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Producing or consuming? The potential annual respiratory variability of the epibiont community in the coastal waters of El Hierro (Canary Islands)

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Within the context of the ECOS project (PID2022-138753OB-C21 & C22), we explored the potential respiratory dynamic of the benthic epiphytic community in two sites around El Hierro island (The Canary Archipelago). Our ultimate goal is to understand the carbon balance of the microbenthic communities.

Samples of the microbenthic communities, epiphytic of macroalgae, have been collected monthly for one year in two contrasting sites: a non-exposed, semiconfined and anthropogenically affected harbour, and a pristine exposed rocky area. In each site, biological and chemical parameters were estimated in two size fractions, smaller than 200 μm , and smaller than 20 μm , along the environmental variables. Here we present the preliminary results concerning the enzymatic parameters associated with the respiratory activity of the communities: the electron transport system activity (ETS activity), a proxy for the oxygen consumption, and the isocitrate dehydrogenase activity (IDH activity), a proxy for the carbon dioxide production.

The two sites exhibited different temporal patterns. In case of the oxygen consumption rates, maximum values were estimated in October in the anthropized site, and higher values were measured in July in the pristine one. Carbon dioxide production rates peaked in April in the pristine area, and in May for the anthropized site. In contrast, the two size fractions (<200 μm , and <20 μm) showed similar temporal patterns at each site.

In addition, the relationship between the respiratory proxies (IDH/ETS ratio) was different in the two sites, indicating variations in consumption and production processes during the sampling period.

These results give us a first idea of whether benthic epiphytic communities can act as carbon sinks or carbon producers.