



Comparative organic geochemistries in surface sediments from the Adriatic (Italy) and Gulf of Lions (France): origin, fate and age of terrestrial-derived organic carbon

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A multidisciplinary research effort, within the framework of the ONR-funded project EuroSTRATAFORM, was carried out to investigate the transport and deposition of terrestrial-derived material in the Adriatic Sea and Gulf of Lions. The Rhône and the Po rivers are currently the two largest fresh water inputs to the Mediterranean Sea. Their deltas receive large inputs of organic matter from both autochthonous and allochthonous sources and potentially sequester a significant fraction of these materials in the seabed. CuO oxidation, elemental, $\delta^{13}\text{C}$ and $\Delta^{14}\text{C}$ analyses were carried out to characterize the origin, age and distribution of organic matter in surficial sediments (0-1 cm). At seasonal intervals, the stations in the prodelta areas and along the main dispersal systems were sampled to determine the temporal variability.

The study showed physical erosion and transport and biological mixing processes selectively removed certain particles, causing particles to be hydraulically sorted, which in turn affected significantly the surficial geochemical distributions. It was observed a clear seasonal variability in the Po and Rhône prodelta area where the reworking of the seabed flood layer was actively involved playing an active role in terms of preferential transport of humified, poor-lignin OC which is adsorbed on finest material. The finest fraction is selectively buried in off-shore regions. Conversely, fresh, sand-sized plant fragments, which are rich in OC and lignin, hydraulically behave like very fine-sand and are retained in the prodeltaic sediments. The different concentration of woody vascular plants tissues, observed during the different seasons, might explain

the different age of terrestrial-derived OC in the prodelta regions.