



Compositional changes of sedimentary organic matter form a 100-yr flood deposit

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In December 2000, a 100-yr flood in the Po River (North Adriatic, Italy) resulted in a 24 cm-thick bed deposit in the adjacent central prodelta. Cores collected after the Fall 2000 flood and in the following 9 years, allowed us to characterize the event-strata in their initial state and document their subsequent evolution with time due to post-depositional processes. Sedimentological changes were investigated using x-ray radiographs and sediment texture analyses. The time-series analysis indicated that roughly half of the original flood deposit was preserved after 9 years, whereas the uppermost unit experienced significant changes including mixing, coarsening, compaction, erosion, and addition of new material. Once the extent of these mechanisms was understood, we analyzed both preserved and altered strata to investigate the effect of specific post-depositional processes on the ultimate fate of sedimentary organic matter (OM). The composition of OM was characterized using bulk and biomarkers analyses including organic carbon (OC), total nitrogen (TN), carbon stable isotope composition ($\delta^{13}C$), lignin phenols, cutin-products, p-hydroxyl phenols, benzoic acids, dicarboxylic acids, and fatty acids. By selecting specific zones of the sedimentary column which over specific time periods experienced intense and clear chemical changes associated with the aforementioned post-depositional processes, we were able to discriminate the effect of these mechanisms on the ultimate fate of OM and test specific hypotheses regarding selective preservation of different classes of biomolecules.