Influence of the organic matter composition on benthic oxygen demand in the Rhône River prodelta (NW Mediterranean Sea)

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Résumé en anglais	Measurements of diffusive (DOU) and total (TOU) sediment oxygen uptakes, oxygen penetration depth, porosity, OC, TN, carbohydrate, lipid, amino acid, chlorophyll a and pheophytin a concentrations were assessed in surface sediments at 9 stations located in the Rhône River prodelta and the adjacent continental shelf during April 2007 (a period characterized by low flow and discharge regimes). Our results show that sedimentary organics in the Rhône River prodelta were mainly fueled by a single source of OM, namely continental inputs. Those inputs were relatively labile and decreased following an inshore–offshore gradient. The descriptors of sedimentary organics mostly resulted from dilution and degradation processes affecting OM during its transfer from the mouth of the Rhône River. TOU/DOU ratios were close to one, with a slight increase at offshore stations. This is coherent with the limitation of bioirrigation in response to organic enrichment. DOU correlated best with bulk quantitative descriptors of sedimentary organics, which probably resulted from the overall correlation between all biochemical descriptors linked with the predominance of a single source of organic matter in the whole studied area. Nevertheless, an influence of Chl a and Pheo a contents on oxygen consumptions, possibly due to freshwater or/and marine primary production, is not to be excluded. These small fractions (<0.08‰ to total OM) could then be responsible for the oxygen consumption, even if not visible in classical measurements as δ13C or C/N.

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