Geophysical Research Abstracts
Vol. 15, EGU2013-9543-1, 2013
EGU General Assembly 2013

Hidden faults in the Gobi Desert (Inner Mongolia, China) revealed by microtremor analysis, ground-penetrating radar and SQUID-supported transient electromagnetics

Andreas Rudersdorf (1), Sebastian Hölz (2), Almaz Torgoev (3), Hans-Balder Havenith (3), and Klaus Reicherter (1)

(1) Neotektonik und Georisiken, RWTH Aachen University, Aachen, Germany (a.rudersdorf@nug.rwth-aachen.de), (2) GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel, Kiel, Germany, (3) Departement Géologie - Georisques et Environnement, Université de Liège, Liège, Belgium

The endorheic Gaxun Nur Basin (GNB, also Ejina Basin, Hei river Basin, Ruoshui Basin) in the eastern Gobi desert is situated between the northern Tibetan Plateau and the Gobi Altai mountains. Recent fault activity is concentrated on the sinistral Altyn Tagh Fault, its eastern continuations and the Qilian Shan frontal thrust in the south, which are induced by the stress field of the India-Eurasia continental collision. In the north, the basin is bound by the Gobi Altai mountains with the major sinistral Gobi-Tien Shan Fault System.
The basin is dominated by a very flat topography, active alluvial sedimentation from the south and eolian erosion by northwesterly winds. The basin formation and basement structure is poorly known. The sedimentary succession of up to 300 m thickness comprises intercalations of alluvial fan deposits, dune sands, lake sediments and playa evaporites. The latter tend to concentrate in the northern part of the basin, where the basin is limited by the Gobi Altai mountains. The top of the diversified successions and the Gobi surface itself is covered by gravels.
Instrumental seismicity and paleoseismic records are rather low and earlier tectonic and paleoseismological investigations are sparse. We, therefore, conducted microtremor analyses and transient electromagnetics with a liquid nitrogen cooled SQUID magnetometer to reveal basement-basin interaction structures; ground-penetrating radar surveys were also carried out to investigate shallow reworking processes. First results show connections between subsurface data and a large-scale (>20 km long) lineament fingerprint from remote sensing studies.
Here, we focus on a NW-SE striking lineament west of the city of Ejina, which shows only minor topographic evidence for fault activity. An earlier drill core nearby resulted in dating irregularities in the upper 60m, which are believed to be related to the lineament. Microtremor analysis shows a significant offset of the basement topography and ground-penetrating radar indicates shallow faulting.