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# Unravelling air-sea interactions driven by photochemistry in the sea-surface microlayer

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Interfaces are ubiquitous in the environment, and in addition many atmospheric key processes, such as gas deposition, aerosol and cloud formation are, at one stage or the other, strongly impacted by physical- and chemical processes occurring at interfaces. Unfortunately, these processes have only been suggested and discussed but never fully addressed because they were beyond reach.
We suggest now that photochemistry or photosensitized reactions exist at interfaces, and we will present and discuss their possible atmospheric implications.
Obviously, one of the largest interface is the sea-surface microlayer (SML), which is a region lying at the uppermost tens to hundreds of micrometres of the water surface, with physical, chemical and biological properties that differ from those of the underlying sub-surface water. Organic film formation at the sea surface is made possible in the presence of an excess of surface-active material. Hydrophobic surfactant films are typically believed to play the role of a physical barrier to air-sea exchanges, especially at low wind speed.
We will show that dissolved organic matter (DOM) can trigger photochemistry at the air-sea interface, releasing unsaturated, functionalized volatile organic compounds (VOCs), including isoprene,... acting as precursors for the formation of organic aerosols, that were thought, up to now, to be solely of biological origin!
In addition, we suggest that when arranged at an air/water interface, hydrophobic surfactant can have weak chemical interactions among them, which can trigger the absorption of sunlight and can consequently induce photochemistry at such interfaces.
A major question arises from such observations, namely: can the existence of such weak intra- or intermolecular interactions and the subsequent photochemistry be generalized to many other atmospheric objects such as aerosols? This topic will be presented and discussed.