



Microbial colonization dynamics of microplastics in the Southern Ocean, and South and North Atlantic (starting)
Dr. Gabriel Erni Cassola

Microplastics have been identified as widespread and persistent pollutants in all types of environmental compartments. On sea surfaces, buoyant polymer types are transported by marine currents to major oceanic gyres, where such particles are found at higher concentrations. Biofouling however—the colonization of particle surfaces by microbes and multicellular organisms—, has been proposed as an important pathway for removal of buoyant plastic from sea surfaces through added density. In addition, such colonizing communities may also perform biological functions and create a nutrient hotspot on particles in otherwise oligotrophic environments. To date however, it remains unknown what the colonization dynamics on such particles are, and if these vary by geographical region. With the proposed work we will provide time series data for the colonization of polyethylene, the most commonly found polymer type in surface waters, by microbes, based on next generation sequencing. In addition, we will provide data on changes in particle density as function of colonization over time, as well as accreted biofilm thickness—both crucial data for informing models of microplastic behavior in sea water. Taken together, the results of the proposed project would constitute the first systematic, time-course assessment of biofilm communities on microplastics in off shore regions generally, but also provide some of the first data on microbial colonization of microplastics for the Southern Ocean, as well as the Southern Atlantic.