



Similarities of the oldest aeolian dust deposits in the World and in the Pannonian Basin

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According to the most continuous loess-palaeosol sequences of the World (e.g. China, Tajikistan, etc.) the climatic and environmental conditions allowed the formation of the oldest loess deposits at about 2.6 Ma BP. The loess layers are generally underlain by red clay, which is wind-blown in origin. So the oldest loess horizons in many regions can be regarded as the continuation of the atmospheric dust deposition after the formation of the red clays. It seems that this stratigraphic connection is a worldwide phenomenon, but it can be observed unequivocally in the Chinese Loess Plateau.

Our sedimentological, geomorphological, micromorphological investigations and field observations all provide strong evidence for the wind-blown origin of the red clay in the Pannonian Basin. After the formation of the red clays (about 3.5 to 2.4 Ma BP) the climate turned to more arid, therefore the rate and the frequency of the background-dust and dust-falling episodes were increased. And maybe this arid-semiarid period between 2.4 and 1.8 Ma BP could be the earliest when loess was formed in the Pannonian Basin.

The grain-size distribution curves of most aeolian sediments are polymodal and represent different transport and/or depositional processes. Grain-size parameters of the bulk sample have been commonly used as environmental indicators in sedimentary investigations. After the mathematic partitioning of the bimodal grain-size distribution curves (using parametric curve fitting and non-negative matrix factorization) we have separated the fine and coarse-grained sediment-populations. The coarse component has pronounced kurtosis and is well sorted, which is interpreted to be the product of local winds. Conversely, the fine component has a wide grain-size range and is poorly sorted, probably represents the background dust-load and it was mainly transported by the westerlies.

The fine particles do not show large difference in the old loess and palaeosol horizons, but we have found some variation in the coarse fraction. The relative increase of the fine fraction in the reddish soils was caused by the dilution at lower regional sedimentation rate, whereas the proportion of the coarse grains was decreased due to the local wetter climate. So, these layers cannot be considered as a result of glacial-interglacial changes, probably they are reflecting the Early-Pleistocene warm-humid and warm-semiarid oscillations (like in Tajikistan), this climatic alterations were much smaller.