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North Atlantic Ocean abrupt climatic events of the last glacial period recorded in Ukrainian loess deposits

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Loess deposits are widely distributed in the Northern hemisphere, where they have recorded not only the glacial-interglacial cycles, but also millennial-timescale changes resembling those in marine and ice cores. Such abrupt variations are clearly marked in Western European series, but have not yet been evidenced in the east of the continent. Here we present results of the high-resolution investigation of a Weichselian Upper Pleniglacial ($\sim$38 - 15 kyr BP) loess sequence from Stayky, Ukraine. The stratigraphy shows an alternation of loess horizons and embryonic soils, similar to sequences from Western Europe. Similarities are also found between variations of a grain-size index (ratio between coarse and fine material fractions) in Stayky and in Western European profiles. Based on these similarities, and in agreement with the luminescence dates, the embryonic soils are associated to the Greenland interstadials (GIS) 7 to 2, and the Vytachiv paleosol at the base of the sequence, to GIS 8. Pollen analysis indicates a wetter climate for these interstadials than for the stadials, marked by loess formation. The grain-size index reaches the highest values for intervals correlated with the Heinrich events 3 and 2. Thus, it appears that the North Atlantic abrupt climate changes have extended their influence and modulated the loess sedimentation at least as far as the Eastern Europe. This result is supported by recent climate modeling experiments, and recommends the Stayky sequence as a reference for further comparisons between profiles along the Eurasian loess belt centered at 50°N.