



Variability of sea surface temperature and chlorophyll in the Aegean Sea from satellite measurements

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Eight years of AVHRR-derived Sea Surface Temperature (SST) and SeaWiFS-derived surface Chlorophyll (Chl) data (1998-2005) are used to investigate key processes affecting the spatial and temporal variability of the two parameters in the Aegean Sea. Climatological SST and Chl maps are constructed using daily data to study seasonal dynamics whereas Empirical Orthogonal Function (EOF) and correlational analysis is applied to the 8-day composite SST and Chl anomaly time-series in order to study the variability and co-variability of the two parameters from sub-seasonal to interannual time-scales. The climatological fields show that Black Sea cold and chlorophyll-rich waters enter through the Dardanelles Straits and they are accumulated in the north-eastern part of the Aegean Sea, steered by the Samothraki anticyclone. Large chlorophyll concentrations are encountered in the hydrological front off the Dardanelles Straits as well as in coastal areas affected by large riverine/anthropogenic nutrient loads. SST climatology reveals strong upwelling during summer along the eastern coasts of the basin due to strong northerly winds, feature which is not present in the surface chlorophyll climatology. Chl dataset presents much stronger sub-seasonal variability than SST, denoting large variations in the phase and strength of the phytoplankton seasonal cycles. EOF analysis of the anomaly time-series shows that SST non-seasonal variability is controlled by synoptic weather variations and anomalies in the north-south wind-stress component regulating the summer coastal upwelling regime. Mean SST and Chl patterns, and their associated variations, are not closely linked implying that mixing and/or upwelling processes play a minor role in regulating surface chlorophyll variability. EOF results show that variations in the chlorophyll transported from the Black Sea and in the riverine nutrient inputs mainly control the intra-annual and interannual variability of the surface chlorophyll in the Aegean Sea.