MPIDS Colloquium

MAX-PLANCK-GESELLSCHAFT

Mass Transfer across the Air-Sea Interface: Complex Multidisciplinary Processes

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For several reasons, mass transfer across the wind-driven air-sea interface is a very complex process. Firstly, we are in a regime with an interaction between molecular diffusion, non-isotropic shear turbulence and non-linear wind waves. Secondly, the wave field and hydrodynamic boundary conditions at the interface depend on minute contaminations by surface active material either of natural or man-made origin. Thirdly, it is very difficult to investigate these processes experimentally.
Contact-free imaging measuring techniques are the key. In this talk three such techniques are reported, which we could significantly improve in the last years in Heidelberg. They helped us to get more insight into the mechanisms controlling mass transfer:
I) a fast shape-from-refraction technique to image the slope of small-scale wind waves,
II) active thermography for fast measurements of the transfer velocity and an insight into the mechanisms both in the field and the lab, and
III) imaging of the mass boundary layer thickness using fluorescent pH indicators.
At the end, the challenges ahead are pointed out.
https://www.youtube.com/channel/UCXeBh78HH0wMzlLBuPJIM8Q

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