

Structure-Geomorphological Districts of Mongolia

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1. Introduction and method

Structure geomorphological districts of any territory distinguish evident that based on its geological structure, depth structure and paleogeography.

Structure geomorphology or morphostructural study that is to make the accurate link of mentioned features based on and defined as “morphostructure is geological and tectonic structure which formed endogenous process and re-changed exogenous process “by I.P.Gerasimov and Yu.V.Mescheryakov, Russian scientists, in 1965. Scientific papers that touched on dividing in to structure-

geomorphological districts in territory of Mongolia have a few, but have been observed the lack.

Principle to making of boundary of morphostructural district hasn't in use, but, in most cases, based on figures of altitude in relief, making morphometric analysis. Boundaries of morphostructural districts are encountered with faults, although district is divided to blocks. Each blocks have feature to geological and tectonic structure, depth structure and morphology.

This paper is not aimed at entering a description of physical geography to each blocks, and determined a just morphostructural description.

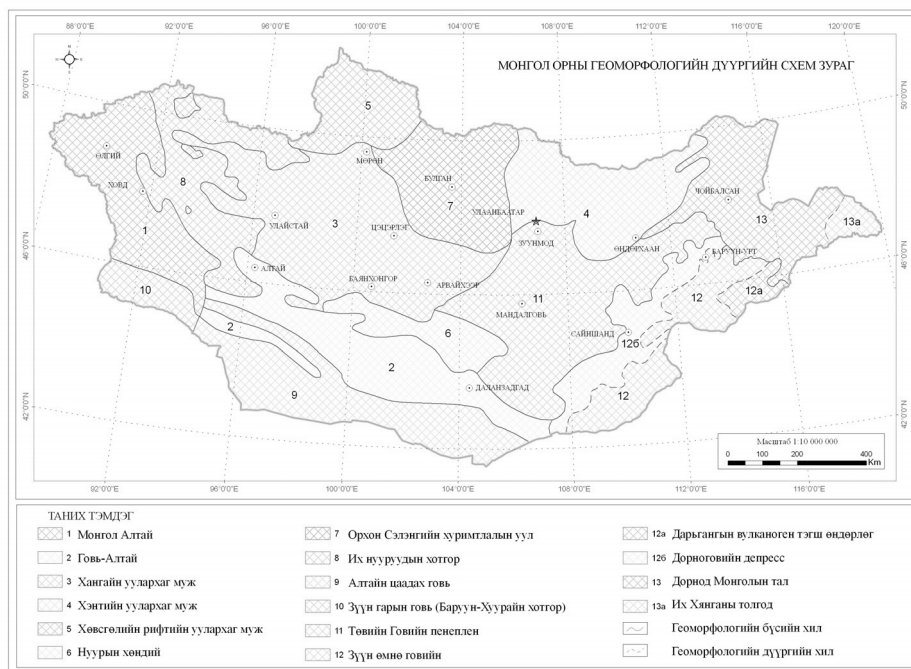


Fig. 1. Schematic map for geomorphological districts of Mongolia (by N.A.Florensov and S.S.Korjuev, 1982)

2. Structure-geomorphological districts

Morphostructurally, Mongolia is divided into several different blocks including 2 megablocks and 13 macroblocks related from region to local for terminology.

A. Mountainous country province megablock:

Macroblocks: 1. Mongolian Altay

2. Khubsugul

3. Khangay

4. Khentey

5. Gobi-Altay and Pre-Altay Gobi

6. Orkhon-Selenge basin

B. Plain country province megablock:

Macroblocks: 7. Basin of Great Lakes (Lake Valley)

8. Baruun Khuuray basin

9. Sulinkheer (South East Mongolia)

10. Khoit Kherulen (North East Mongolia)

11. Central Gobi peneplain

12. Dornod-Mandal Ovoo

13. Atas Bogd-Gurvansaikhan

Mongolian Altay macroblock. Mongolian Altay is mountain range located in western part of Mongolia and separated by Pre-Altay deep-seated fault in the east from Basin of Great Lakes and Bulgan deep-seated fault in the south from Baruun khuuray basin. It belongs to epiplatformic orogeny that formed on folded, then peneplained basement of Paleozoic age. Its main morphostructural elements are occurred in present relief as changed by exogenic process neotectonic structure.

The basement of Mongolian Altay is divided into tectonic blocks with strike of north-west, and cutted by deep-seated faults.

Morphostructural feature for Mongolian Altay is composite result of fracturing and folding deformation at the Pre-Cenozoic basement.

By a terrane subdivision of plate tectonics, Mongolian Altay is forearc/backarc basin.

The thickness of earth's crust beneath Mongolian Altay is 42-60km.

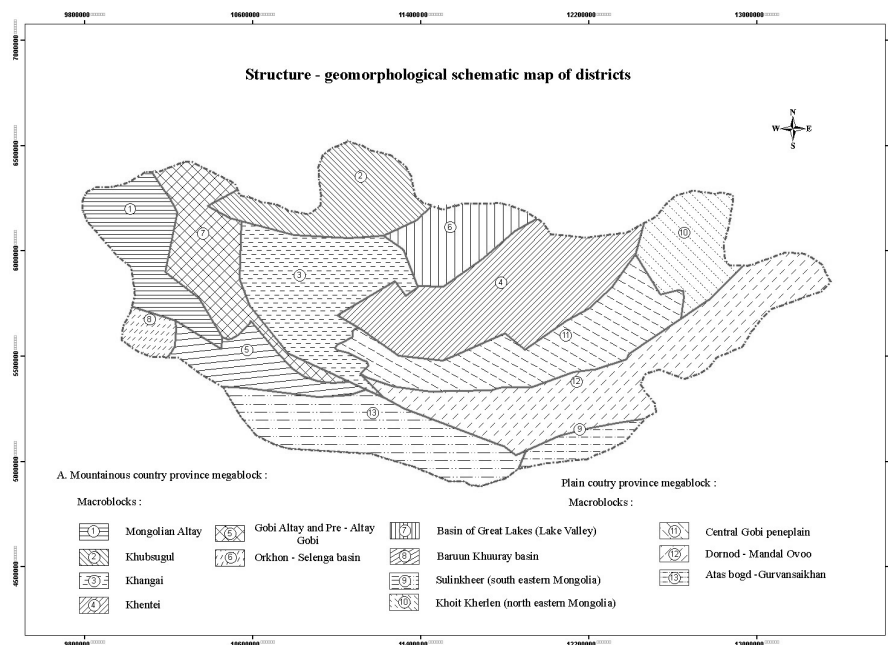


Fig. 2. Schematic map of structure-geomorphological districts (Kh.Ulambadrakh, 2007)

Khubsugul macroblock. Khubsugul macroblock is located northern part of Mongolia and separated by Kangay deep-seated fault in the south and Agardag fault in the west. Khubsugul morphostructure is also composite result of fracturing and folding deformation related thickly with development of south west side of Baigal rift zone.

Main morphostructure for Khubsugul is influenced Khubsugul, Darkhad and Busingol rift basins. Furthermore, East Khubsugul, West Khubsugul and Shishged arched uplifts are to composite structure. The bigger faults which formed in Caledonian time and directed to meridian are controlled the development of them.

Khubsugul macroblock is cratonic block and island arc for tectonic classification.

The thickness of earth's crust in Khubsugul is 45-55km and is the thinner of 5-6km in Darkhad and Khubsugul rifts.

Khangay macroblock. Khangay is located in west and central part of Mongolia. Khangay uplift or dome is composite structure that distinguished to the bigger and smaller blocks. Khangay dome is subdivided into several blocks including Bulnay, Tarvagatay, North-west Khangay, East Khangay and South Khangay. It not occurred horst and graben structure, but is dominantly ring structure of various size and origin. From ring structure, Chuluut gol, Shireet nuur, Upper Orkhon and Upper Ongiin gol are the evident and they related to granitic intrusive of Late Paleozoic and Mesozoic ages and basalt of Cenozoic. South limb of Khangay dome is very high seismic activity. In central part of Khangay, the thickest earth's crust of Mongolia is 55-60km.

Tectonically, is cratonic block with superimposed basin of Late Paleozoic-Lower Mesozoic.

Khentey macroblock. Khentey macroblock is uplift or dome dominated ring structure of various size, kind and age, horst and dome intrusive. Ereendavaa, Baga Khentey, South East, North West and Periphery blocks distinguished within Khentey macroblock. These blocks are with eroded, strong fractured ring structure, moreover,

horst (Boroo), and small dome (Modot, Janchivlan) morphostructures. Ereendavaa block of it is more interesting morphostructure and here is alternated horst and graben structure.

Tectonically, Khentey macroblock consists of turbidite basin (Baga Khentey, South East, Periphery blocks) forearc/back arc basin (North West block) and cratonic block (Ereendavaa).

The thickness of earth's crust beneath is 45km.

Pre-Altay Gobi and Gobi Altay macroblock. Generally, this is east continuation of Mongolian Altay, but difference of it is strike that directing west to east and northwest to south east.

Pre-Altay Gobi and Gobi Altay are the similar to some morphostructural features, history of relief development, although considered together. Macroblock's "face" is blocking, folding-blocking mountain and transverse basin.

The example of transverse morphostructure is Arts Bogd. Gobi Altay mountain range is piedestal mountain which is first stage of regenerated mountain development.

This macroblock shows island arc and its basin. The thickness of earth's crust is 45-50km.

Orkhon-Selenge macroblock. This is located in central-north part of Mongolia. By a morphostructural features, it subdivided into Selenge-Jid, Orkhon-Selenge and Tuul-Orkhon blocks. This macroblock has weak differentiated dome blocking uplift (Khangay, Buteel, Buren), blocking uplift (Zaamar, Khoshoot), horst (Nomgon, Mogod uul, Khalzan uul, Tuleet uul), graben and graben-like basin (Jargalant, Mogod, Darkhan, Lun). Moreover, well kept volcanic (Togoo, Uranmandal, Khuis mandal) and active faults (Orkhon, Selenge, Mogod, Bayangol).

The thickness of earth's crust is 42.5 (north east side of macroblock)-44km.

Basin of Great Lakes (Lakes Valley) macroblock. This macroblock is located in western part of Mongolia,

directing to submeridian.

Basin of Great Lakes is superimposed, composite basin system and formed in place of previous Mesozoic basin. It is divided into Uvs nuur, Central, Khar Us-Zeergent and Shargiin Gobi blocks.

Within these blocks, not occurred specific main structure and occurs few faults (Bayan nuur, Darvi) Morphostructural feature of this macroblocks that consisting of alluvial, proluvial, alluvial-proluvial and aeolian plain should occur and explain the information based on geophysical data to each blocks.

The thickness of earth's crust is 42- 44km. Tectonically, this is island are.

Baruun Khuuray basin macroblock. Baruun Khuuray basin macroblock is located in south west of Mongolia and separated by Bulgan fault in the north west and Alag nuur fault in the east.

Structurally, it is relative stable block of earth's crust that consisted of Middle-Paleozoic rocks.

It is seen as structural wedge with separated by faults in all side. The smaller faults in macroblock are as horst and graben to composite structure. Weak occurred this structure at surface is seen as plain, either hilly territory.

BaruunKhuuray is island are for tectonic district. Earth's crust is 45km.

Central Gobi peneplain macroblock. Morphostructurally, relative weak studied. Intensive stage of peneplainisation is explained that Mesozoic to Oligocene.

The main "role" in peneplain is completed various faults. Grabens formed along faults (Ikh Bogd-Ondorshil, Dundgobi, Khoshuu Khiid).

Sulinkheer (South East Mongolia), Khoit Kherulen (North East Mongolia), Dornod-Mandal Ovoo and Atas Bogd-Gurvan Saikhan macroblocks are dominantly plain relief, and, weak occurred morphostructure.

Sulinkheer is the one of main structure of platform development in Mongolia. Its basement is occurred at surface and is to 700-800m depth in north west side

(East Gobi tectonic depression).

Dornod-Mandal Ovoo and Khoit Kherulen macroblocks have ring structure from remains of volcanoes.

These macroblocks are not distinguished to detailed blocks, but with many faults. The thickness of earth's crust for them is 42.5 (Sulinkheer, Khoit Kherulen) to 45km (Dornod-Mandal Ovoo, Atas Bogd-Gurvan saikhan).

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