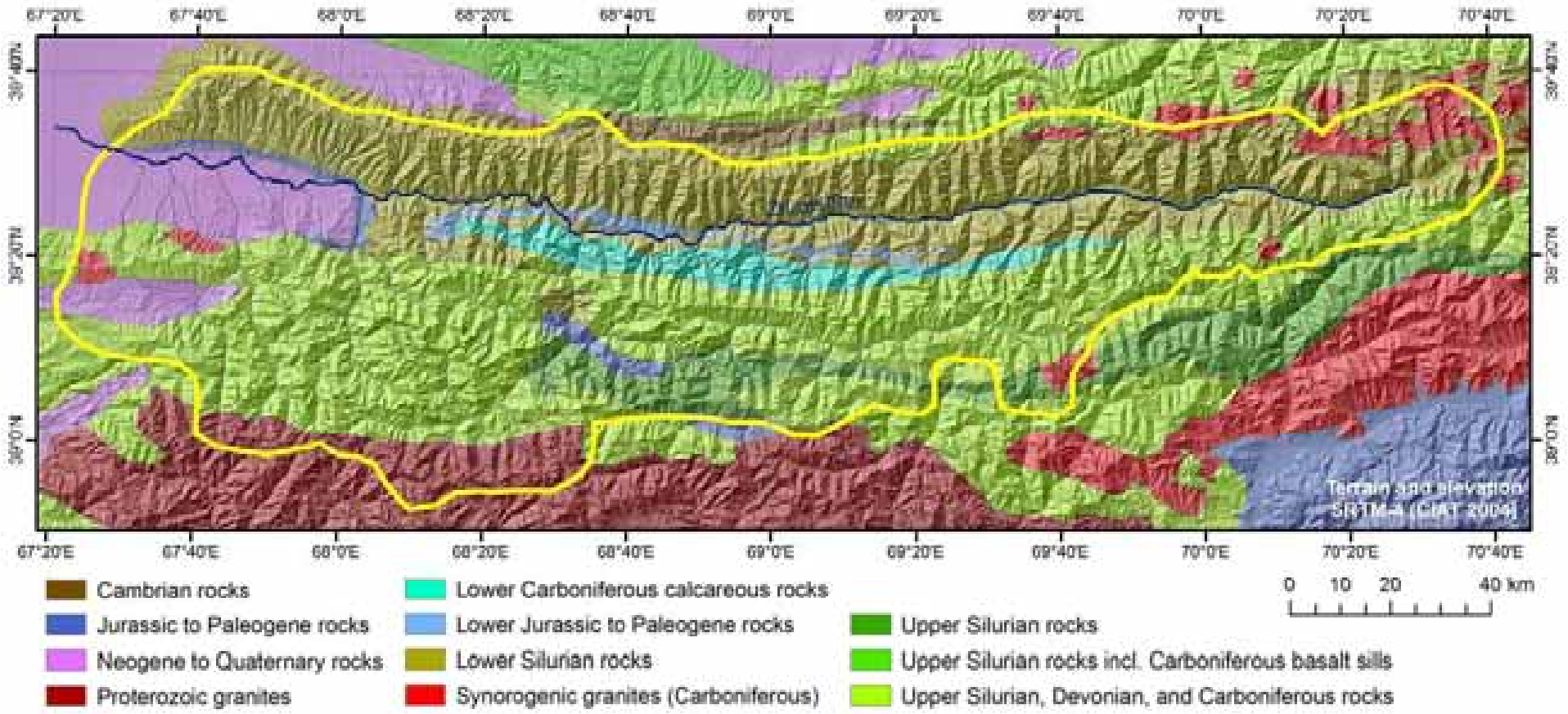
# Structure of the N Pamir / S Tien Shan



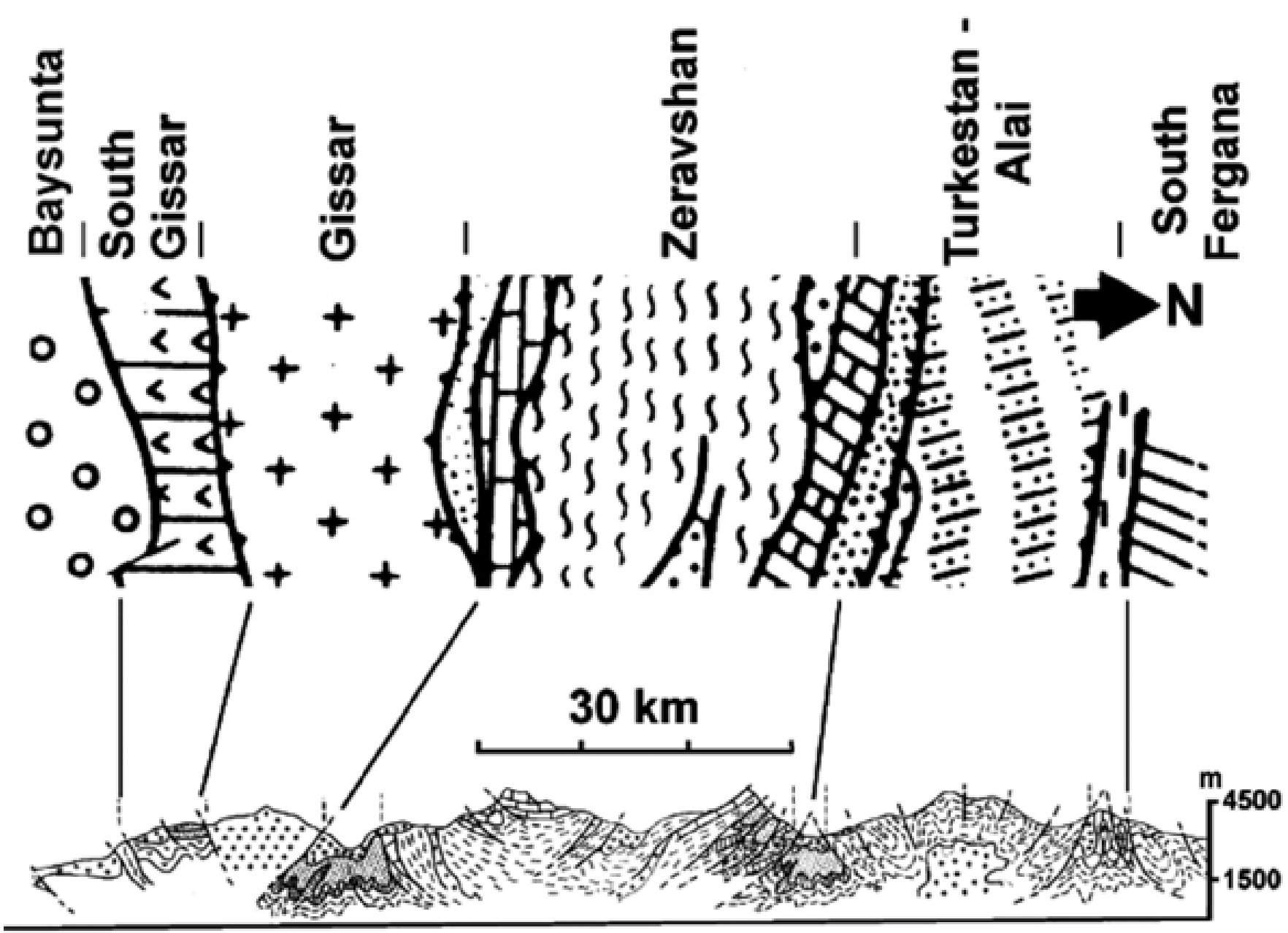

## Block diagram

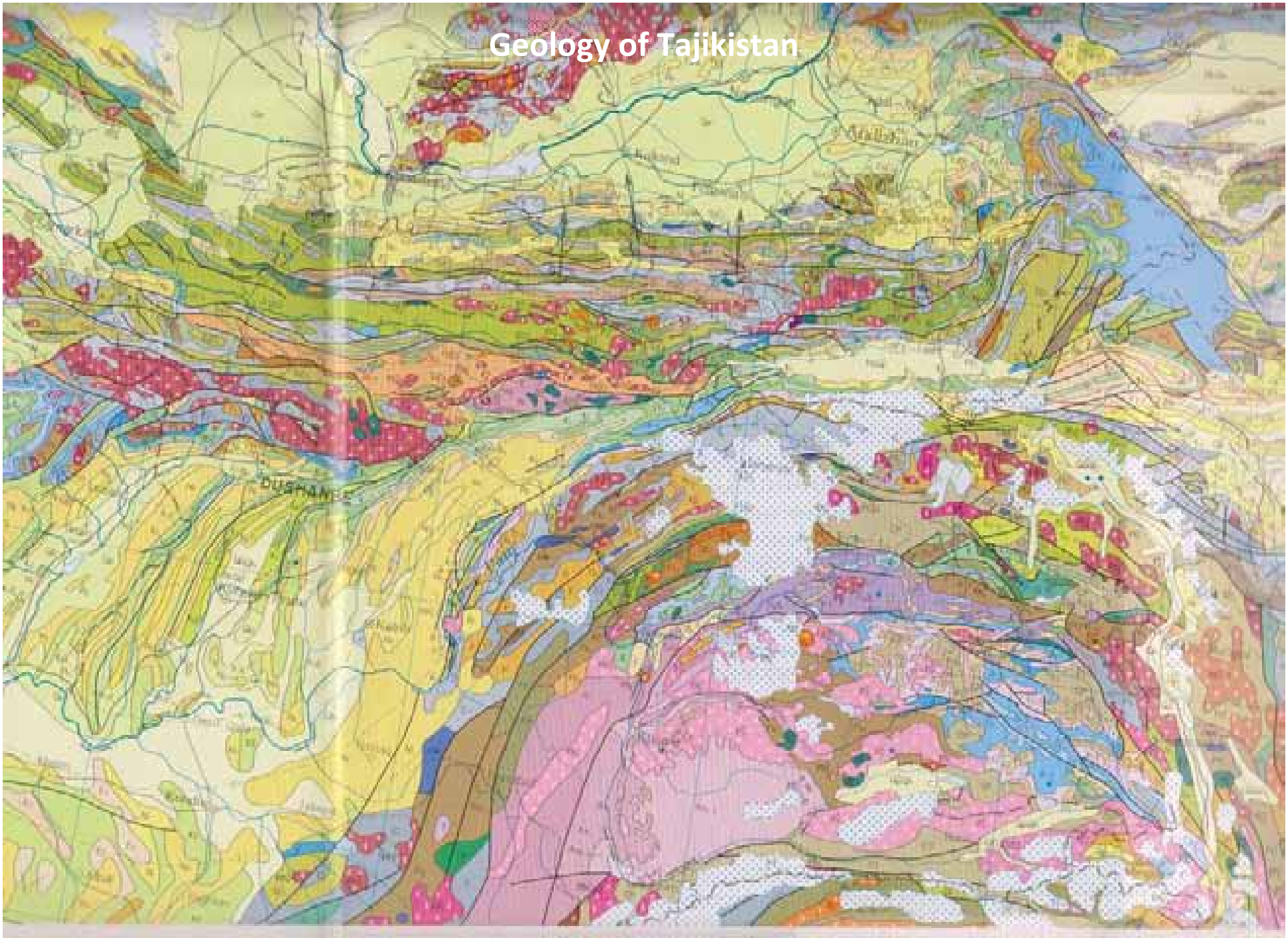


# Geology of North Tajikistan (Zarafshan)



**Tectonic units and structure of North Tajikistan**

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# Geological hazard factors

1. **Geological units or tectonic blocks:**
   **different "life histories" → diff. lithological character (rock types) + structural styles**

2. **Past and present tectonic regimes + magmatic events (intrusions, degassing)**
   **→ dipping, folding, faulting (structural styles, incl. local variations), often combined (more than one cycle of crustal transformations) → rock stress and disintegration**

3. **Seismicity: concentrated on active fault systems (incl. Benioff zones; often ancient, but reactivated → distribution understood not without reference to earth history)**

4. **Geologically very recent mountain building → uplift, (over)steepening of relief**
   **→ "mass wasting" (erosion, landslides, …) + precipitation, glaciation**

5. **Weathering: enhanced under conditions of (a) advanced rock disintegration, as well as (b) moderate rainfall and sparse vegetation (no interception)**

6. **Glacial reworking of relief → unconsolidated rocks, additional stress and steepening of relief → additional landslides + pervasive slope-parallel, near-surface fracturing on glacier retreat and stress release**

7. **Glacial retreat and "left-overs": ice avalanches, surges, etc. + dead ice, permafrost retreat → release of disintegrated rock masses and weathering products**

# Examples


Glacial retreat – debris flows


Fluvial redistribution

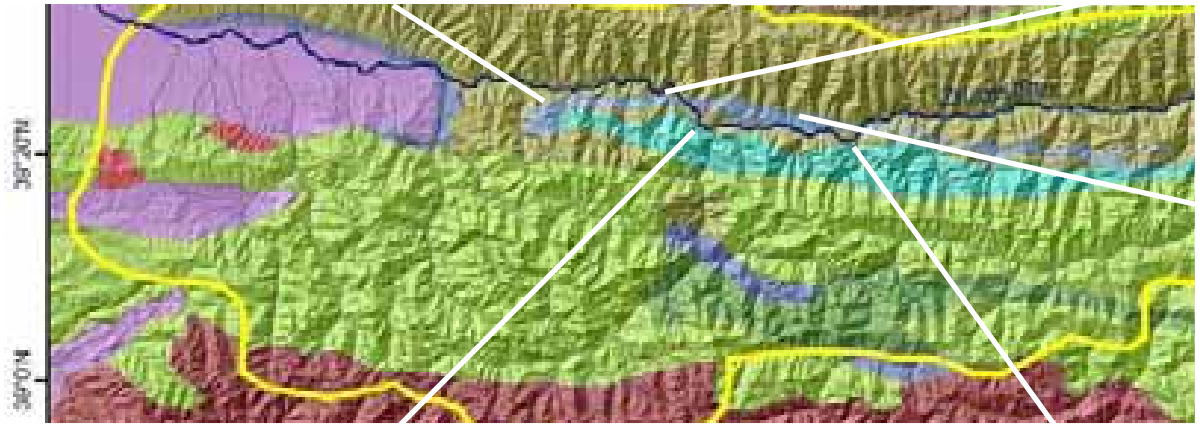

Undercutting – oversteepening

Structural control


**Lithological control**

**+ exposure and oversteepening by uplift, erosion (and glacial activity)**

**+ weathering**





Oversteepening local only, but …


… rock disintegration throughout


Discontinuities


… rock disintegration throughout

# The main problem in predicting events