Thursday, October 11
Poster Session 4
10:30–12:00

Poster 76

ASSESSING PHYTOPLANKTON PHENOLOGY IN A TYPICAL TROPICAL MARINE ECOSYSTEM USING SATELLITE, MODEL AND BGC-ARGO - BASED APPROACHES

In oligotrophic tropical marine ecosystems, thermal stratification (under warm conditions) may contribute to a shallowing of the mixed layer above the nutricline and a reduction in the transfer of nutrients to the surface lit-layer, ultimately limiting phytoplankton growth. We study such linkages in the northern Red Sea (NRS) - a typical tropical marine ecosystem. First, we utilise satellite-derived chlorophyll-a observations (OC-CCI – European Space Agency), in conjunction with a Biogeochemical - Argo dataset, and assess the capability of remote sensing to estimate phytoplankton phenology metrics in the NRS. Remotely sensed phenology matches bloom-timing metrics derived from an in situ chlorophyll-a dataset with a surprising degree of precision. Satellite-derived phenology metrics also successfully capture the predominant mechanisms affecting regional nutrient availability (convective mixing and a cyclonic eddy). These findings offer important insights into the capability of ocean colour remote sensing for monitoring food availability in the tropics and encourage the use of satellite-derived phenology in data-limited regions. Following this, we assessed the interannual variability (1998-2015) of both phytoplankton biomass (indexed by chlorophyll-a concentration) and phenological indices (timing of bloom initiation, duration and termination) in relation to regional warming in the NRS. We demonstrate that warmer conditions are associated with substantially weaker winter phytoplankton blooms, which initiate later, terminate earlier and are shorter in their overall duration. Analysis of modelled datasets reveals that these alterations are directly linked with the strength of atmospheric forcing (air-sea heat fluxes) and vertical stratification (mixed layer depth).

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