



## **Optical study of organic matter as a tool for documenting environmental variations in Neogene fluvio-lacustrine sediments from northern Tianshan piedmont.**

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The Tianshan range spreads in NW China over an E-W distance of 2500 km. The present topography (summits higher than 7000 m) is mainly due to a phase of Cenozoic reactivation induced by the collision of India-Asia tectonic plates. In return, the Central Asian climate has probably been largely affected by the Tianshan surrection as Himalaya range did for the SE Asia, Indian regions and Pamir Plateau. The purpose of our study is to understand the evolution of the environment under climatic (SE Asiatic, Indian, Siberian monsoons and Westerlies as well) and geodynamic influences. The uplift history may be approached by the study of adjacent sediment volumes accumulated in Junggar and Tarim basins. The evolution of climate is quite difficult to constrain, due to the azoic and detrital character of sedimentary series.

In order to reconstruct the Late Tertiary environmental evolution of Central Asia, we have studied two sections of Neogene sediments on the northern piedmont of the range (Kuitun He, Jingou He) and a lacustrine series cored in a present piedmont lake (Ebi Nor). The outcropping continental series may be studied in terms of eroded volumes, depositional environments and palaeo-landscapes. They are more difficult to study in terms of material origin, age of deposition and climatic conditions due to the poorly preserved fauna and the successive possible oxidation and reworking of original material. The sediments from the Kuitun He and Jingou He sections have been previously dated using magnetostratigraphy giving an age span from ~3.1 to ~10.5 My and ~8.1 to ~23 My respectively (Charreau et al., 2005). The detrital sediments deposited in the lake record the four last My.

This presentation aims to confirm the large interest of palynofacies (optical study of resistant organic matter) for studying continental formations. Results are compared to sedimentation rates and magnetic parameters evolution. The other objective is to attempt for the last million years, a comparison between sedimentary records of both the outcropping series and the lake ones.

The results indicate that through Neogene times, the environmental conditions in the northern flank of Tianshan varied strongly at the My scale, from drastic arid conditions to humid ones, i.e. true lacustrine environment. Although the organic content of these sediments is very low (< 0.5 % TOC), the optical study of organic matter remnants reveals variations in quality of supplied organic matter: algae derived OM, litter OM, soil OM, reworked OM, giving information on the evolution of 1) the water-table, 2) the nature and density of vegetal cover at the time of deposition.

The confrontation of palynofacies results with age scale along the last 23 My, reveals that the environment was first very arid and became more and more humid, i.e. favourable to the development of a vegetal cover. By ~20 My, a typical lacustrine environment is recorded, marked in palynofacies composition by a dominance of amorphous organic matter, derived from algae. At 15 My, a period of intense run-off with strong humidity is recorded in Jingou He section. Then aridification conditions set back definitely with a probable acceleration at 7 My as seen in Kuitun He section. However, a first humid period is recorded around 5-4 My, as revealed by soil and vegetal cover markers in Kuitun He series and true lacustrine conditions in Ebi Nor sediments. A second one, only documented in Ebi Nor sediments, occurs at about 1 My, and for a period of about 500 ky.

#### References

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