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The wind-driven response of the Mediterranean sea biogeochemistry to the Eastern Mediterranean Transient. A numerical model study.

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Hindcast simulations of the Mediterranean sea coupled physical biogeochemical dynamics were performed using the NEMO-BFM modeling system using the ECMWF ERA40 atmospheric forcing functions. The atmospheric data presents anomalous heat flux and wind conditions in 1992-1995 over the Aegean Sea and the eastern Mediterranean, with a marked anomaly of wind stress curl in the Levantine basin. The modelling system reacts to such conditions with limited formation of eastern Mediterranean deep water of aegean origin and with a rearrangement of the thermohaline circulation in the Levantine basin leading to upwelling conditions uplifting the thermocline and injecting nutrients in the upper layers. In subsequent years, strong vertical mixing events occurred in the Ionian sea. In combination with these processes the model simulated a negative zonal net transport of phosphate that likely distributed part of the upwelled nutrients westward (Levantine to Ionian sea). The reaction of the eastern Mediterranean biogeochemical machinery to such sequence of events has been studied by analysing the temporal trends in the time series of surface chlorophyll concentration, net primary production (NPP) and bacterial carbon production (BCP). The general conclusion is that primary and bacterial production as well as chlorophyll concentration responded with a positive trend in the eastern Levantine, in the Aegean, north-eastern Ionian and partly in the eastern Adriatic.