HIGH RESOLUTION CLIMATIC VARIATIONS RECORDED BY MOLLUSK FAUNA AT NUSSLOCH (RHINE VALLEY, GERMANY) DURING THE LAST GLACIATION

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Between 31 and 19 kyr B.P. important eolian sediments deposited in Western Europe at Nussloch favored by the enhanced atmospheric circulation at mid-latitudes and large areas of deflation providing quantities of material.

The 10m-high studied sequence is composed of an alternation of nine gley-loess cycles deposited in a steppic environment. During gley formations, the climate is less windy, colder and more humid, and the malacofaunas have lower diversity and equitability than during the loess deposition. Top of the gleys is characterized by the thaw of the permafrost, when it is present, and by a demographic explosion of the mollusk fauna. Similar lithological alternations have been evidenced in all the Late Pleistocene deposits in Western Europe. They suggest that global climatic variations had a strong influence on the continental domain in Europe during this interval.

Using the GRIP timescale, previously adapted to our loess sequence, we showed that the terrestrial mollusk abundance matches with the d18O of the Greenland ice-core. Thus, the high biological abundances regularly occurring in the sequence is interpreted be related to climate ameliorations. Nevertheless, the system is disturbed in the upper part of the sequence due to a strong increase in local moisture indicated by a decrease in both mollusk species richness and in d13C of the organic matter of the soil, restraining the development of the malacofauna during climatic improvements. The comparison with marine proxies indicates that the composition of the assemblages during the
Heinrich 3 event had a higher proportion of semi-open environment species than during Heinrich 2 event, that could suggest a less severe climate. Furthermore, Heinrich 3 event is preceding by few particular assemblages typical of a very cold and humid environment. A strong amount of precipitation could have occurred at this time on the European continent, and could explain the important expansion of the Scandinavian ice-sheet southward just before the Last Glacial Maximum.