Monday, October 8
Poster Session 1
16:00–18:00

Poster 29

THE IMPACT OF WATER CONSTITUENTS ON RADIATIVE HEAT TRANSFER IN THE OPEN OCEAN AND SHELF SEAS

We estimate the contribution of optically active water constituents (OACs), i.e. phytoplankton, CDOM and inorganic suspended sediments, to energy fluxes in the upper ocean and across the air-sea interface using a coupled bio-optical-ocean-atmosphere model. Our aim is to understand how heterogeneity in OACs in shelf seas affects the characteristics of sub-mesoscale vertical turbulent mixing and advective fluxes, through feedbacks with upper ocean heating rates and water density. We consider selected shelf sea regions (western Baltic Sea, Laptev Sea and New York/New Jersey Sea Bight) characterized by different freshwater and nutrient regimes, and complex bio-optical and hydrodynamic processes. We assess the impact of highly variable concentrations of OACs on heating rates. Modelled heating rates are evaluated against more rigourous co-located heating rate calculations performed using a dedicated atmosphere-ocean radiative transfer model. We show in different regional shelf seas how upper ocean heating rates induced by OACs contribute to the seasonal modulation of thermal energy fluxes across the ocean-atmosphere interface. We discuss the consequences for regional weather forecasting and climate change research.

Bronwyn Cahill, Free University Berlin, bronwyn.cahill@fu-berlin.de, https://orcid.org/0000-0003-3782-2553
Bennet Juhls, Free University Berlin, bennet.juhls@awi.de
Juergen Fischer, Free University Berlin, juergen.fischer@fu-berlin.de
Ulf Graewe, Leibniz Institute for Baltic Sea Research, ulf.graewe@io-warnemuende.de
John Wilkin, Marine and Coastal Sciences, Rutgers University, wilkin@marine.rutgers.edu
John Warner, U.S. Geological Survey, jcwarner@usgs.gov
Neil Ganju, U.S. Geological Survey, nganju@usgs.gov