



Impact of river channel shifts on tetraether lipids in the Rhône prodelta (NW Mediterranean): Implication for the BIT index as an indicator of paleoflood events

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In this study, we tested the applicability of the BIT (Branched and Isoprenoid Tetraether) index as a proxy of paleoflood events in the river-dominated continental margin of the Gulf of Lions (NW Mediterranean). We compared the concentrations and distributions of branched glycerol dialkyl glycerol tetraethers (brGDGTs) and crenarchaeol of suspended particulate matter (SPM) collected in the downstream of the Rhône River as well as a core-top and a ~8-m long piston core RHS-KS57 taken in the Rhône prodelta. The piston core covers the last 400 years with four distinct intervals recording the river influence under natural and man-induced shifts of Rhône distributaries: Bras de Fer, Grand Rhône, Pegoulier, and Roustan. Our results indicate that there are mixed sources of brGDGTs and crenarchaeol in the Rhône prodelta, which complicates the use of the BIT index as an indicator of continental OC inputs and thus as a paleoflood proxy. However, the sedimentary BIT record obtained from the period, when the continental material was delivered by the Rhône River more directly to the core site (Roustan phase; 1892 to Present-day), strongly mimics the historical paleoflood record. This shows the potential of the BIT index as a paleoflood proxy, as long as the delivery route of the continental material by the rivers to the core sites remained constant over the time. Our study also highlights that shifts in the course of the distributaries and river channels should be taken into account for the use of the BIT index as a paleoflood proxy.