

Phytoplankton winter blooms in the offshore south Adriatic waters are regulated by hydroclimatic events in the period 1995-2012

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Data of phytoplankton abundance in winters of 1994 and 1995, and surface chlorophyll satellite-derived data (1997-2012) are the basis for investigation of characteristics and intensity of phytoplankton blooms in the open South Adriatic. Special attention is paid to the relation of different circulation regimes in the Ionian Sea (prevalently anticyclonic or cyclonic direction of Northern Ionian Gyre - NIG) to intensity of phytoplankton blooms. Different circulation regimes in the Ionian Sea cause inflow of water of different physical and biochemical properties into the Adriatic. Relatively high winter production events were evident in the open South Adriatic during both anticyclonic and cyclonic regimes. In the nutrient rich anticyclonic years, shallow vertical mixing is sufficient for enrichment of euphotic layers with the nutrients and development of the bloom, while in nutrient poor cyclonic years deep vertical mixing is necessary. Moreover, intense blooms have occurred in the years of specific hydroclimatic properties (i.e. East Mediterranean Transient – EMT and during extremely cold winters) and reversal years (from anticyclonic to cyclonic circulation of NIG and vice versa). In conclusion, winter season is important for production in the open South Adriatic waters and could not be omitted in the total yearly production estimates. Winter bloom intensity in the open South Adriatic depends on synergistic effects of local meteorological conditions and large time scale climatic variabilities in the Eastern Mediterranean on one hand, and water masses of different properties entering the Adriatic on the other.