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## Reconstruction of fire regime changes in the French Mediterranean region during the last 8,500 years using microcharcoal

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Nowadays, the Mediterranean region is strongly impacted by fires. Projected warming scenarios suggest increasing fire risk in this region considered as hot-spot of the climate change (Liu et al., 2010; Pechony and Shindell, 2010). However, models based on modern-day statistical relationships do not properly account for interactions between climate, vegetation, and fire. In addition, process-based models must be tested not only against modern observations but also under different past climate conditions reflecting the range of climate variability projected for the next centuries (Hantson et al. 2016). Marine sediments are a major source of fire history of nearby land masses. Here, we present a unique 8,500 yr long record of biomass burning changes from southeastern France based on a marine microcharcoal sedimentary record from the Gulf of Lion, located in the subaqueous Rhone river delta. Sediment delivery to the Gulf of Lion comes mainly from the Rhône River draining a large watershed in southeast France (ca.100,000 km<sup>2</sup>). Due to the direction of dominant winds blowing from the North-North-West (Mistral and Tramontane) and carrying fine particles from the land to the sea, the microcharcoal record likely reflects the biomass burning in the Rhone watershed and South-East of France. Our results show multi-centennial to millennial changes in biomass burning with a periodicity of 1000 years for the full record and between 500 and 700 years before 5,000 cal BP and after 3,000 cal BP. Large peaks of biomass burning are associated with marked dry periods observed in the region. Burning of biomass is higher when the region is dominated by xerophytic vegetation than when mesophyte vegetation dominates. The trend and periodicity of the biomass burning record suggest a predominant climatic control of fire occurrences since 8,500 cal BP in this region.