**Organization of lipids in the seawater**

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This study introduces atomic force microscopy (AFM) as a direct imaging technique for visualisation and characterization of marine lipid assemblies at the nanoscale.

The methodological protocol including direct deposition of seawater and in seawater resuspended marine lipids on freshly cleaved mica followed by rinsing has been developed. The AFM visualization, morphology and height characterization of the resulting structure domains represent one new approach to perform such complex studies. The results were confirmed by force curve measurements.

Topographic images revealed main structural domains including monolayers, partially and fully flattened bilayers and intact liposomes**.** These domains exhibit different shapes, from regular, almost spherical to irregular shapes with linear and angular boundaries. It was shown that by means of the layer thickness determination, the resolving the supramolecular arrangements of the lipid in marine environment can be performed with high precision, simplicity and reproducibility at the nanoscale and could be applied on other biological layers and soft materials, in general.