

The BIO-Tide project: The role of microbial biodiversity in the functioning of marine tidal flat sediments

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Coastal tidal sediments are highly productive ecosystems at the land-sea interface. Their productivity is mostly fuelled by microbial biofilms covering the sediment surfaces. The biofilms consist of a complex biogenic polymer matrix inhabited by a diverse consortium of benthic microalgae and heterotrophic microorganisms. Complex carbon fluxes in these biofilms fuel coastal food webs including local fish and shellfish stocks. However, many unknowns remain regarding these C fluxes, but most importantly, how microbial biodiversity mediates them. The BIO-Tide project (EU Horizon 2020 ERA-Net COFUND BiodivERSA, www.bio-tide.eu) aims to identify and quantify the relation between microbial biodiversity and C cycle related ecosystem functions. In a large-scale field experiment in the Bay of Bourgneuf (France, June 2017), the link between microbial biodiversity and C cycling was investigated in two contrasting tidal flat environments (sand vs silt) using state-of-the-art techniques for the simultaneous characterization of microbial diversity and activity in RNA stable isotope probing experiments (RNA-SIP) in combination with production and flux measurements (a.o. PAM fluorometry, CO₂ fluxes, extracellular polymeric substance (EPS) production and hyperspectral remote sensing). The first results, which suggest an almost instantaneous yet site specific uptake and retention of the label, will be presented.

Keywords: mudflats; intertidal; microbial diversity and functioning; BIO-Tide; stable isotope probing