

This pdf file contains all figure pages in the dissertation:

GEOLOGICAL MAPPING AND CRUSTAL SHORTENING OF
CENTRAL TIBET

By

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A Dissertation

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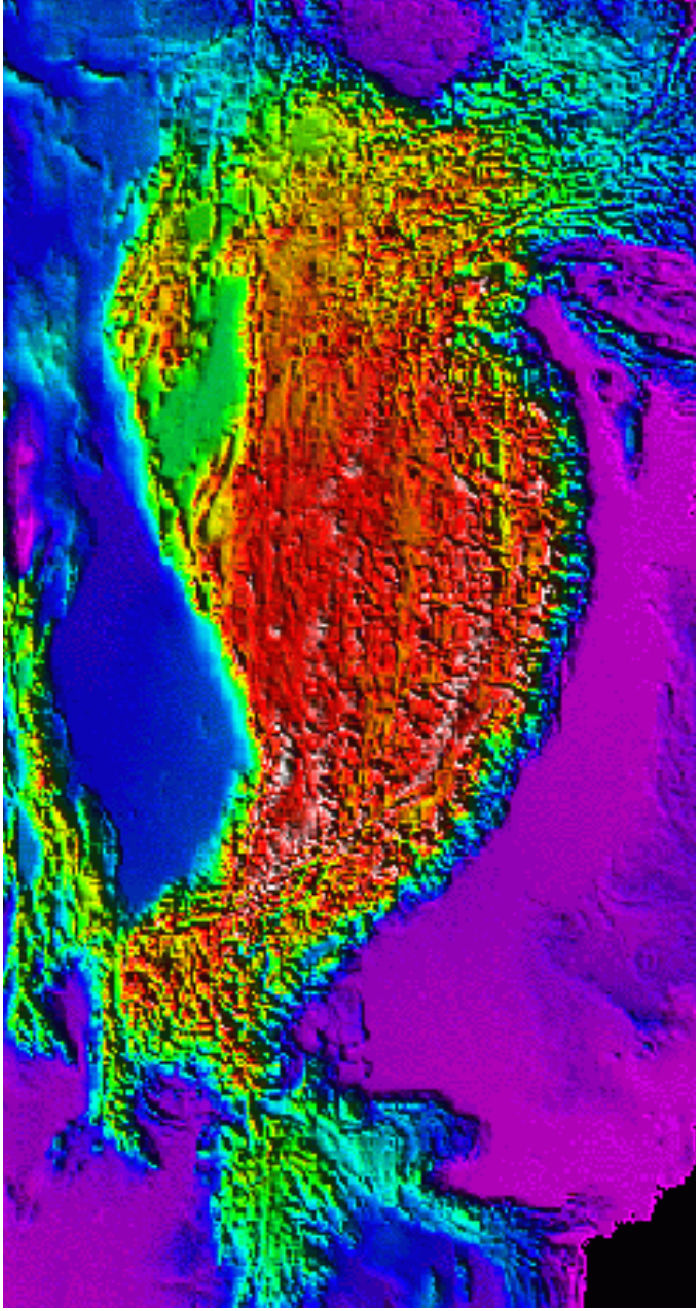


Figure 1.1 Topographic image of Tibet and its surrounding area

(from <http://www.geo.cornell.edu/geology/indepth/MainMenu/mmIntro.html>)

Color indicates elevation as follows: magenta=sea-level; blue=1000m; cyan=2000m; green=3000m; yellow=4000m; red=5000m; white=6000m and above.

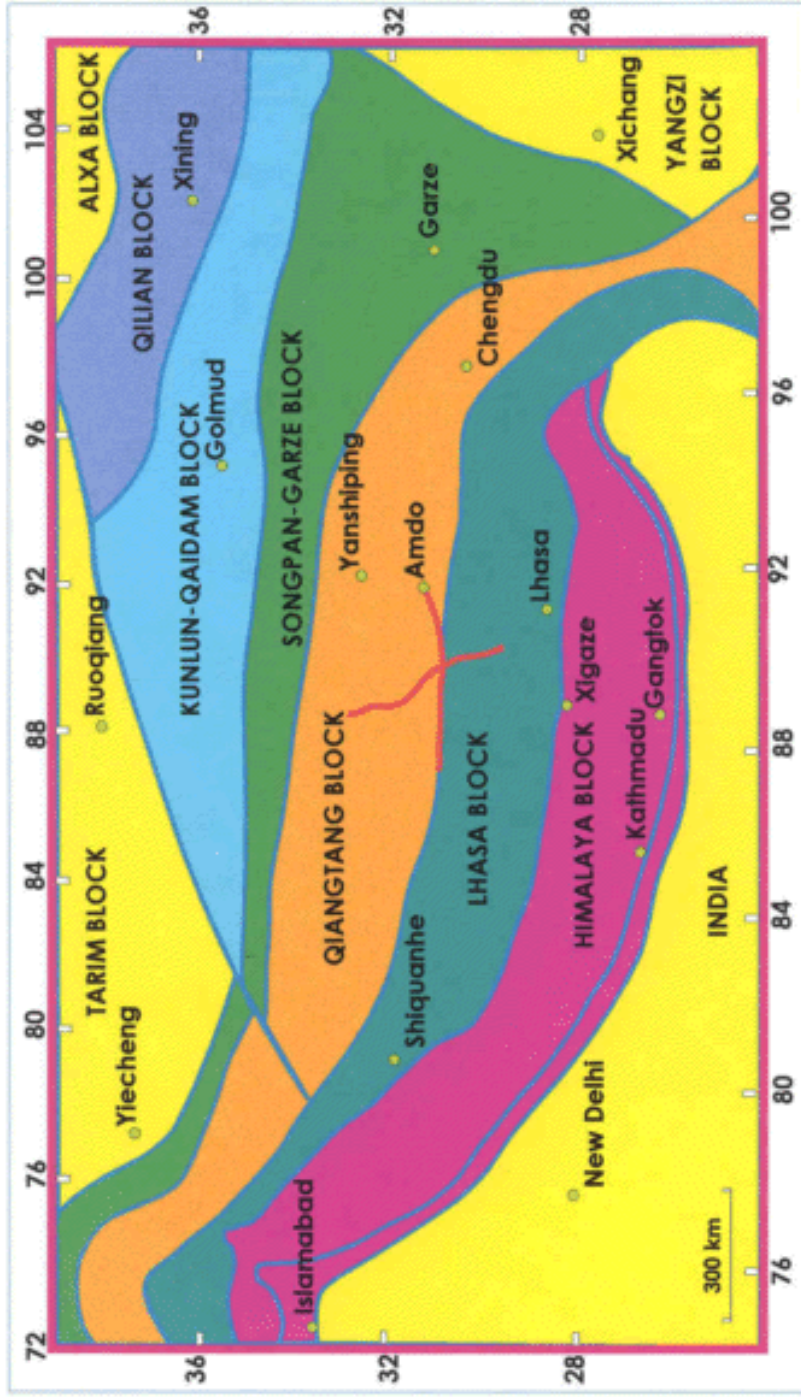


Figure 1.2, Tectonic division map of Tibet and its surrounding area. Red lines are INDEPTH 3 survey line. (after the Geological map of the Qinghai – Tibet plateau and its adjacent region. 1988).

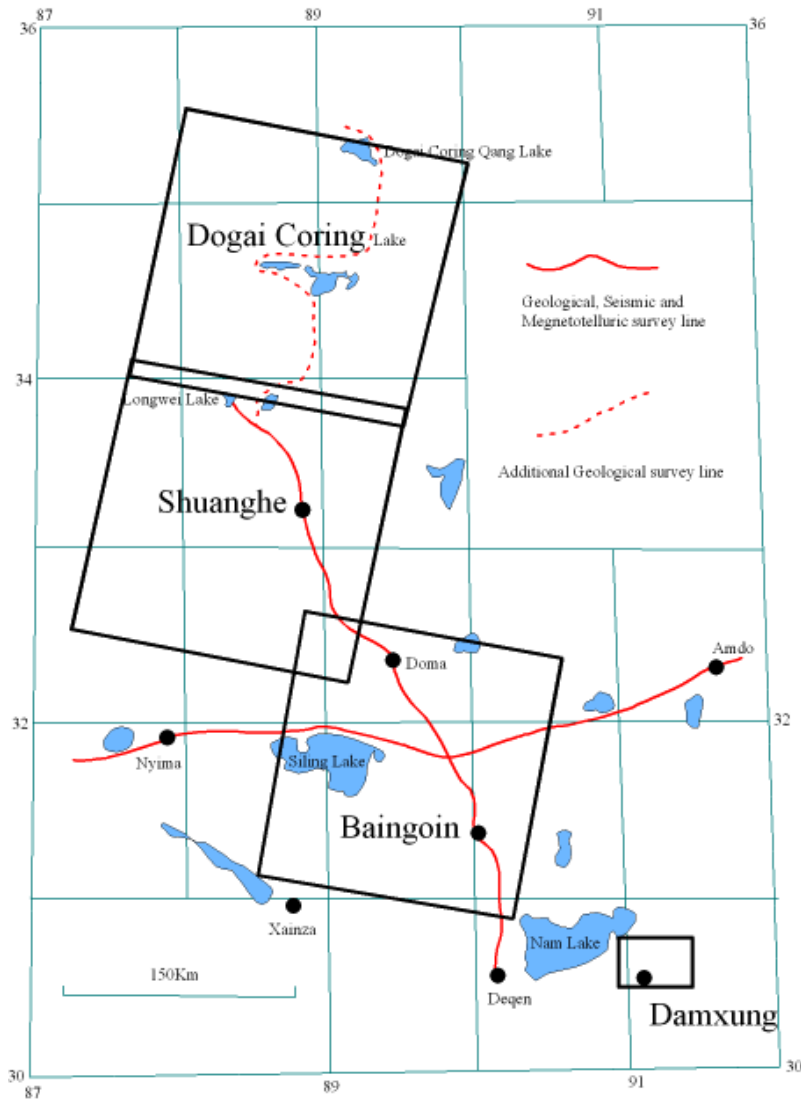


Figure 1.3, INDEPTH 3 survey line (see Plate 1 for details) and locations of the Baingoin, Shuanghe and Dogai Coring interpreted geological maps; as well as location of the northeastern Nyainqentanglha geological map.

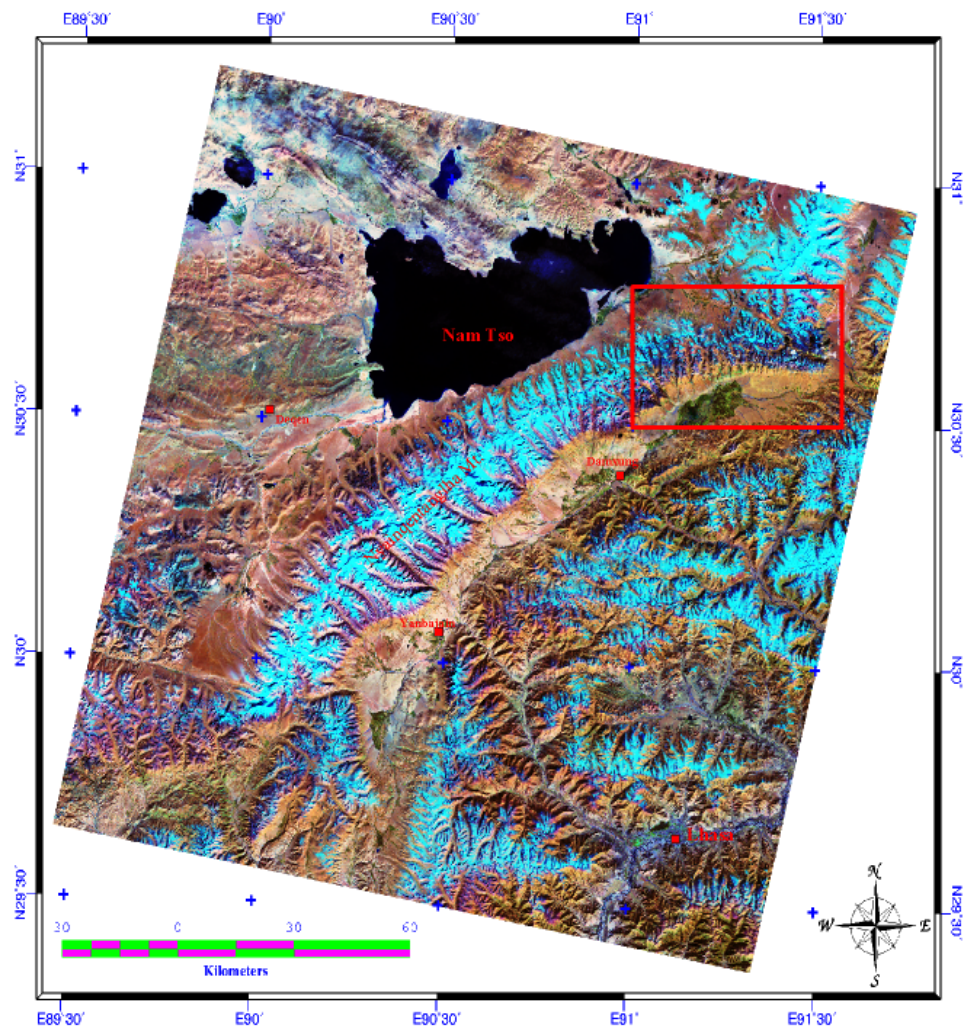


Figure 3.1, TM image of Nyainqentanglha Mt. and study area (Red rectangle). This TM image is false colored with bands 5, 4 and 2 mapped to red, green and Blue respectively, and registered to geographic coordinates and projected to UTM zone 46.

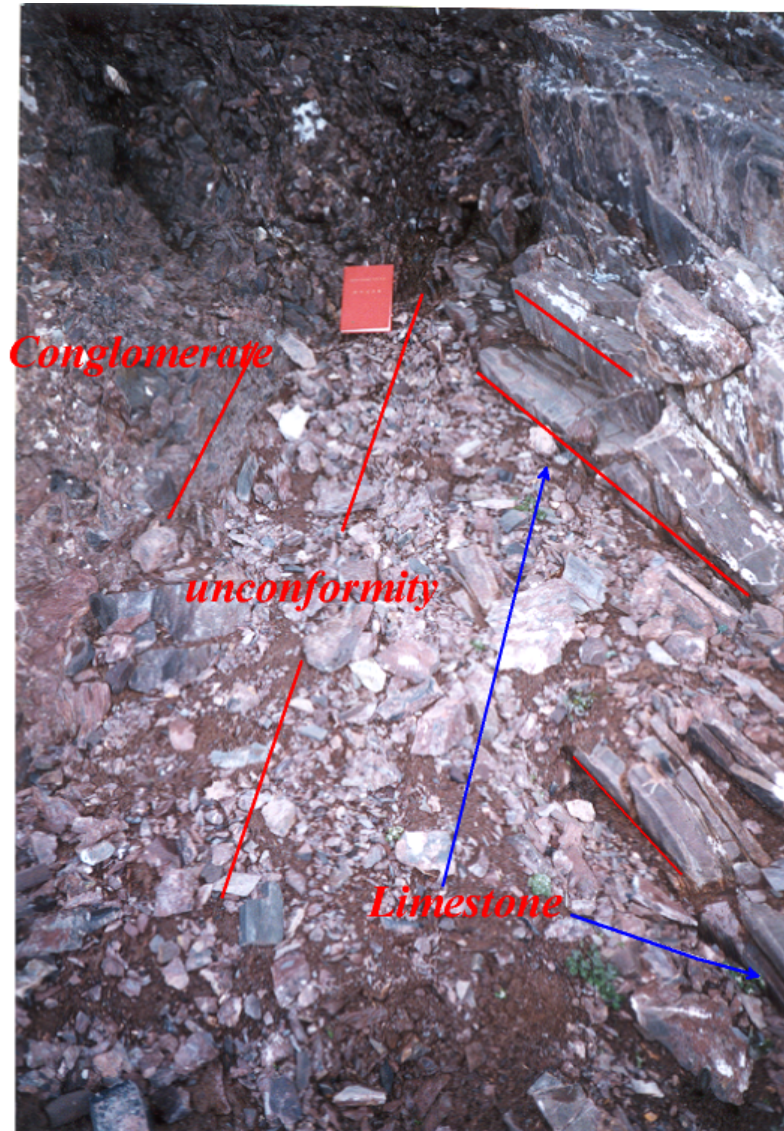


Figure 3.2, Outcrop at station number: 001 (see Plate 2 for locality), view to east, shows unconformable contact of conglomerate on bedded limestone and phyllite.



Figure 3.3, Outcrop at station number: 001 (see Plate 2 for locality), view to east, shows thinly - layered limestone.



Figure 3.4, Outcrop at station number: 001 (see Plate 2 for locality), view to east, shows conglomerate containing layered limestone pebble.



Figure 3.5, View of outcrop, looking south (station number: 010, see Plate 2 for locality), shows strong sub - horizontal lineation in highly strained conglomerate.

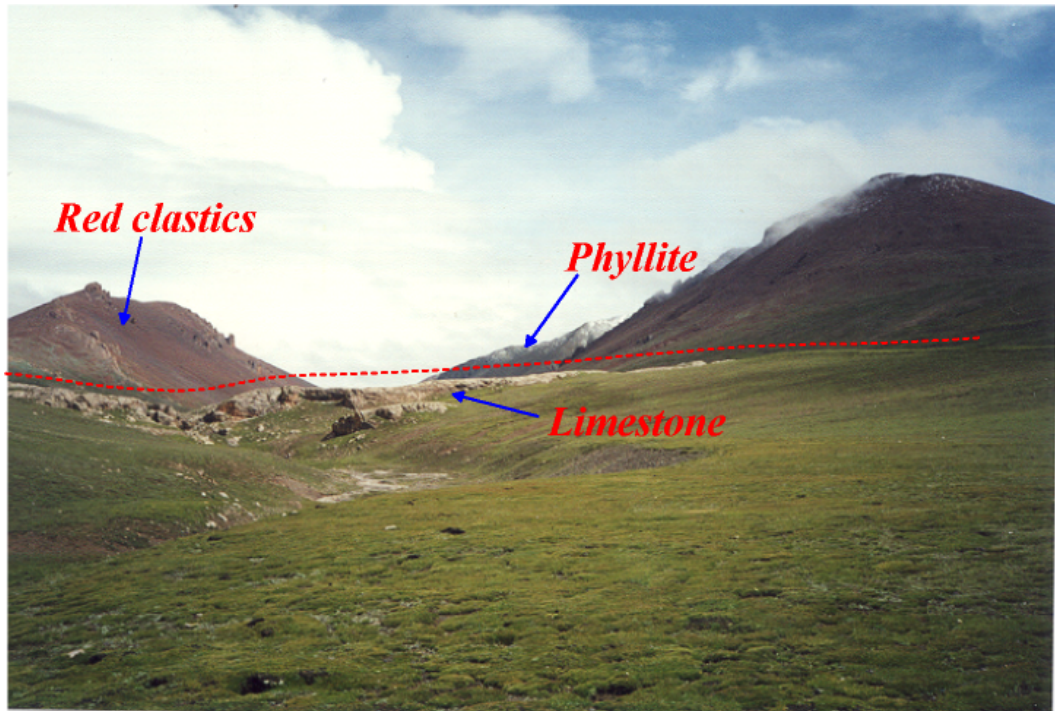


Figure 3.6, View looking south (to the north of station number: 038, see Plate 2 for locality). Phyllite contacts red clastic rocks unconformably. A reverse fault is inferred along the contact between red clastics and limestone.



Figure 3.7, View looking east (station number: 026 (see Plate 2 for locality).

A reverse fault (dashed line) is inferred along the contact between the metamorphic rocks and Jurassic limestone to the north. The metamorphic rock is cut (beyond the edge of this picture) to the south and east by Yanbajain – Damxung graben.

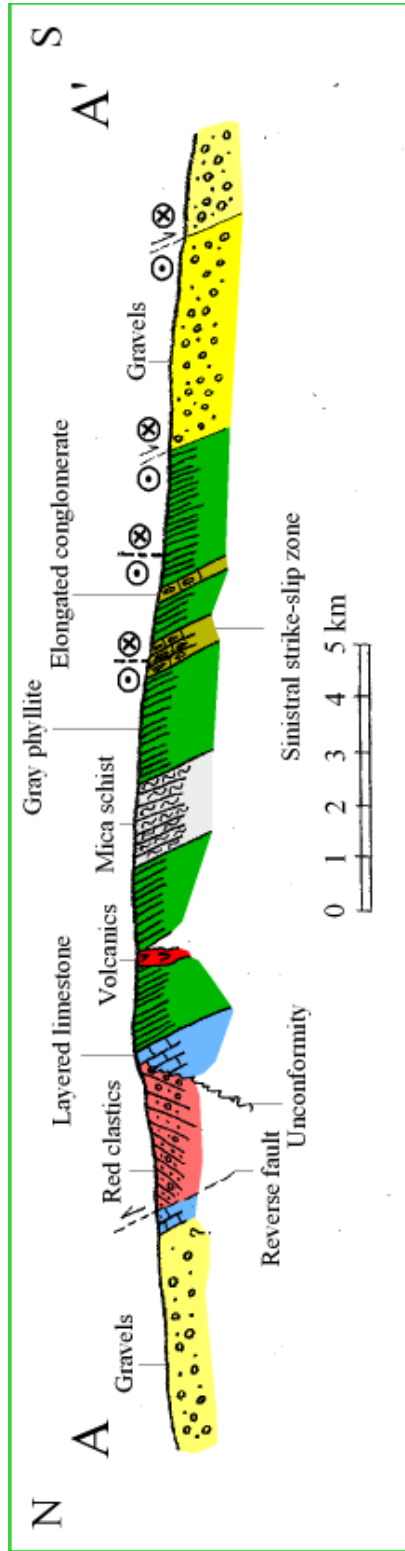


Figure 3.8, Nagenla stratigraphic and structural section (see Plate 2 for locality).

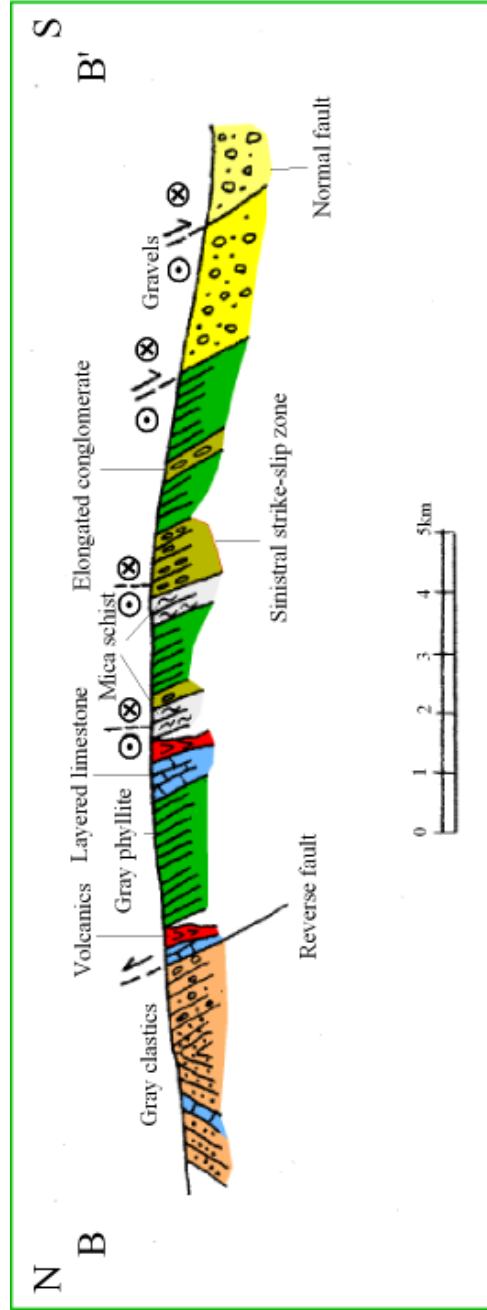


Figure 3.9, Qula stratigraphic and structural section (see Plate 2 for locality)

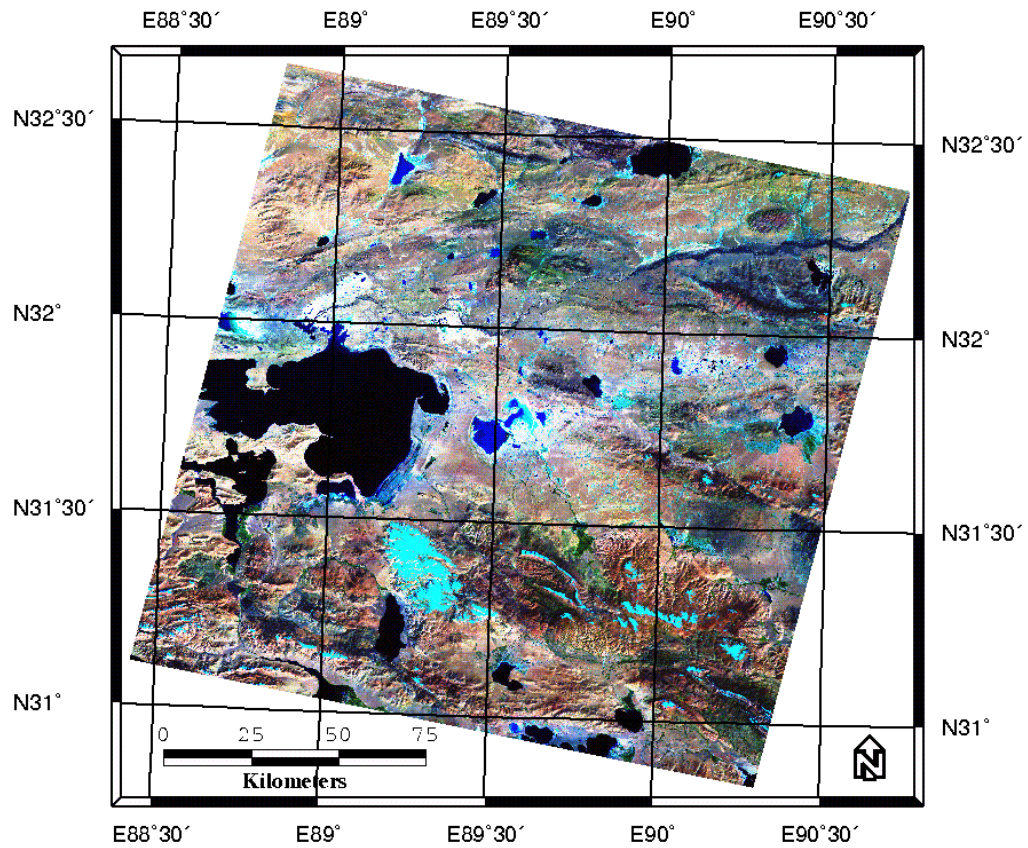


Figure 4.1, Landsat TM Image (30-meter original resolution) of the Baingoin study area. This TM image is false colored with bands 5, 4 and 2 mapped to red, green and blue respectively, and registered to geographic coordinates and projected to UTM zone 46.



Figure 4.2, Field photo view to the east. Tilted strata (pebbly conglomerate and sandstone) of the Dingqinhu formation (dip angle: 32°) in the northern margin of the Lunpola basin.

GPS position: $N32^{\circ}01.381'$ and $E90^{\circ}09.523'$



Figure 4.3, Field photo view to west at the northern bank of the Zajiazangbu river in the Lunpola basin. Strongly-folded strata of the Dingqinhu formation. GPS position: N32°4.701' and E89°37.955'

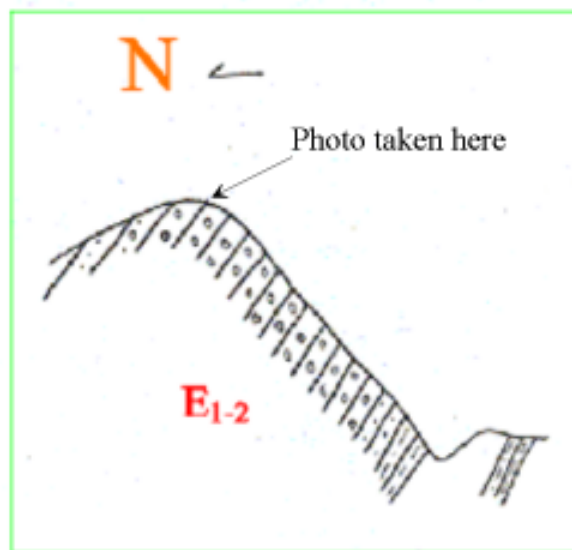


Figure 4.4, Field photo view to the north from the southern margin of the Lunpola basin. Conglomerate of the Niubao formation. Schematic cross-section has exaggerated topography. GPS position: N31°47.620' and E89 °59.641'



Figure 4.5, Purplish red coarse conglomerate (Niubao formation) seen in the Lunbei basin.

GSP position: N32°21.756' and E89°44.589'

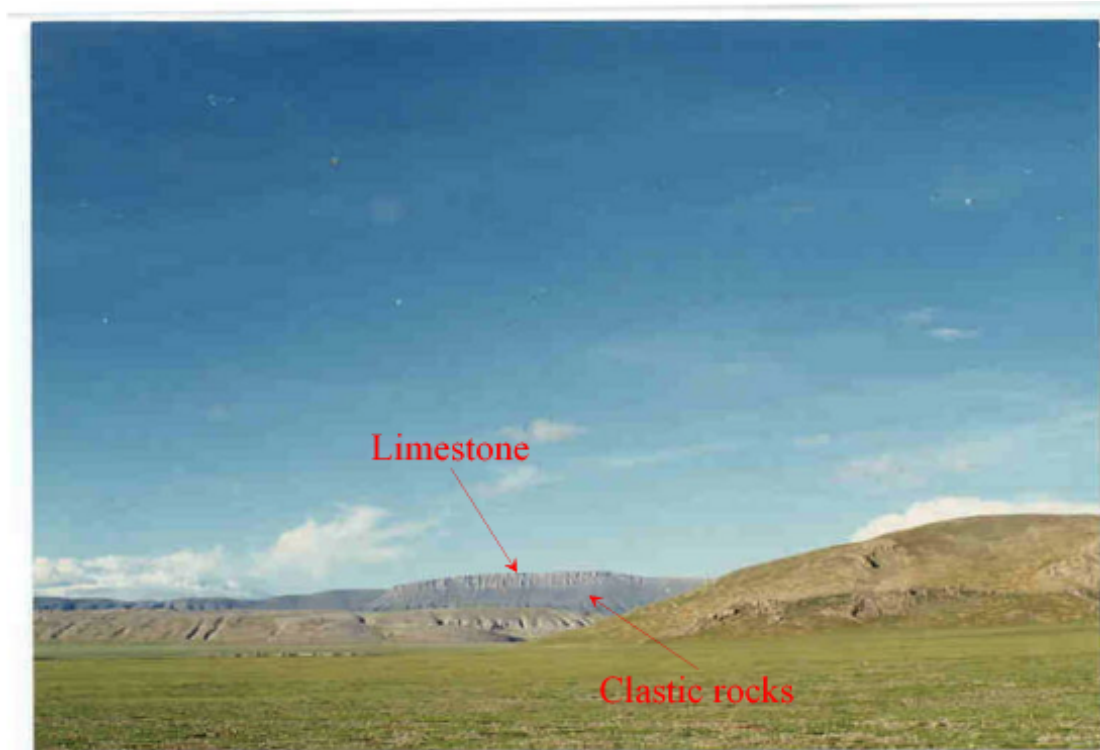


Figure 4.6, Field photo viewing to north of Boqe. Thick limestone contains distinctive fossils indicating an age of early Cretaceous and contacts underlying clastic rocks conformably.

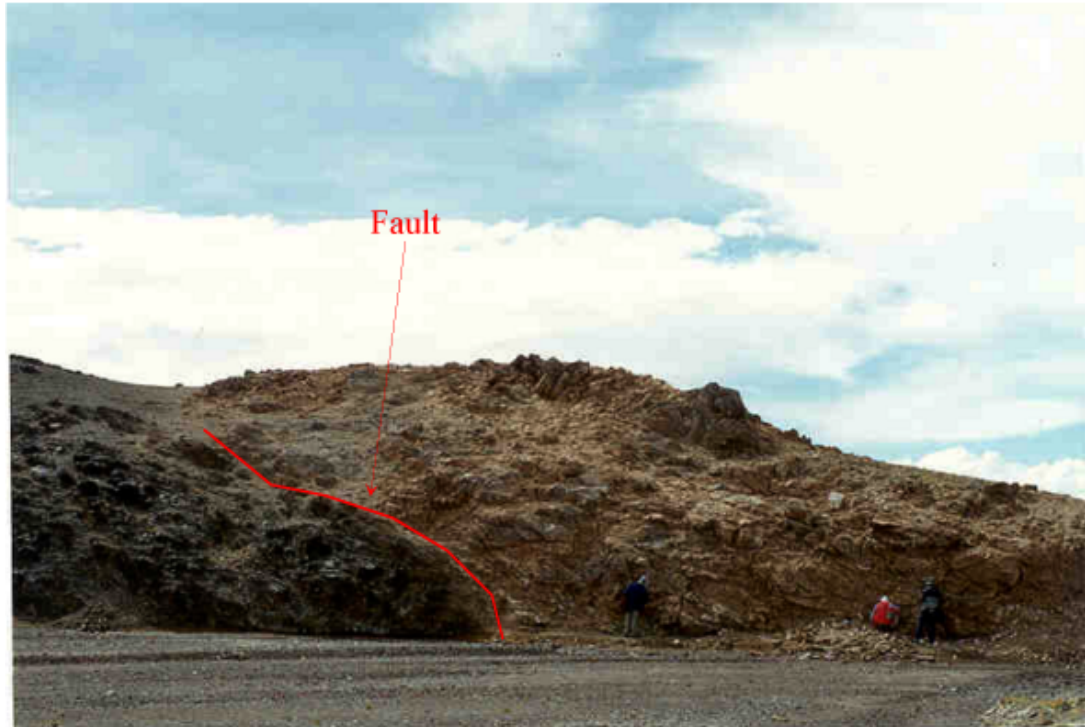


Figure 4.7, Field photo view to the north. Ophiolite (harzburgite) contacts carbonate rocks by fault (Strike: 120° , dip angle 85° N).

GPS position: $N32^\circ 13.259'$ and $E89^\circ 38.137'$



Figure 4.8, Grayish black slate and metamorphosed siltstone (Strike: 55° , dip angle: 20° E, Mugangri group flysch).

GPS position: $N32^\circ 12.854'$ and $E89^\circ 38.532'$

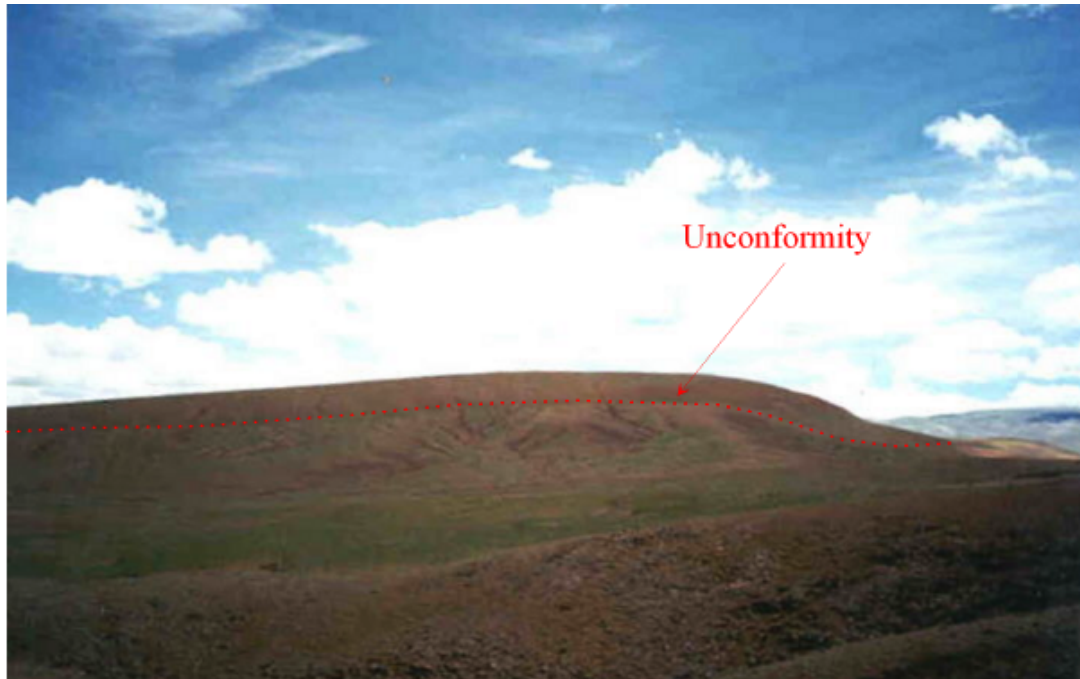


Figure 4.9, Field photo view to the east. Gently-dipping late Tertiary strata unconformably cover older red beds (near Duoba).

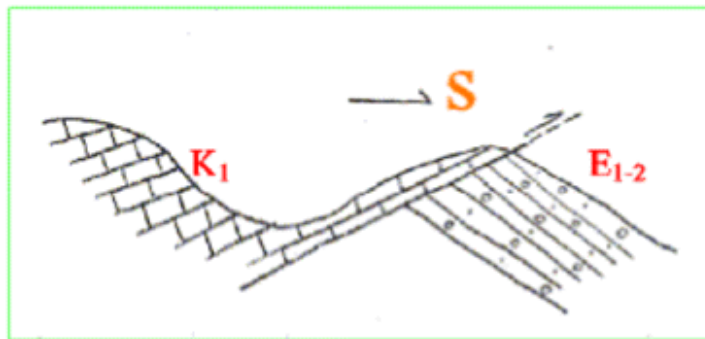
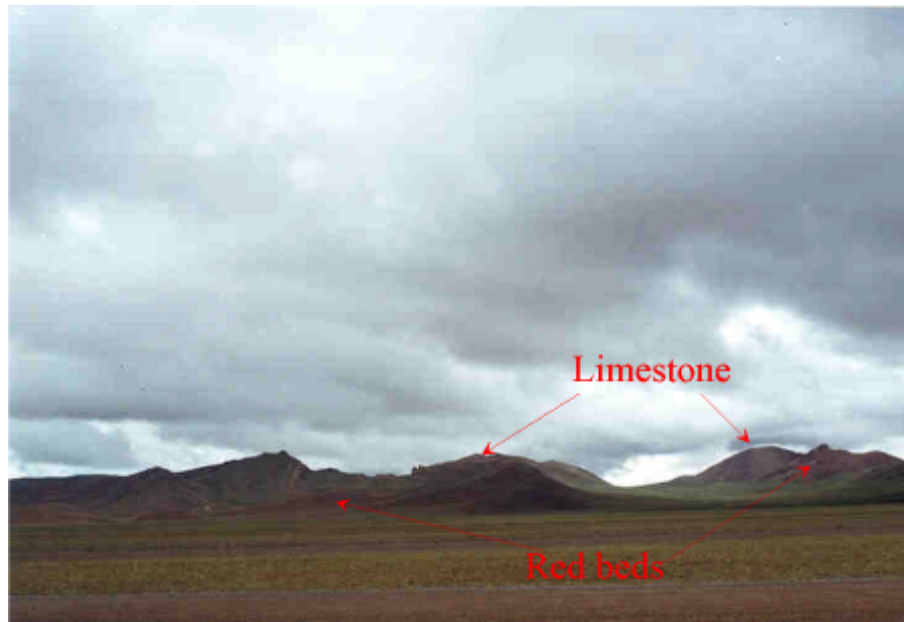


Figure 4.10, Field photo view to the north in the northern margin of the Duba basin. The Langshan formation limestone is thrust over the Niubao formation red clastics.

GPS position: N31°47.953' and E88 °43.643'

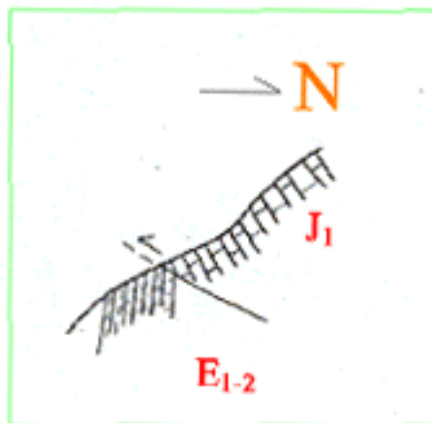
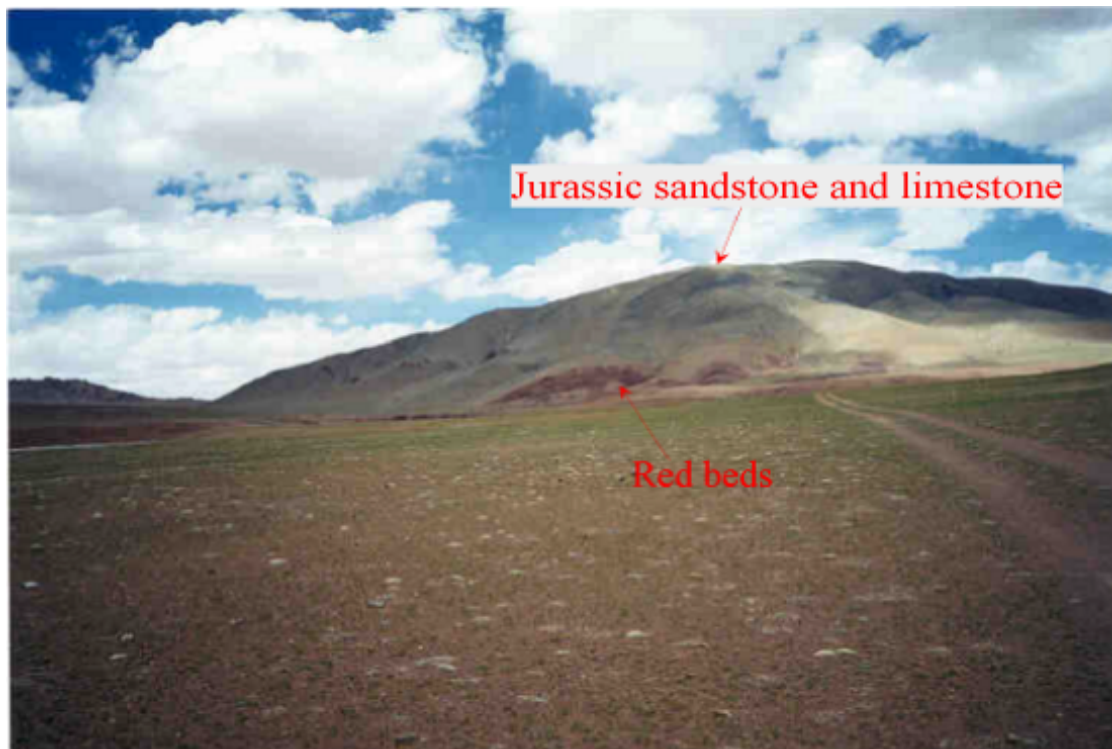


Figure 4.11, Field photo view to the north in the Lunbei basin. J₁₋₂s thrusts over E₁₋₂n. Schematic cross-section has exaggerated topography.
GPS position: N32°24.485' and E89 °33.738'

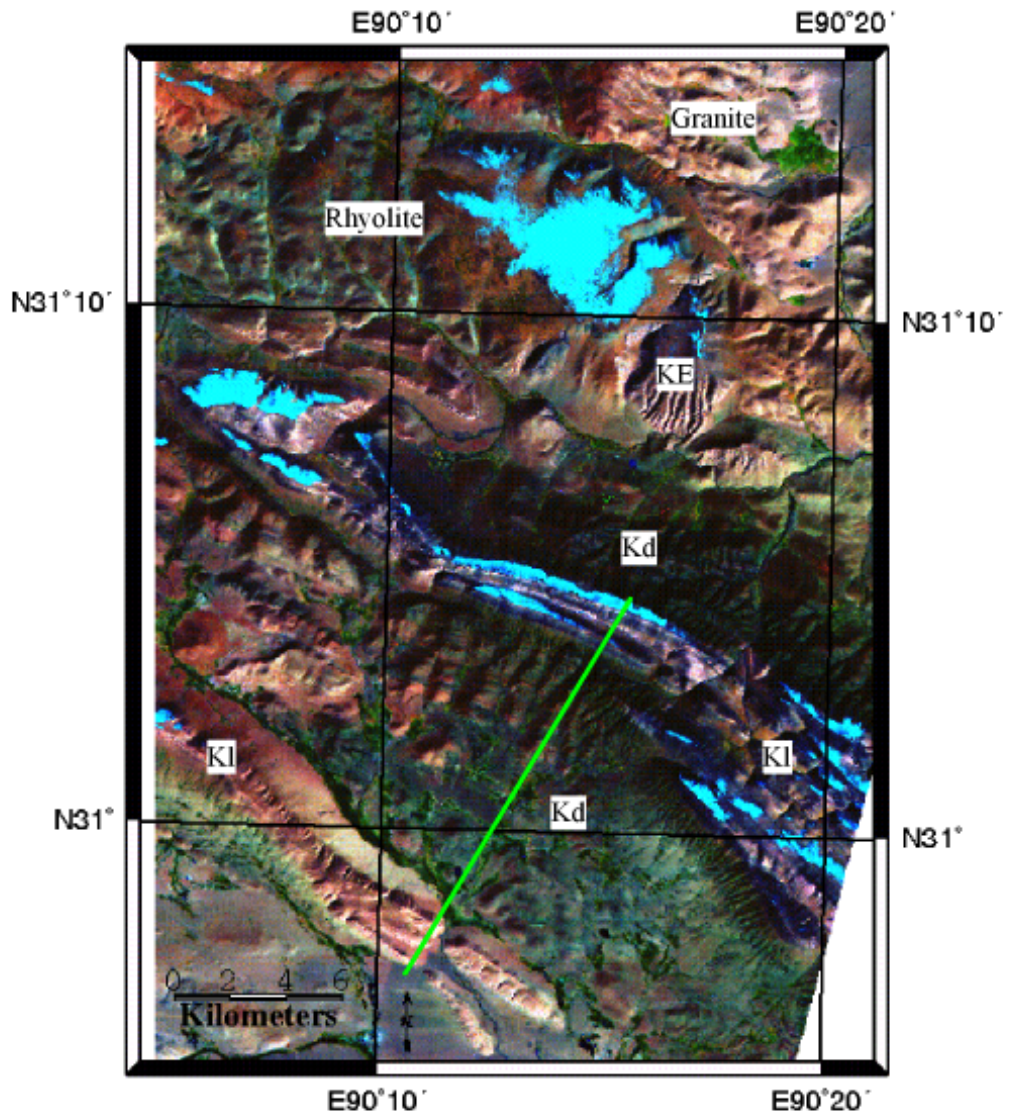
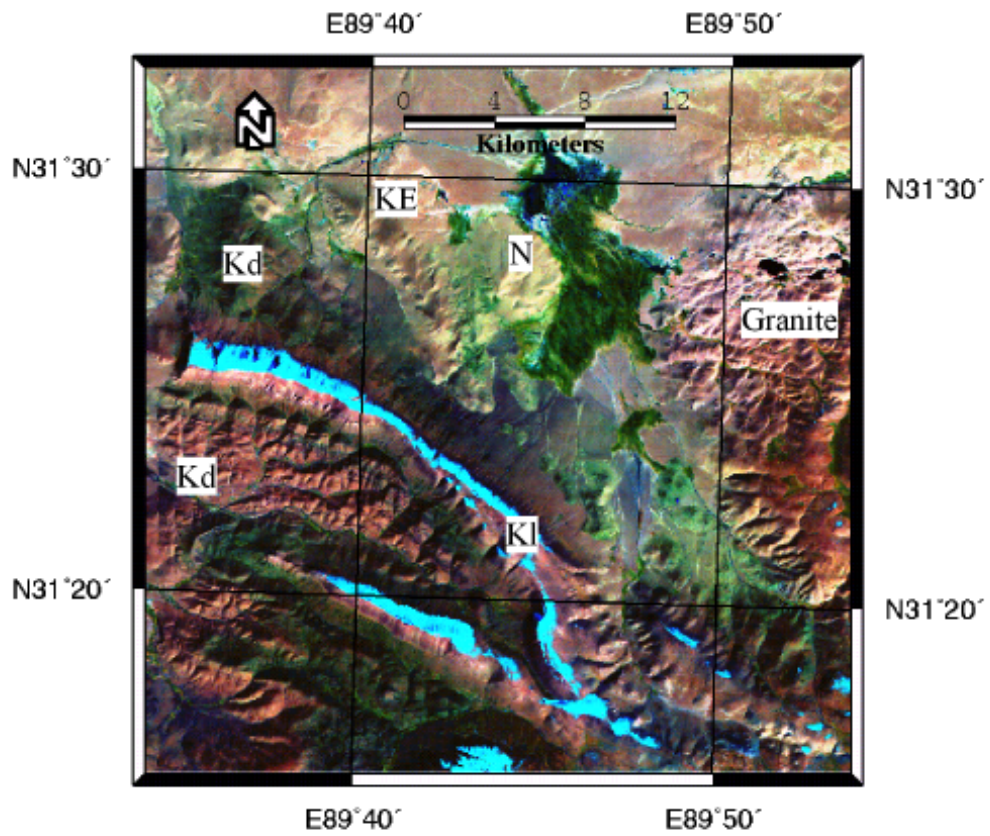


Figure 4.12, Image and geological units of the Boque area (Southeastern part of the Baingoin sheet).



**Figure 4.13, Image and geological units of the Duoba area.
(Lower middle part of the Baingoin sheet)**

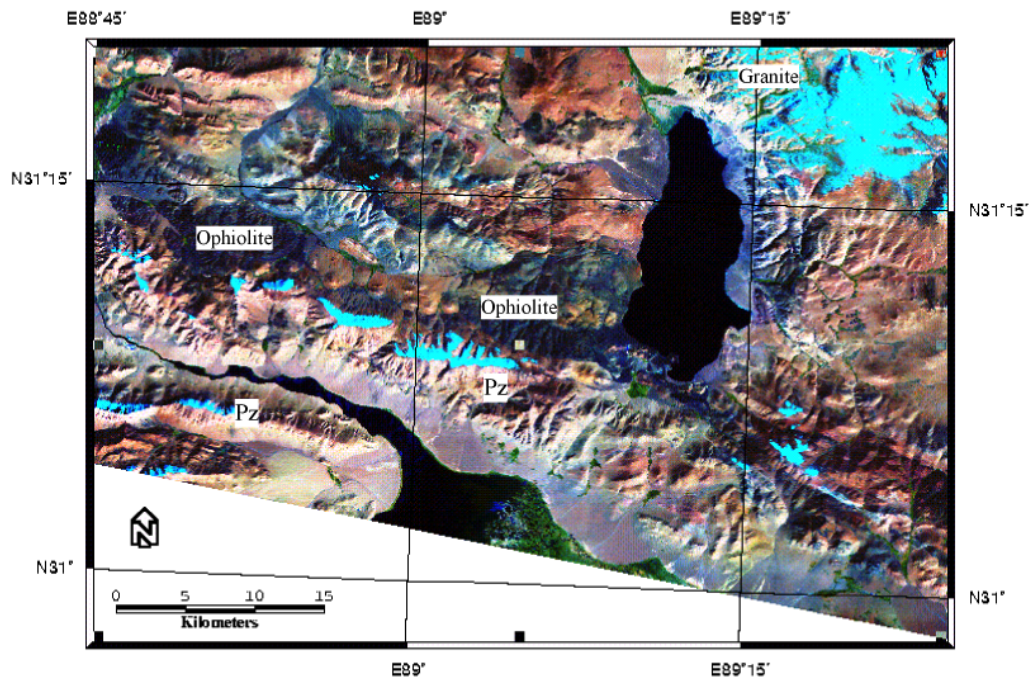


Figure 4.14, Image and some geological units of the Xiongmei area (Southwestern part of the Baingoin sheet).

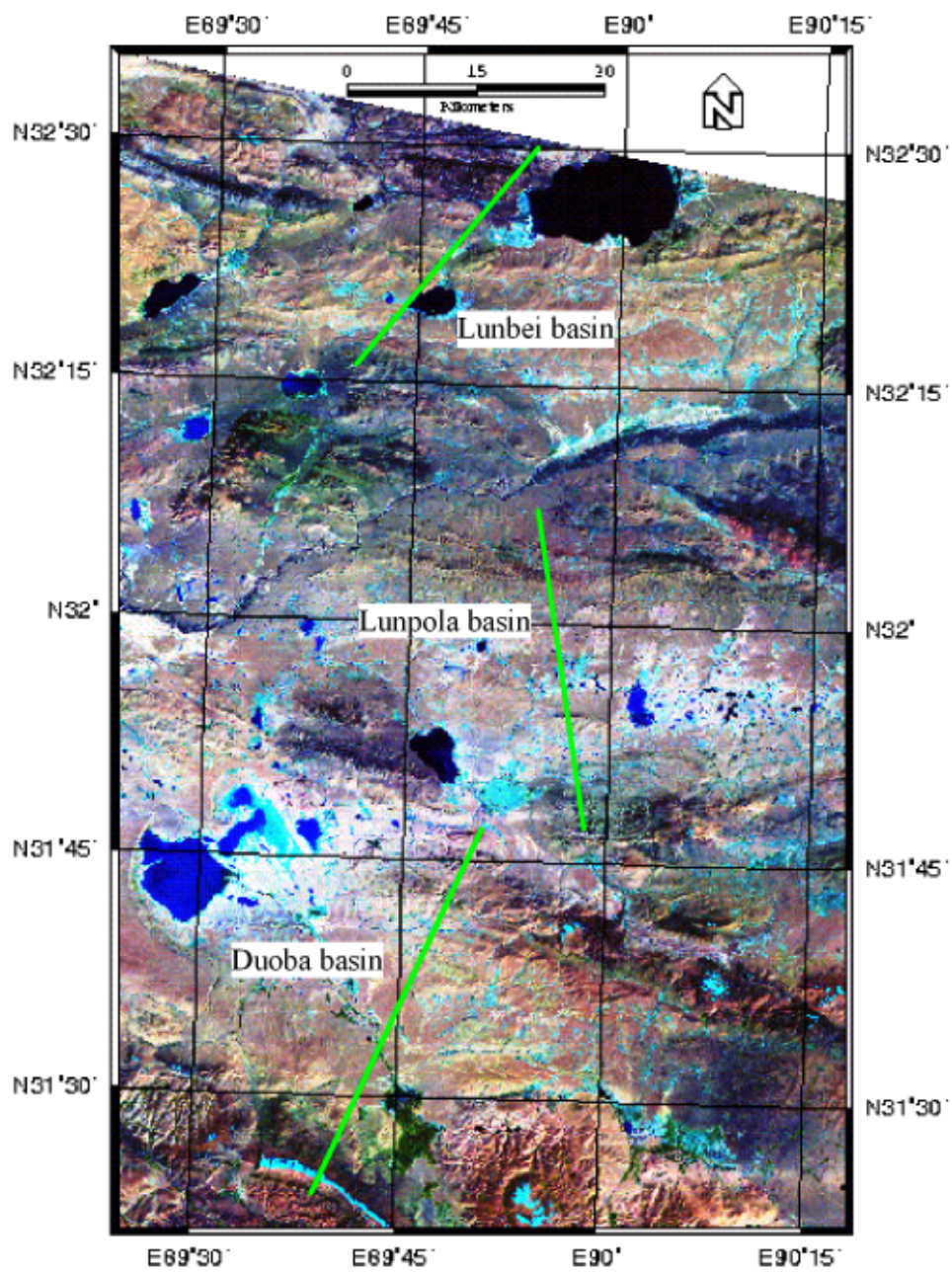


Figure 4.15, Basins and their cross section localities.

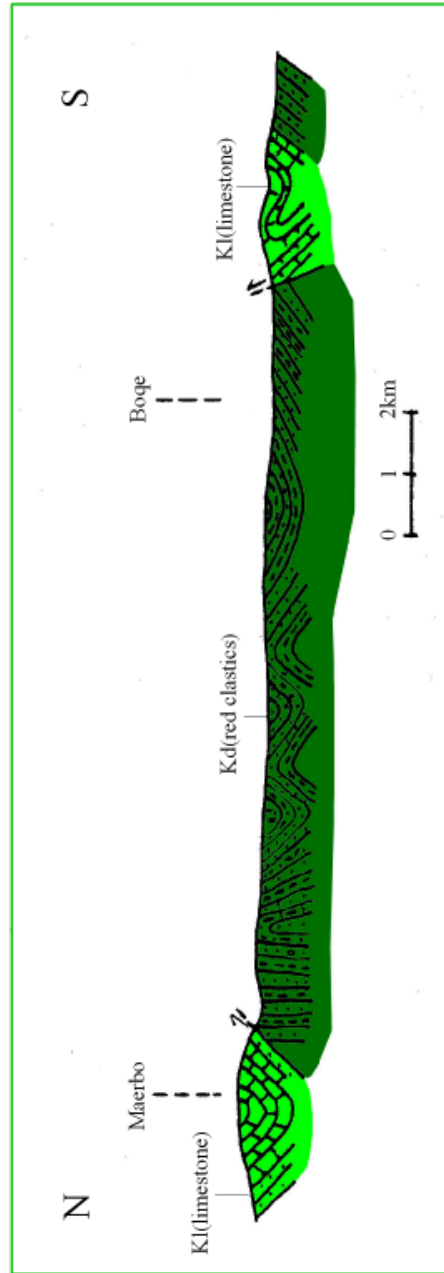


Figure 4.16, Boqe - Maerbo Sketch Stratigraphic and Structural Section.
 (see Figure 4.12 for locality)



Figure 4.17, Langshan - Duoba Stratigraphic and Structural sketch perspective view
 (After Han, 1983)

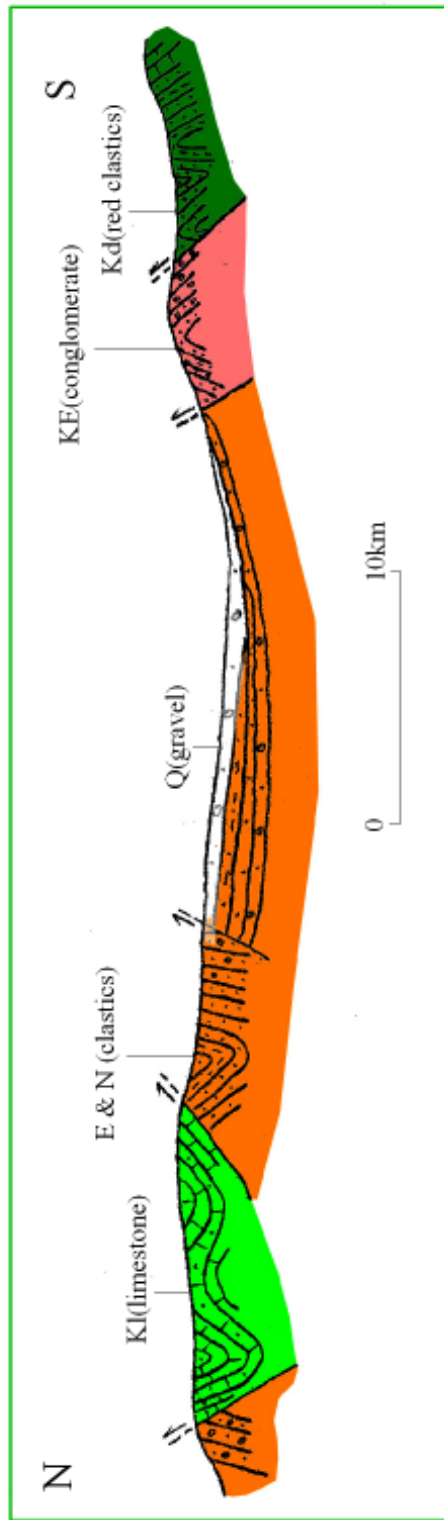


Figure 4.18, Sketch Stratigraphic and Structural section across the Duoba basin and its margins
 (see Figure 4.15 for locality. Topographic profile and vertical scale schematic).

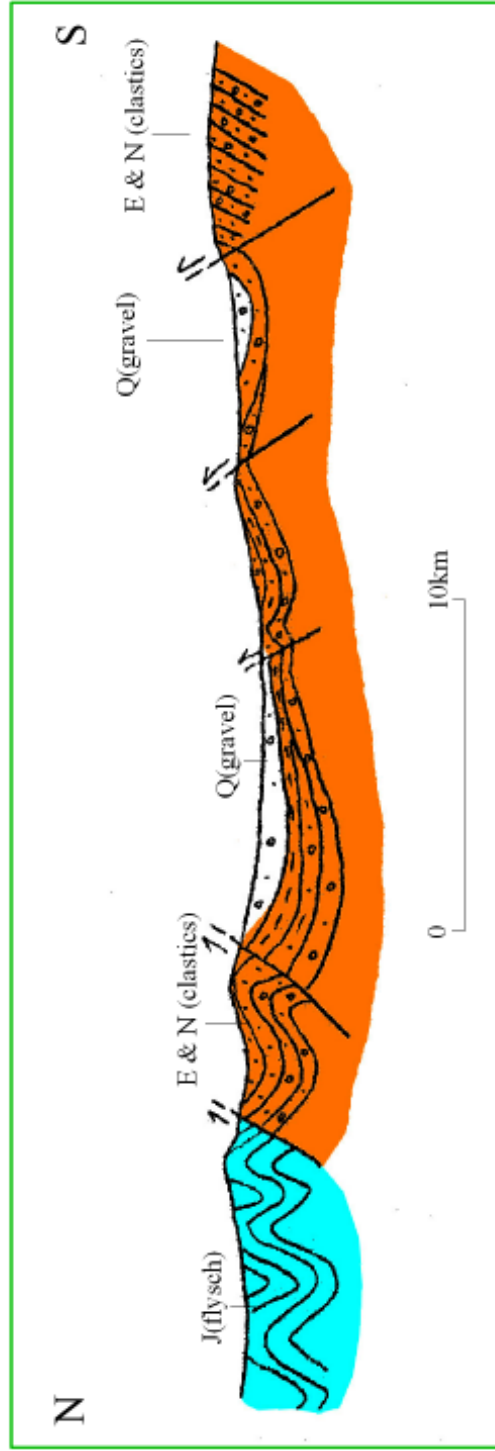


Figure 4.19, Sketch Stratigraphic and Structural section across the Lunpola basin and its margins (see Figure 4.15 for locality. Topographic profile and vertical scale schematic).

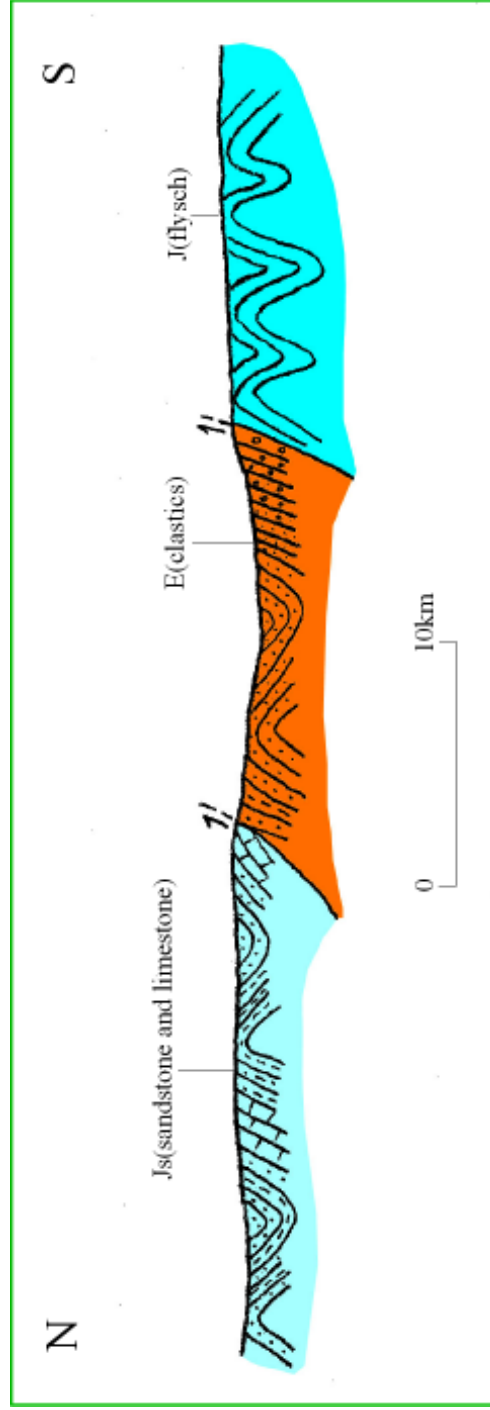


Figure 4.20, Sketch Stratigraphic and Structural section across the Lunbei basin and its margins
 (see Figure 4.15 for locality. Topographic profile and vertical scale schematic).

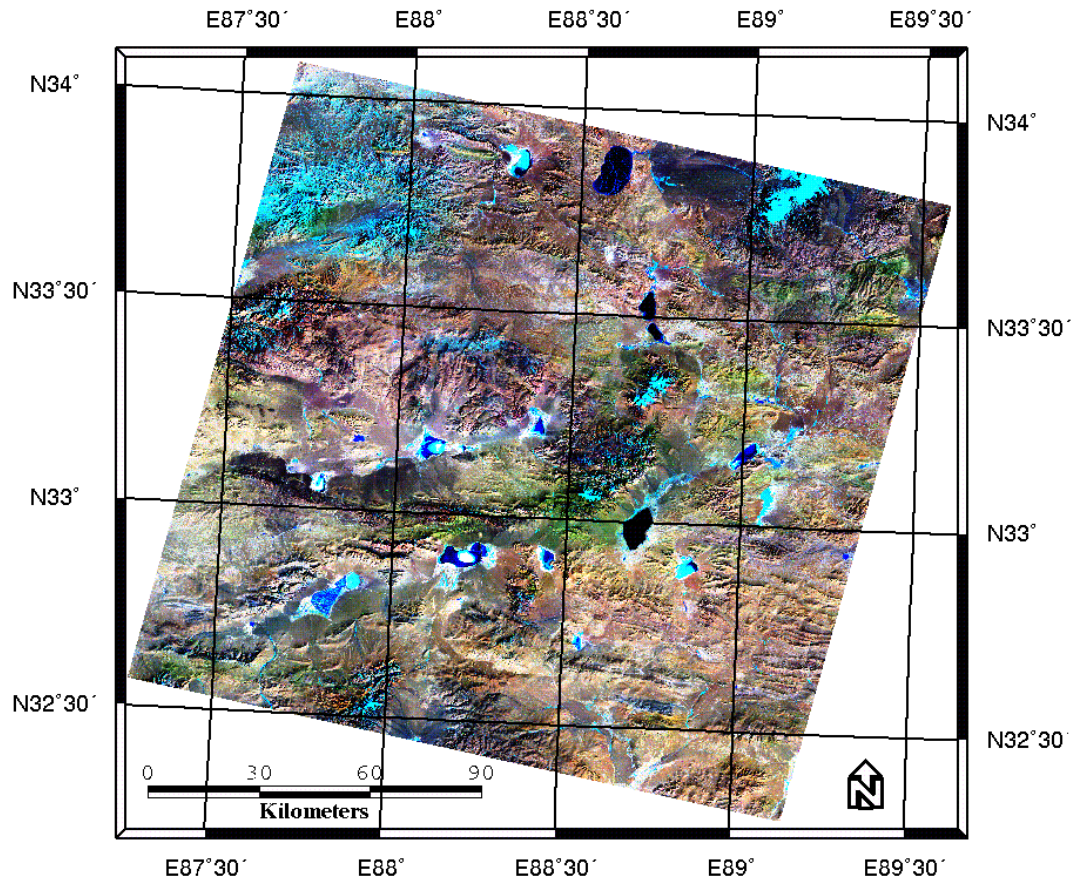


Figure 5.1, Landsat TM image (30 meter original resolution) of the Shuanghe study area. This TM image is false colored with bands 5, 4 and 2 mapped to red, green and blue respectively, and registered to geographic coordinates and projected to UTM zone 46.



Figure 5.2, Field photo view to the northwest. Tertiary clastics seen at the Ambushan area dip to the right.

GPS position: N33°09' and E88°44'



Figure 5.3, Field photo view to the north. Fault contact between white limestone and red clastics in the Shuanghe area.

GPS position: N33°16.845' and E88°50.600'



Figure 5.4, Field photo view to the north. Large conglomerate channel-fills in red arenites (Eocene?). The bedding dips to the left.

GPS position: N33:1:9.04 and E88:27:4.01



Figure 5.5, (Detail) cobble conglomerate from channel in redbeds – mostly limestone clasts.

GPS position: N33:1:48.77 and E88:27:12.79



Figure 5.6, Field photo view to the west. Red conglomerates and sandstones (Eocene?) unconformably over Triassic limestones. View to WNW.

Unconformity arrowed. Redbeds strike ~E-W.

GPS position: N33:11:43.61 and E88:44:10.08



Figure 5.7, Field photo view to the east. Base of red conglomerates, with dip slope on right lapping around and unconformably overlying steeply-dipping Triassic limestones.

GPS position: N33:11:43.61 and E88:44:10.08



Figure 5.8, Field photo view to the east. White Triassic limestone contacts the underlying metamorphic rocks by a detachment fault, and view to east over the Shuanghe graben.

GPS position: N34:11:38.37 and E88:44:14.98



Figure 5.9, Field photo. Phyllites under, and Triassic limestone (pointed by arrows) over detachment fault; movement top to SW (left).

GPS position: N33:9:15.33 and E88:43:19.89



Figure 5.10, Field photo view to the north, Basalt in the Shuanghe area.

GPS position: N33°0.668' and E88°21.043'



Figure 5.11, Field photo view to the west. Lower grade metamorphic rocks (slate and phyllite etc.) seen at a W-E trending river valley in the Shuanghe area.

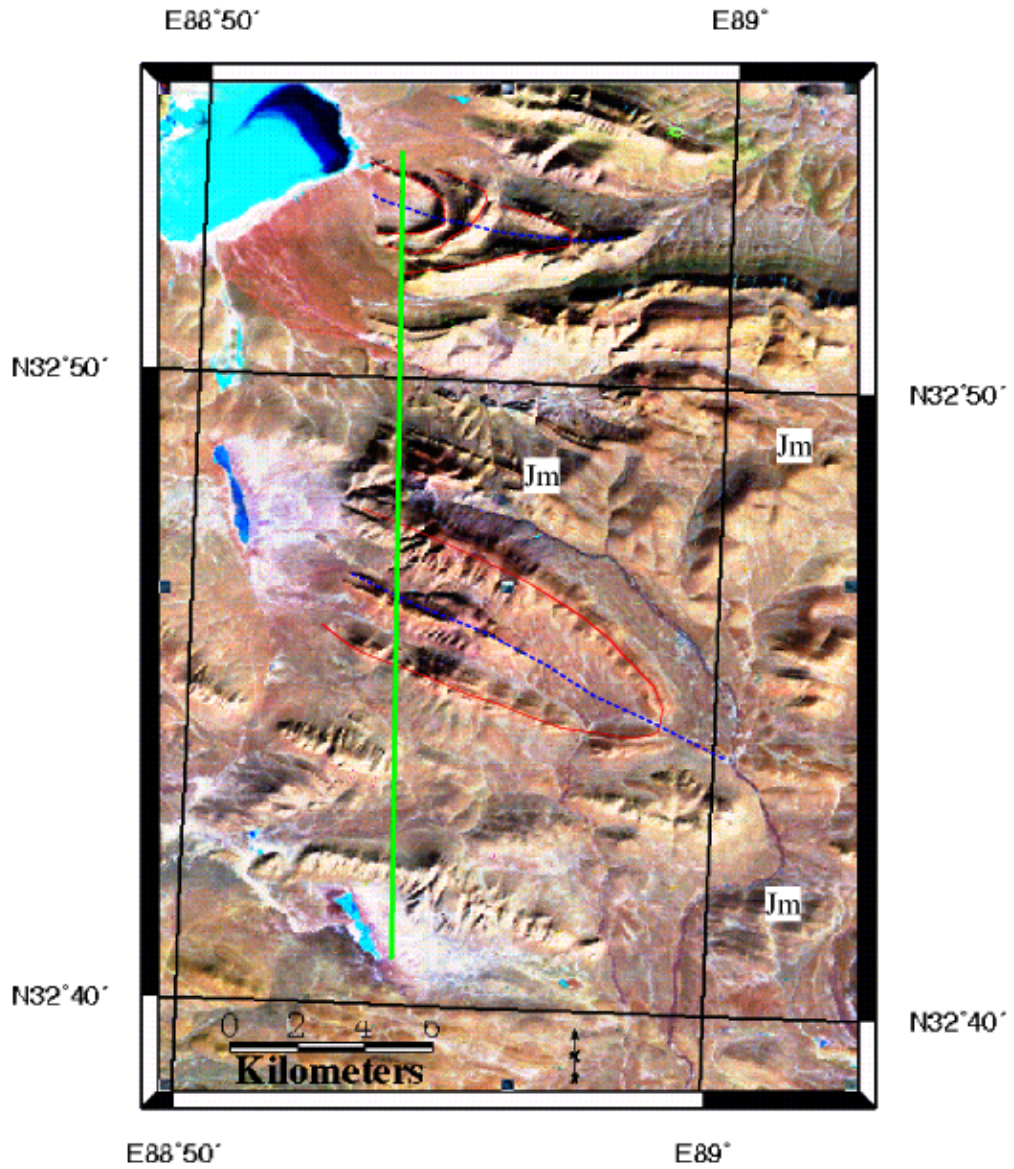


Figure 5.12, TM image of the Dongbula area.

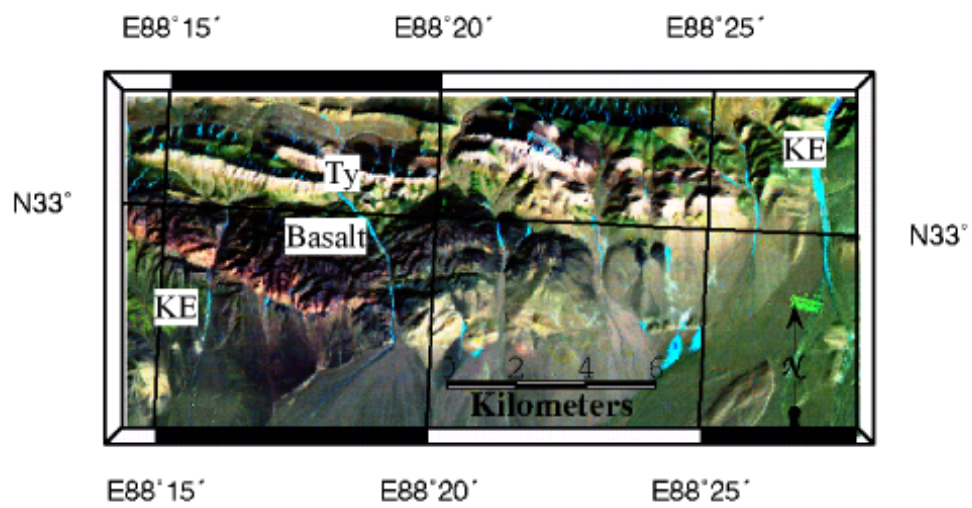


Figure 5.13, Image and geological units of the Xiangqiong area.

(Southeastern part of the Shuanghe sheet)

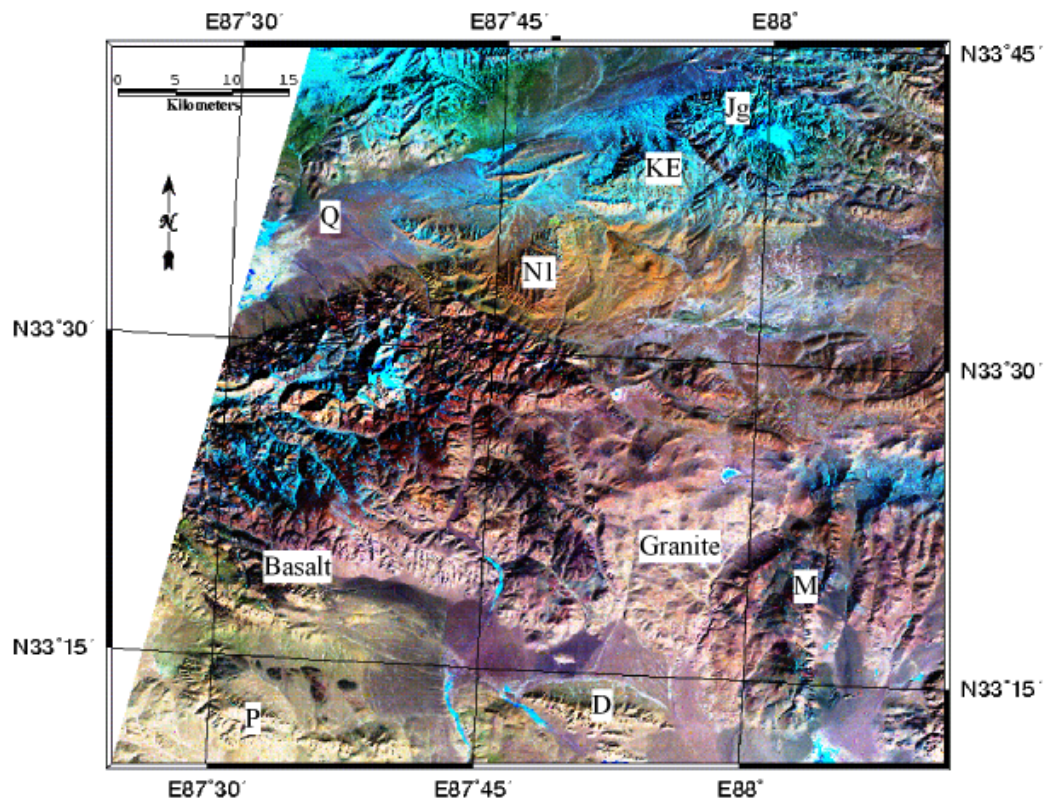


Figure 5.14, Image and geological units of the Chasong - Nadegangri area (Northwestern part of the Shuanghe sheet).

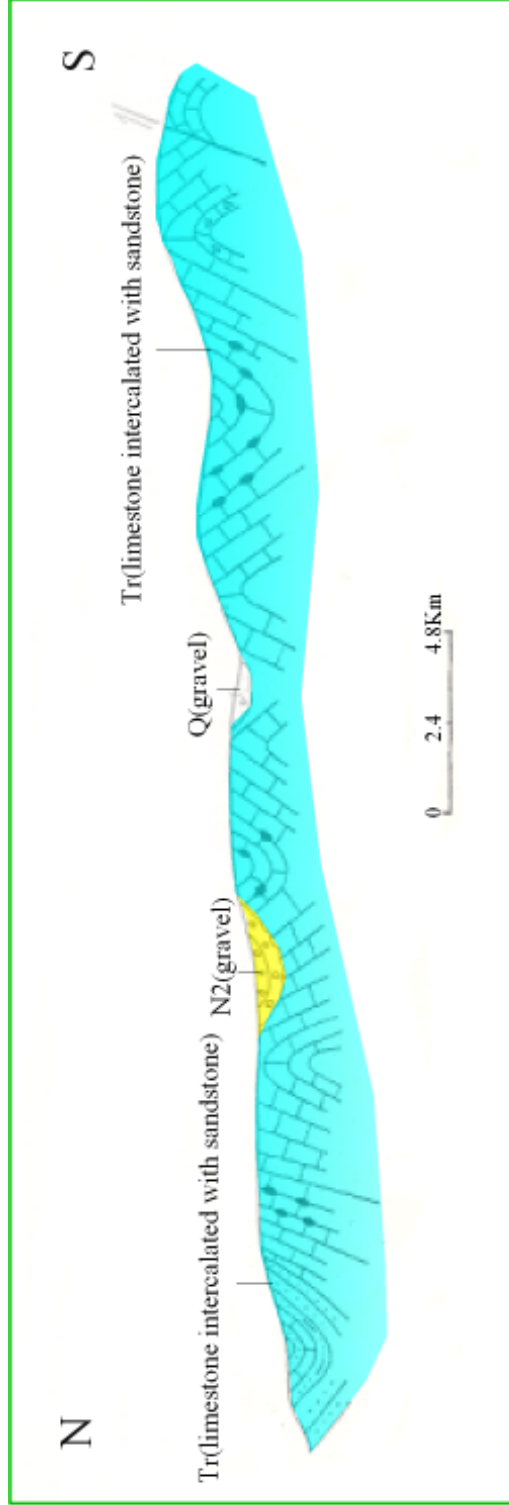


Figure 5.15, Zaye Stratigraphic and Structural Section (located outside of our study area and no information found about topographic profile and vertical scale). (After the Report of the Gaize sheet, 1986)

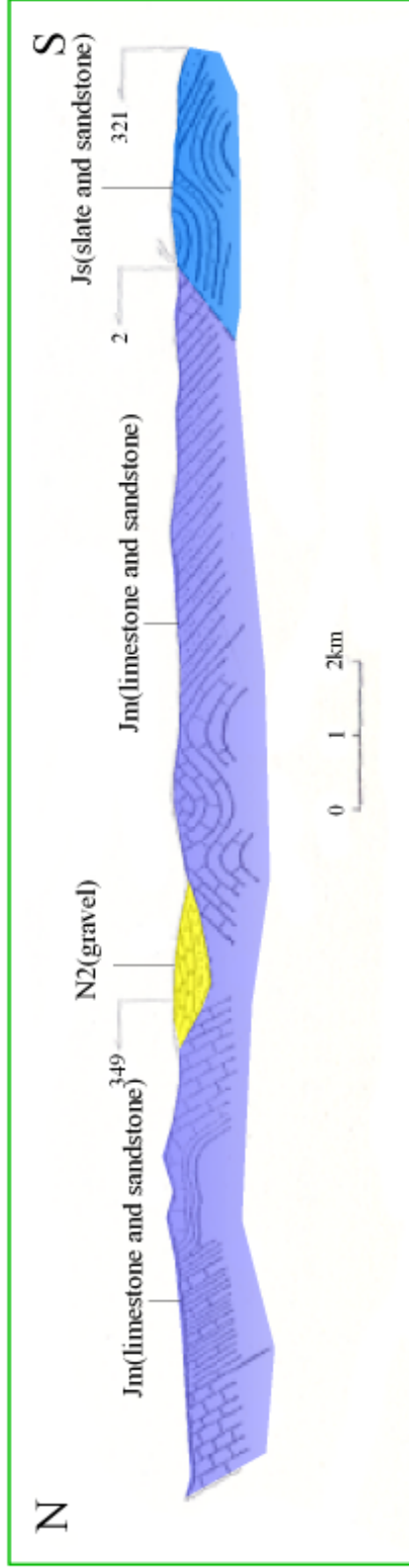


Figure 5.16, Beilei Lake Southwest Stratigraphic and Structural Section
 (see Plate 6 for rough locality and no information found about topographic profile and vertical scale).
 (After the Report of the Gaize sheet, 1986)

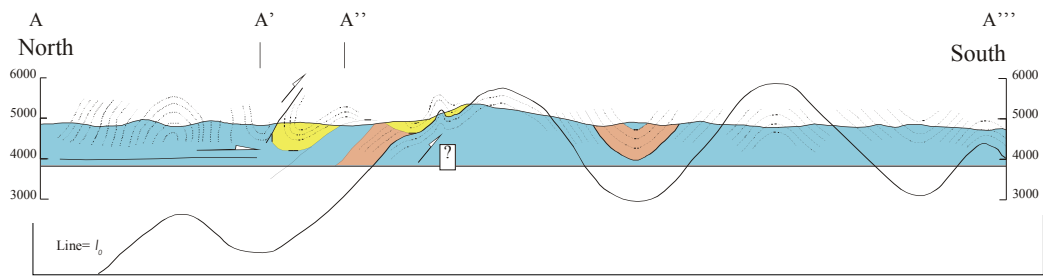


Figure 5.17, The Dongbula section (drawn by M. Edwards; used in Kidd et al., 2001) (see Figure 5.12 and 5.18 for locality).

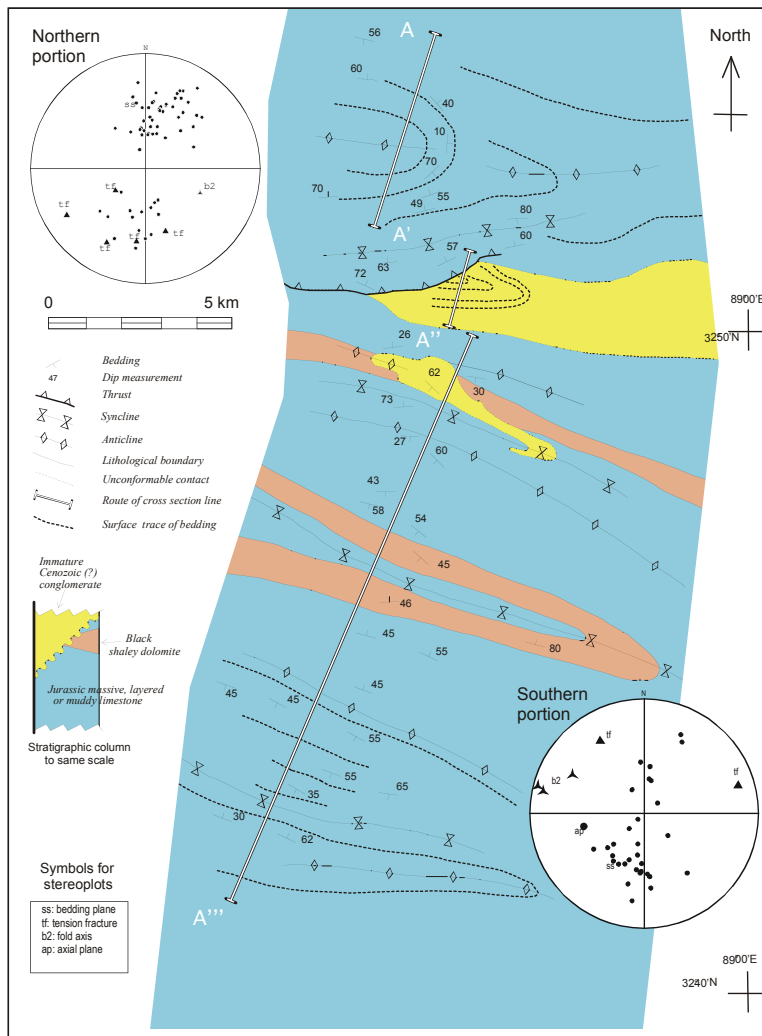


Figure 5.18, Detailed geological map of the Dongbula area (drawn by M. Edwards; used in Kidd et al., 2001).

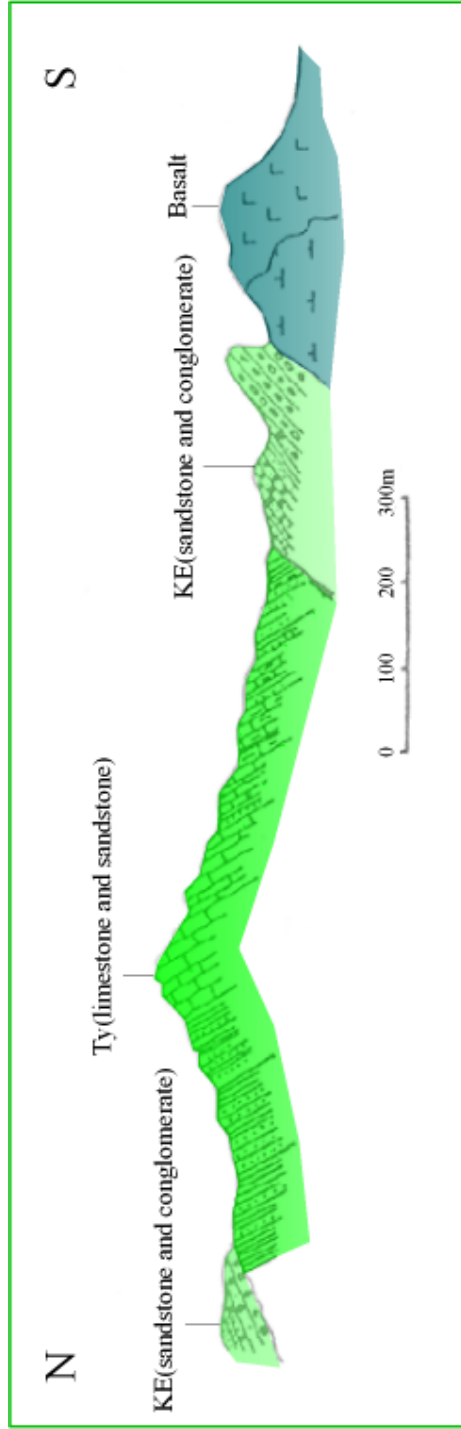


Figure 5.19, Xiangqiong Stratigraphic and Structural Section
 (see Figure 5.13 and Plate 6 for rough locality and no information found about topographic profile and vertical scale). (After Wu et al., 1985)

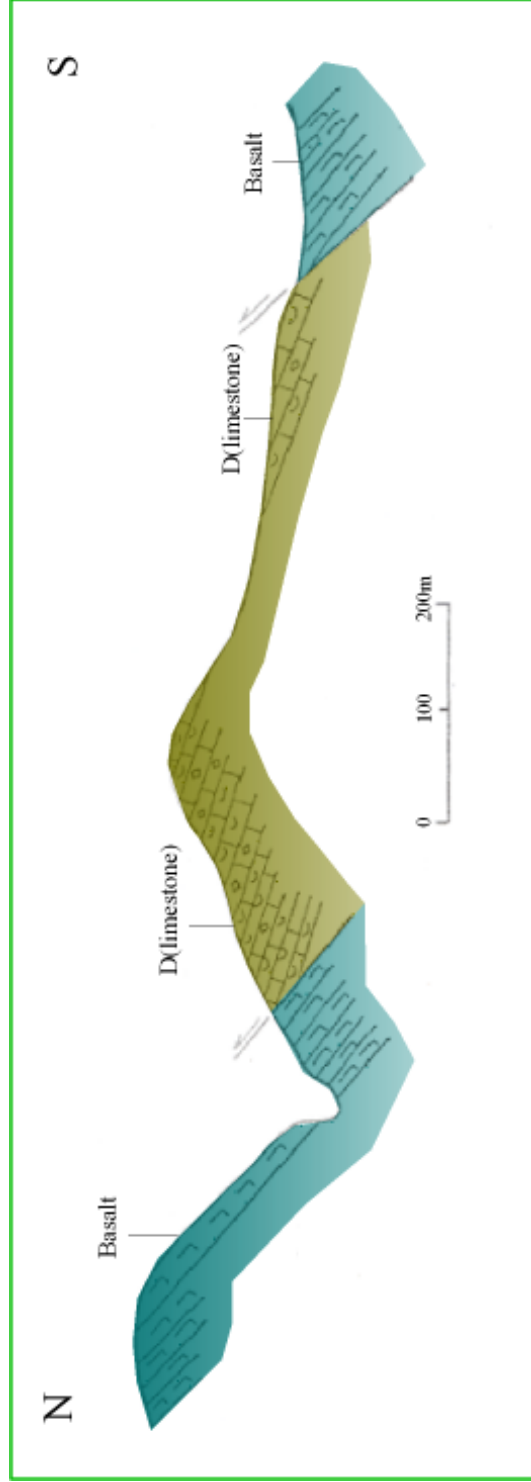


Figure 5.20, Chasong Southwest Stratigraphic and Structural Section
 (see Figure 5.14 and Plate 6 for rough locality and no information found about topographic profile and vertical scale). (After the Report of the Gaize sheet, 1986)

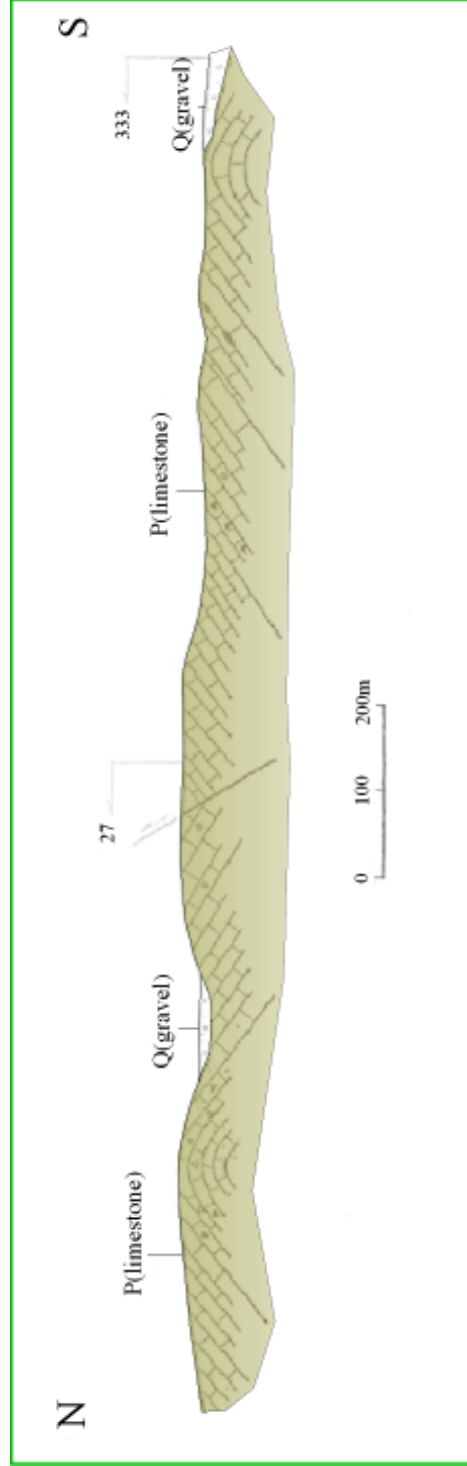


Figure 5.21, Chabo Lake South Stratigraphic and Structural Section
(located outside of our study area and no information found about topographic profile and vertical scale).
(After the Report of the Gaize sheet, 1986)

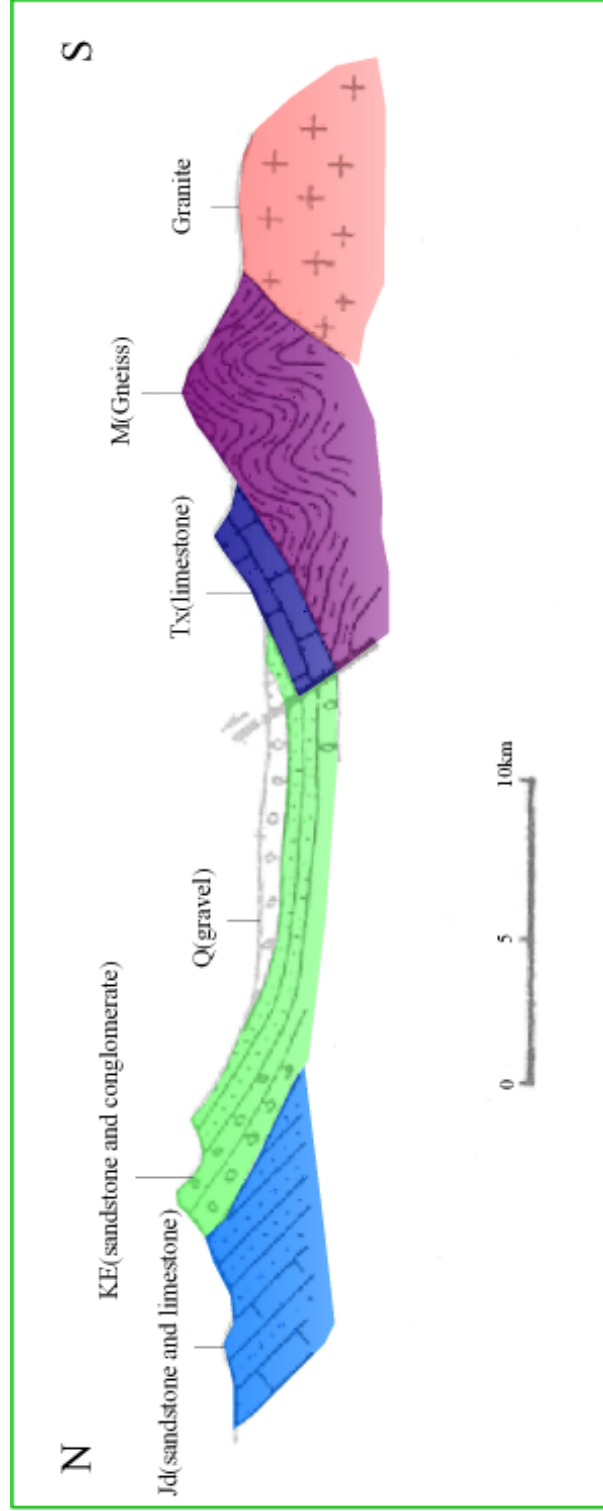


Figure 5.22, Jiangaishan - Nadeangri Stratigraphic and Structural Section
 (see Figure 5.14 and Plate 6 for rough locality and no information found about topographic profile and vertical scale). (After Hu et al., 1986)

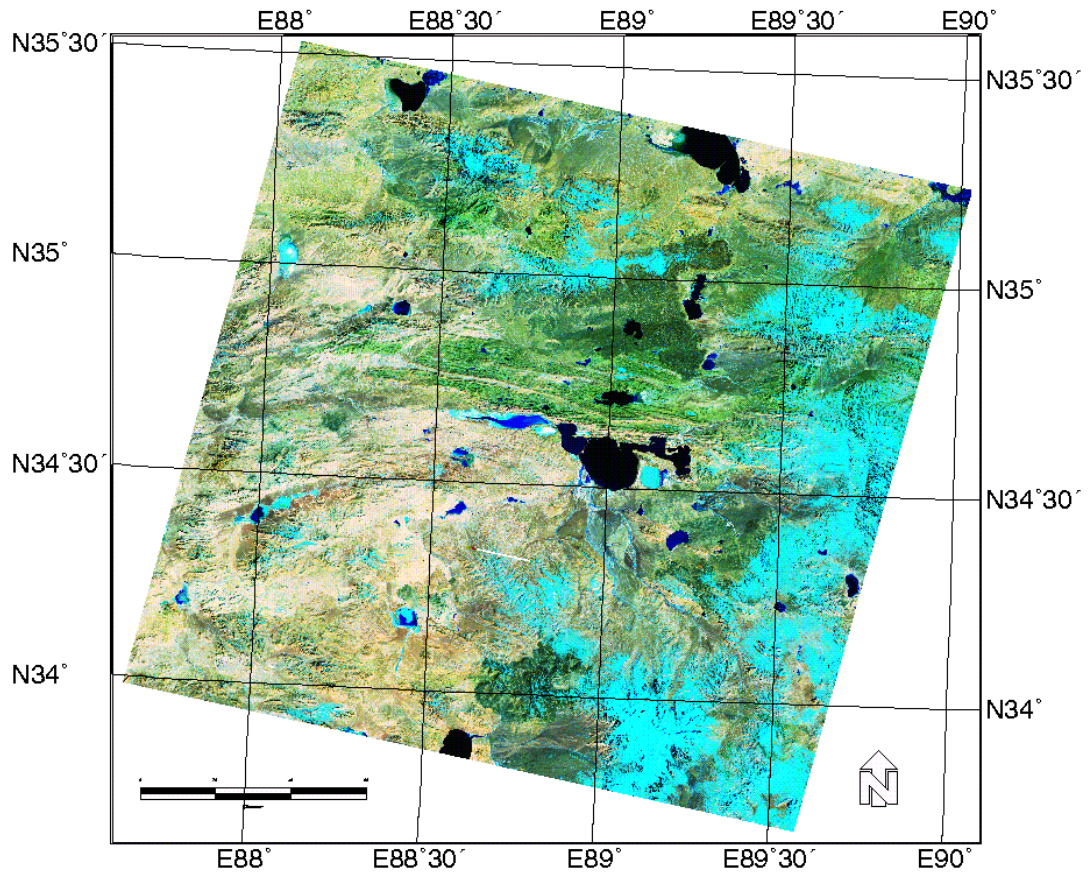


Figure 6.1, TM image of the Dogai Coring study area.

This TM image is false colored with bands 5, 4 and 2 mapped to red, green and blue respectively, and registered to geographic coordinates and projected to UTM zone 46.

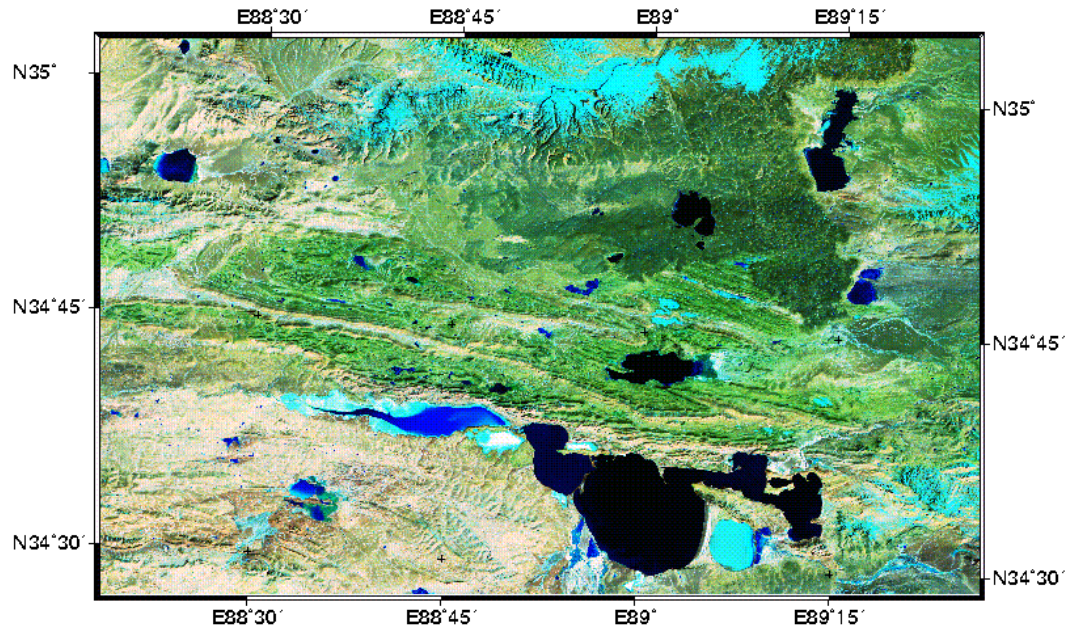


Figure 6.2, TM image of north of Dogai Coring lake.



Figure 6.3, Field photo view to East (taken by Prof. Kidd).

Unconformable contact between early Tertiary Red beds and Volcanic rocks north of the Dogai Coring lake.



Figure 6.4, Field photo view to north across the Dogai Coring lake (taken by Prof. Kidd). North of the lake is early Tertiary red beds. South of the lake has no volcanic rock seen.

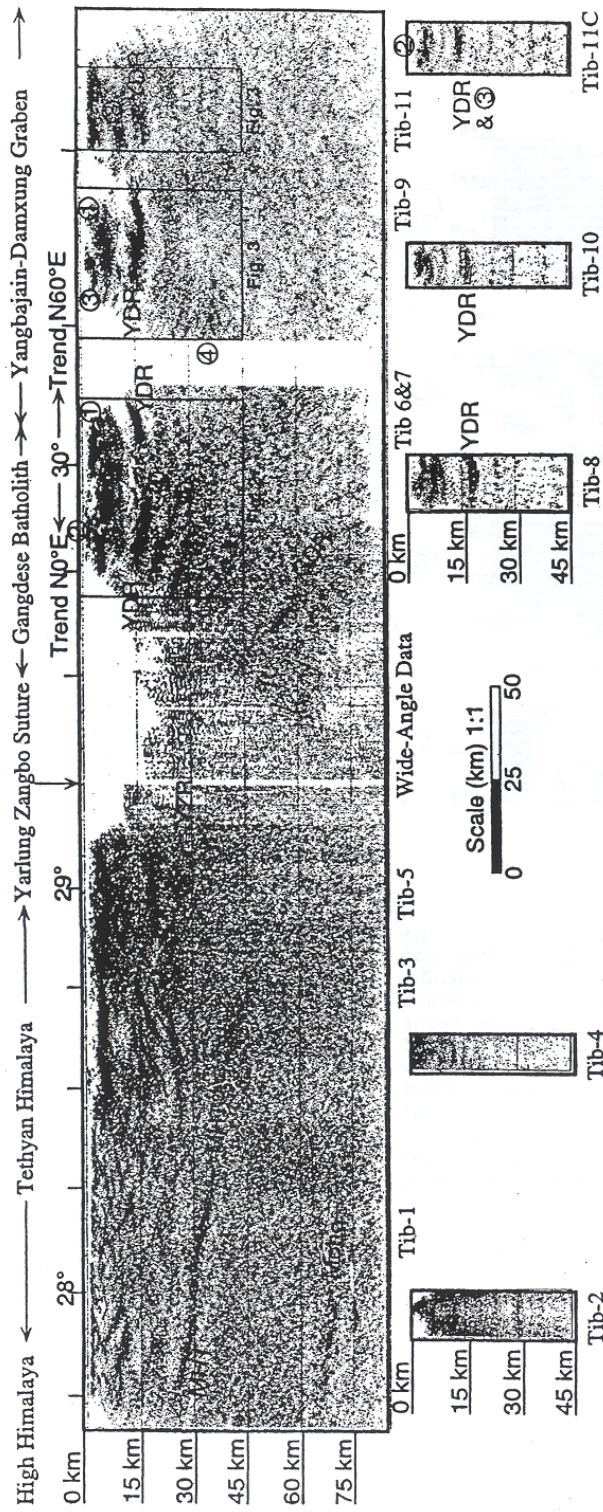


Figure 7.1, The INDEPTH seismic profile across the Yarlung Zangbo suture in the southern Tibet (Douglas Alsdorf, Larry Brown and K. Douglas Nelson et al., 1998)

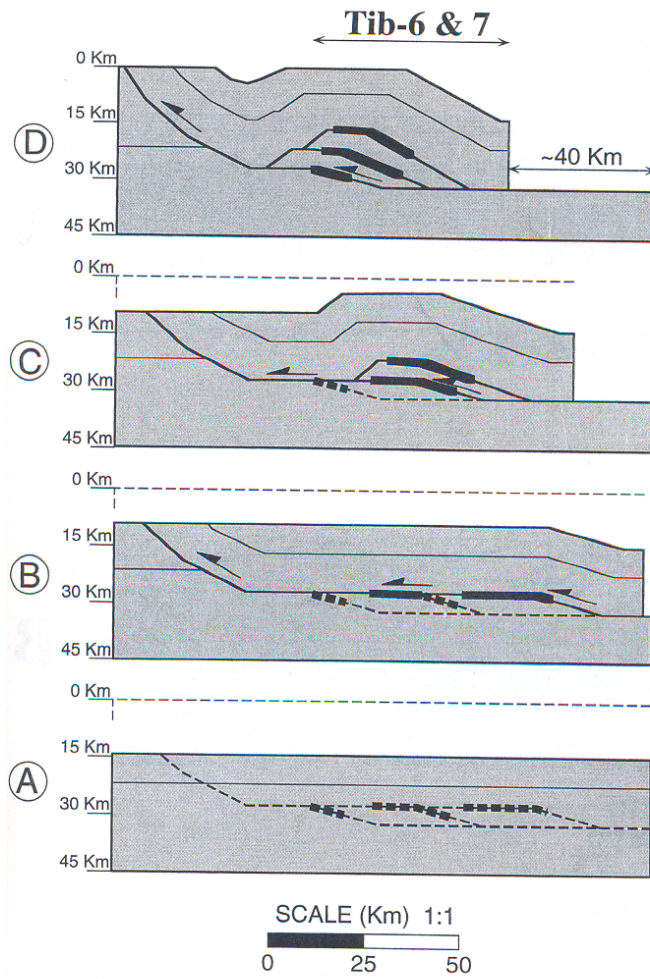


Figure 7.2, Schematic evolution of the proposed duplex observed in the INDEPTH seismic profile beneath the Gangdese batholith in the southern Tibet (Alsdorf, Brown, Douglas Nelson, et al., 1998).

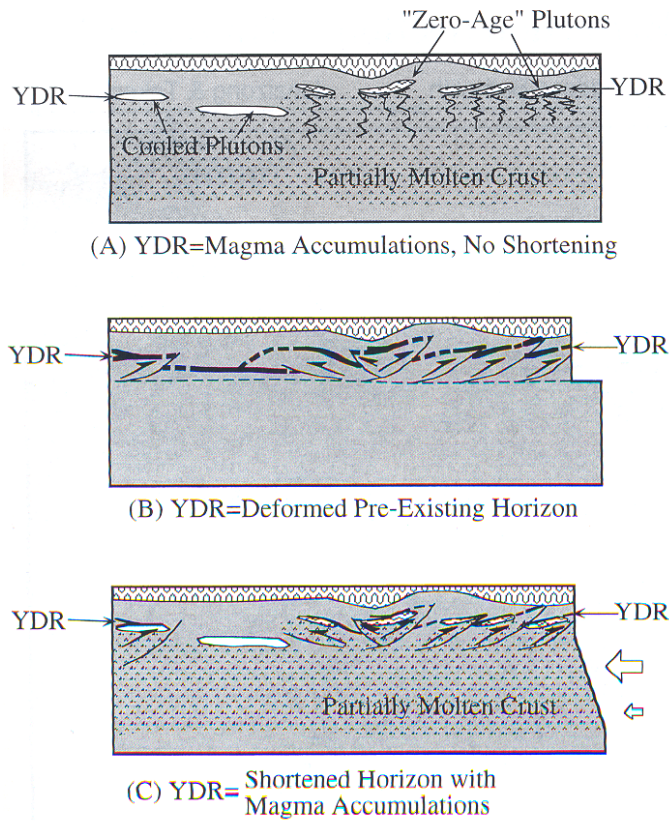


Figure 7.3, Schematic showing three possible interpretations of the Yangbajain - Damxung Reflection observed in the INDEPTH seismic profile in the southern Tibet (Alsdorf, Brown, Nelson, et al., 1998).

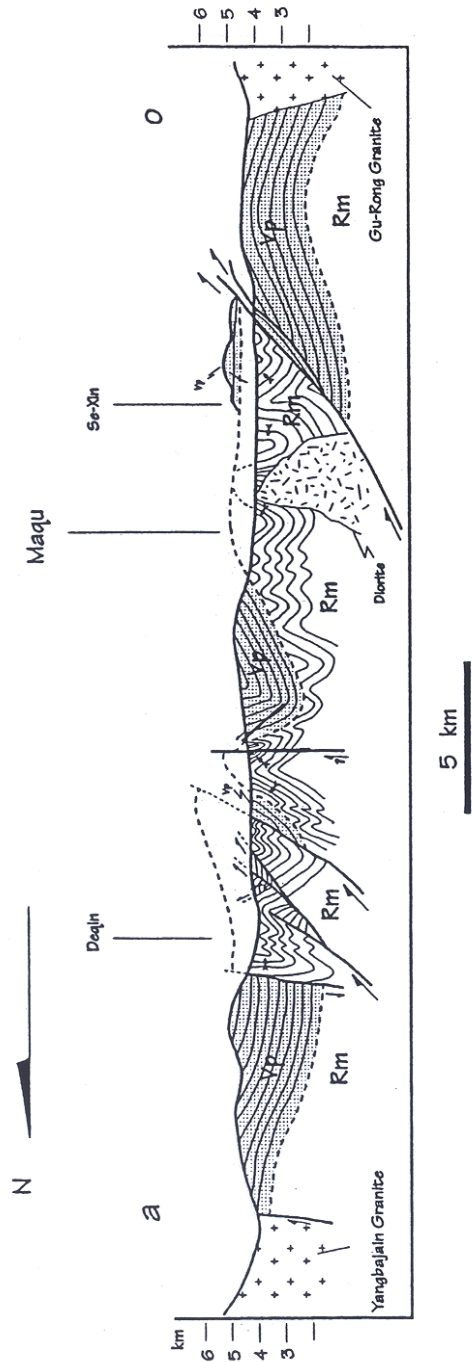


Figure 7.4, Synthetic cross section in the Maqu area in the southern Tibet (Pan, 1993)

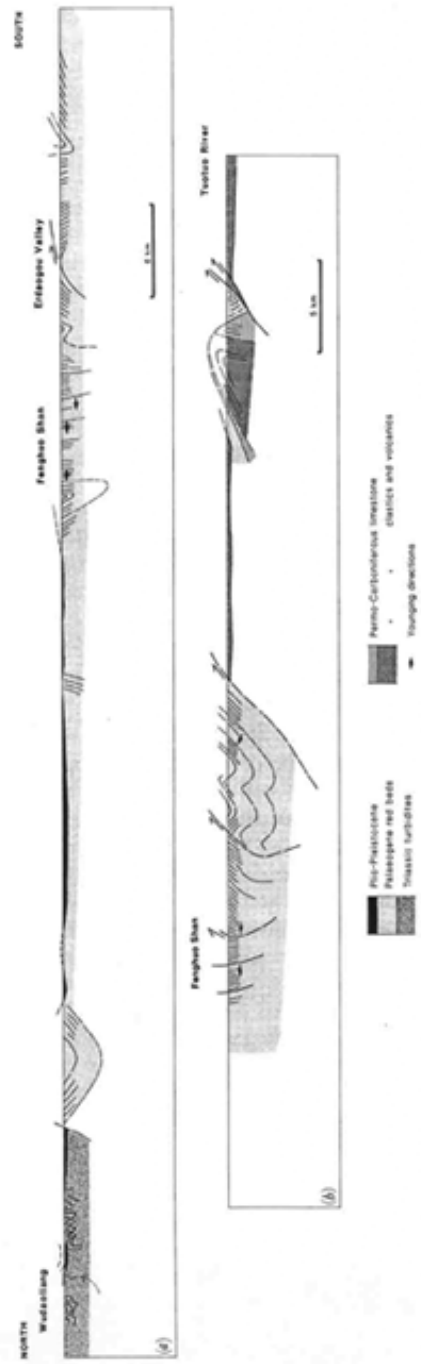


Figure 7.5, Cross section through the Fenghuoshan (Coward and Kidd et al., 1988).