



Seasonal and intra-annual variability of physical and biological characteristics in the Subtropical NE Atlantic from satellite data.

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Satellite-derived Sea Surface Temperature (SST) and Chlorophyll-a (Chl-a) spatial and temporal variability was investigated on seasonal and interannual scales in the Azores region (the Subtropical North-East Atlantic) using Empirical Orthogonal Functions (EOF) and Wavelet analyses. EOF analysis was conducted for both, with and without the mean seasonal cycle. Results for SST, show that when a seasonal cycle was present, 97% of the total variance was explained by seasonal variability (EOF 1), 1% represented a pattern associated with the intensity of eastward advection of warm surface water across the Mid-Atlantic Ridge (EOF 2), and 0.4% represented the meridional out-of-phase pattern (EOF 3). Correlation of the corresponding Principal Component functions (PC) with the North Atlantic Oscillation (NAO) Index revealed strong correlation with PC 1 on an inter-annual scale, suggesting that the SST seasonal cycle is modulated by NAO forcing. The best (positive) correlations with NAOI were obtained for the PC 3, suggesting opposite signs of interannual variability in the northern and southern subtropics to be related to NAO forcing. For Chl-a, EOFs 1 and 2 together explained 88% of the total temporal variance. This suggests that the seasonal cycle has slightly different amplitude and shape from the western to the eastern parts of the region. EOF 3 reflected the variability of the spring bloom, since it was close to zero during all other periods of the year. On an annual scale all the corresponding PCs were negatively correlated with NAOI, e.g. at periods of high NAOI the seasonal cycle and, particularly, the spring bloom was less pronounced. This was probably linked to the dependence of Chl-a concentration to wind mixing intensity. Wavelet analysis revealed that, aside from the seasonal cycle, a 4-year periodicity was present. The amplitude of the spring blooms depended on the phase shift between the seasonal and 4-year maxima. The most intensive spring blooms took place when both seasonal and 4-years peaks coincided in time.