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Productivity within the West Iberian coastal upwelling system: Calibrating the planktonic foraminifera Ba/Ca proxy

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The high productivity coastal upwelling regions are considered key locations to understand the linkage between the biological pump, or export productivity and climate in the past, which is essential for simulating future climate. Especially, the past productivity reconstructions are not easy and straightforward, in part because different proxies record fundamentally different aspects of productivity or more than one environmental parameter, and all contain their own assumptions. The Ba/Ca ratio in planktonic foraminifera (PF) is still one of those proxies that can have multiple interpretations. It has been used as proxy for riverine freshwater input, as proxy of seawater Ba concentration, and as productivity proxy on the seafloor. To improve the knowledge and accuracy of the productivity reconstructions using Ba/Ca in PF species in a coastal upwelling region, we will: 1) investigate if the content and distribution of Ba/Ca in the water column, during two years, reflected the productive waters during the coastal upwelling months; and after 2) use upwelling/ downwelling (spinose/ non-spinose) most abundant PF species for the region, and compare the data with other available productivity data ($\delta^{13}C$ and Cd/Ca in PF species, PF fauna, bulk Ba concentration, total organic carbon) from a large set of surface sediment samples from the West Iberian margin. High seawater Ba/Ca values are correlated with high nitrate concentrations and colder waters, coinciding with the upwelling summer season. No correlation is observed between the seawater values and river discharge. In sediments, high Ba/Ca values in *Globigerina bulloides* and *Neogloboquadrina incompta* (upwelling related species for the NW region), close to the coast seems to reflect the higher productivity due to coastal upwelling. Ba/Ca values of non-spinose species *N. incompta* are higher than of spinose species *G. bulloides*, apparently reflecting the integration of Ba-rich particulate organic matter during of their shell calcification, as previously suggested by Fehrenbacher et al., 2018 (https://doi.org/10.1016/j.gca.2018.03.008).