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# INFLUENCE OF COASTAL PROCESSES ON THE ORGANIC COMPLEXATION OF IRON AND COPPER IN THE MACARONESIA REGION

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**Abstract:** Coastal environments around islands are characterized by the combination of physical, chemical, and biological interactions, such as water mixing, wind stress, dust deposition, and resuspension from sediments that have impacts on the biogeochemistry of trace metals like iron (Fe) and copper (Cu). Therefore, the coastal waters and the influences of their processes on the organic complexation of Fe and Cu have to be studied to fully understand the biogeochemical cycles of these metals in the marine environment.

Dissolved iron (dFe) and copper (dCu), the concentration and the conditional stability constants of organic binding ligands ($L_{Fe}$, $L_{Cu}$, log $K^{cond}_{Fe3+L}$ and log $K^{cond}_{Cu2+L}$) were studied in the surface coastal waters of the Macaronesia region (Cape Verde, Canary Islands, and Madeira). Samples were collected during the POS533 cruise (2019) and analysed by competitive ligand exchange adsorptive cathodic stripping voltammetry. More than 98% of dFe (0.46-1.32 nM) was organically complexed with $L_{Fe}$, whose concentration range was between 0.56-2.96 nM. The log$K^{cond}_{Fe3+L}$ presented values between 20.77 and 21.90 ($L_2$-type ligands). In the case of dCu (0.07-4.03 nM), more than 99% was complexed and $L_{Cu}$ concentration was in the range of 0.54-2.59 nM. The log$K^{cond}_{Cu2+L}$ showed values between 13.40 and 14.42 ($L_1$-type ligands). The results suggest that, along the region, physical processes related to the water mixing could influence Fe and Cu speciation. Dissolved metals and ligand concentrations were greater at the coastal stations than in oceanic water related to biological activity and water mixing induced by the wind. Furthermore, greater concentrations were observed on the eastern parts of Fogo, Tenerife and Gran Canaria than on the western coast, due to stronger wind incidence.

**Key words:** Iron, Copper, Organic ligands, Cathodic stripping voltammetry, Coastal water.

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