# The impact of microbial life (exopolymer gels production) on the formation of Sea Spray Aerosols

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In recent years, the pivotal role of sea spray aerosols (SSA) in cloud formation and their impact on human health have gathered significant attention. Research conducted by VLIZ and Ghent University has unveiled new features of SSA, containing marine biomolecules with intriguing bioactivity potential (Van Acker *et al.* 2020, 2021), while other research revealed the presence of harmful marine phycotoxins posing health risks (Cheng *et al.* 2005). However, all these studies highlight the considerable variability in the enrichment of biomolecules in SSA.

This project aims to elucidate the factors influencing the production of SSA alongside their enrichment in biomolecules under controlled conditions. Our hypothesis postulates a correlation between SSA production and the presence of microbial exudates, specifically Transparent Exopolymeric Particles (TEP) and Coomassie Stainable Particles (CSP) in seawater. The influence of the physicochemical properties of the water column and the water-air interface, such as salinity, temperature, surface tension, and viscosity, on SSA production and composition is well-established in literature (Cravigan *et al.* 2020; Modini *et al.* 2013; Saliba *et al.* 2019). Concurrently, microbial gels like TEP and CSP have been identified as influential elements affecting surface tension and the overall composition of the sea surface microlayer (Santschi *et al.* 2020; Schwehr *et al.* 2018; Thornton, Brooks, and Chen 2016). Preliminary findings from our ongoing research, conducted within a controlled environment using a Marine Aerosol Reference Tank (MART), suggest a mild positive relationship between the concentration of exopolymer gels in the water column and the amount of SSA produced.

To comprehensively understand the impacts of TEP and CSP on the production of SSA, further investigation is imperative. This involves refining experimental conditions and employing specific analytical methodologies. The outcomes of this research hold promise for advancing our understanding of SSA dynamics, contributing to both atmospheric science and considerations for human health.

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**Keywords**
Sea Spray Aerosols; Marine Gels; Transparent Exopolymeric Particles; Coomassie Stainable Particles; Surface Microlayer; MART