

**CONSIGLIO NAZIONALE DELLE RICERCHE
ISTITUTO DI SCIENZE MARINE**



CICLO DI SEMINARI

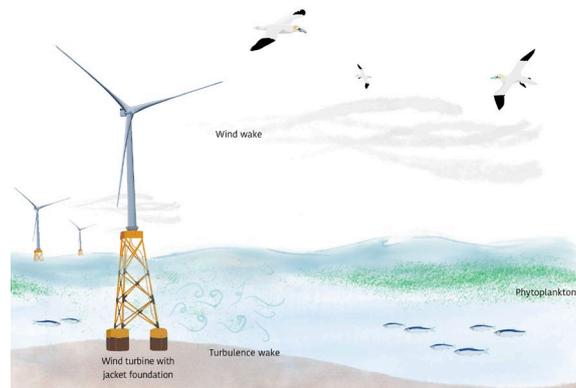
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Tuesday, 9th December 2025 – 2:30 pm

The potential impacts of Offshore wind farms on phytoplankton

Speaker: Dottorressa Arianna Zampollo

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Abstract - The rapid growth of renewable energy development in shelf seas has raised the need to assess the direct and indirect impacts of these new infrastructures on marine ecosystems. The regions hosting OWFs contain a range of different hydrodynamic conditions, from mixed to seasonally stratified water columns, with many physical and biological processes predicted to be affected. The spatial extent and temporal differences of these effects are uncertain but may impact whole ecosystems, from phytoplankton to top predators. To start addressing the possible effects of wind energy extraction, we have modelled the oceanographic impacts of decreasing wind speed behind OWFs (wind wakes) in the region of Firth of Forth and Tay Bay (Scotland, UK), an ecological and economic area of interest for conservation and the fishing industry. We used a hydrodynamic model (FVCOM) coupled to a biogeochemical model (ERSEM) to investigate the impact of OWFs before, during and after phytoplankton bloom. An overall decrease in phytoplankton occurred in this area (7%), and spatial changes distributed before, during and after phytoplankton bloom depending on variations in stratification. Overall, dipoles in sea surface height, temperature and salinity were observed. Hence, investigating the effects during three biologically driven periods suggested that temporal information is needed to understand impacts induced by OWFs. The consequences of the spatial and temporal changes in phytoplankton abundance should be further investigated in relation to their effects on upper trophic levels.