

## **Synchronicity between IRD events in Northern Atlantic and grain size variations of the Serbian loess during the last million years**

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Loess covers huge parts of the continents, especially in the middle latitudes of the Northern Hemisphere. However, except in the case of formation of the Chinese Loess Plateau, which is linked with the East Asian Monsoon, we do not know the potential relationship between loess formation and responsible air circulation type(s) in any other region. Comparison between Serbian and Chinese loess-paleosol sequences magnetic and grain size records provide general similarities especially in the case of magnetic records matching. This transcontinental correlation reveals also that there are significant similarities between the magnetic records of northern Serbia and the central Chinese loess plateau. The general multi-millennial variations of presented magnetic proxies are almost identical in these distant major loess regions. This correspondence appears to be also similar with the globally integrated marine records, potentially suggesting accordance in soil formation processes on Eurasian scale. However, median grain size and other parameters of textural variations indicate significant differences in variations of median grain size between Serbian and Chinese loess records. These textural differences point that Serbian loess is formed as a consequence of completely different air circulation than in the case of Chinese loess plateau.

Robust evidence of grain size variations recorded in the Serbian loess indicates significant synchronicity with the appearance of Ice Rafted Debris (IRD) events identified from deep sea cores in the North Atlantic during the last one million years. Additionally, higher contribution of coarse grains, the thickness of loess layers, sedimentation rates and increase of U-ratios is observed in Serbian loess-paleosol sequences is associated with a more pronounced decrease of sea surface temperatures in the Western than in Eastern Mediterranean. These differences in the sea surface temperatures in the Western and Eastern Mediterranean illustrate more polar front fluctuations between the Pyrenees and Alps influencing the more frequent cyclone genesis in Genova gulf, as an important regional climatic anomaly. Modern regional synoptical atmospheric circulation patterns as well as studies in the North Atlantic area support our hypothesis that the observed grain size variations reflect the long-term migration, seasonal duration and permanency of the polar front on a multi glacial-interglacial scale.