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Late Miocene to Quaternary evolution of the Çankırı Basin (Central Anatolia, Turkey)

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The Central Anatolia Çankiri basin straddles the Izmir-Ankara-Erzincan suture belt, it is bounded by the North Anatolian Fault Zone (NAFZ) to the North and the Kırşehir Crystalline Complex to the South. The sedimentary succession is more than 4 km thick and was deposited during 5 different sedimentary cycles spanning from the Upper Cretaceous to Quaternary. Within the Upper Miocene cycle, three different formations have been distinguished: the Tuglu Formation (Serravallian/Tortonian), the Suleymanli Formation (MN13-Messinian p.p.) and the Bozkir Formation (Messinian p.p.). During Pliocene to Quaternary, two clastic formations have been distinguished yet grouped together in the Deyim Formation.
Within the framework of the EUROCORES Topo-Europe programme, the VAMP (Vertical Anatolian Movements Project) Project focuses on the tectonic and climate interactions in the Anatolian Plateau. In the Cankiri basin, an international and interdisciplinary research team (APVV-ESF-EC-0009-07 and IGAG-CNR TA.P05.009.003) has achieved detailed sampling and study of key stratigraphic sections. Samples have been collected to study ostracods, benthic foraminifera, nannoplancton, charophytes, molluscs, fish remains, palynomorphs and small mammals. The small mammals analyses have allowed to better constrain the stratigraphic position of the studied formations whereas the other palaeontological analyses provided detailed information about the palaeoenvironmental and palaeoclimatic evolution of the basin during that time.
The Tuglu Fm depositional environment evolves from a marginal marine environment to a shallow lacustrine and then to a slow flowing fluvial system. At the base, the ostracoda and foraminifera assemblages point to hyperhaline water bodies. The unit was deposited in subtropical conditions, riparian forests and swamps alternating in time.
A regional angular unconformity accounting for about 3 million years gap separates the Tuglu Fm by the overlying Suleymanli Fm. In such a time frame, the tectonic regime of the Çankırı basin changed from extensional to transcurrent, corresponding to the time when the NAFZ became the dominant controlling tectonic structure.
The Suleymanli Fm deposited in an alluvial fan to alluvial plain environment as indicated by the occurrence of terrestrial and freshwater molluscs. Scattered ostracod valves point to permanent and ephemeral shallow water bodies in an arid environment.
The Suleymanli Fm grades into the Bozkir Fm. This latter Fm is characterised by an alternation of secondary diagenetic gypsum and pelitic layers. It was deposited in subtropical conditions with steppe elements (mainly herbs). The occurrence of rich ostracoda assemblages in some of the pelitic layers point to a permanent shallow water body subject to desiccation during aridity pulses.
Above the Bozkir Fm, the Deyim Fm represents a drastic change in depositional environment, being characterised by several cycles of fluvial conglomeratic bodies unconformably overlying the above mentioned Fms. Such variations of the base level could be linked to the uplift of the Çankırı Basin which could then be dated as post-Messinian.