

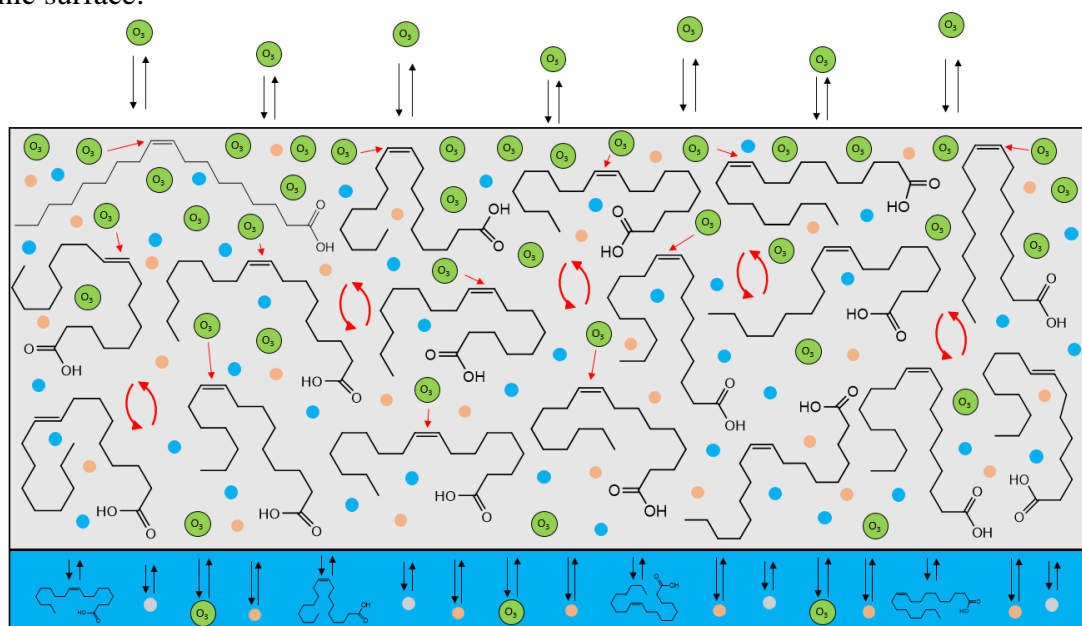
# Ozone uptake at the Sea Surface

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Within the upper 50-100  $\mu\text{m}^1$  of the ocean exists the sea surface microlayer (SML), which is a very complex mixture of predominantly natural (*ca.* 90 %) material sourced mainly from marine biota. The ocean is known to be an important sink with regard to the global ozone budget and previous studies have indicated that iodide within the SML is responsible for around half of the chemical loss of ozone to the ocean surface<sup>2</sup>. It has been suspected that the remainder of ozone loss occurring at this surface can be attributed to organic material within the SML. It is currently not known which species are responsible for this loss of ozone, but poly-unsaturated fatty acids (PUFA) provide likely candidates due to their accommodation of carbon-carbon double bonds and their roles and abundance within biological processes and dominant presence within the SML. We studied ozone uptake kinetics over a laboratory mimic of the SML using a solution of Instant Ocean<sup>®</sup> and humic acid with 3 different C18 PUFAs at varying concentrations dissolved into pentadecane. Ozone uptake coefficients,  $\gamma$  were in the range *ca.*  $4 \times 10^{-5} - 3 \times 10^{-5}$  for  $[\text{O}_3]_{(\text{g})}$  mixing ratios of 100-500 ppbv. A positive correlation was observed between  $\gamma$  and the volume of PUFA. At low ozone exposure,  $\gamma$  demonstrated a strong positive correlation with  $[\text{O}_3]_{(\text{g})}$ , but plateaued at an ozone exposure above *ca.* 100 ppbv. This is the reverse of behaviour expected for Langmuir-Hinshelwood kinetics and to the best of our knowledge, has not yet been discussed in the literature. We propose this trend to result from the structural aspects of the SML compared to a pure sample of the fatty acid in previous studies<sup>3</sup>. These results, alongside those obtained in future studies into ozonolysis reaction kinetics can be combined with accrued knowledge on secondary reactions and the gaseous products emitted from the surface as a direct result of ozone interaction with the SML. Once assimilated and scaled to global values this data can be positioned into atmospheric models allowing us to simulate the activity of ozone at the oceanic surface.



## References

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