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Seasonal chlorophyll-a concentration cycle and inter-annual variability at three subtropical ocean sites.

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The time-series stations BATS (Bermuda Atlantic Time series Study) and ESTOC (European Station for Time series in the Ocean Canary islands)are located in the western and eastern subtropical North Atlantic Gyre, respectively, while time-series station HOT (Hawaii Ocean Time series)is located in the eastern subtropical sector of the North Pacific Ocean. The three in situ time series stations provide the opportunity to study similarities and differences which may exist within the subtropical Atlantic and between both ocean basins. Here we present a comparison of monthly biogeochemical and hydrographical measurements carried out from 1994 to 2003 at the three stations with the goal to study the impact of the hydrography variability on the chlorophyll concentration in the water column.

The three stations exhibit similar hydrographic variability and oligotrophic conditions. The mean winter mixed layer depth is around 200 m at BATS, 140 m at ESTOC and 110 m at HOT and the average depth of the seasonal thermocline is around 50 m at ESTOC and HOT, but shallower at BATS (around 25 m). The nitracline is located at ESTOC around 90 m whereas it is below 100 m at BATS and HOT (near 110 m and 130 m respectively). The nutricline is steeper at ESTOC compared to BATS and HOT. The mean euphotic zone depth is near 90 m depth at BATS and ESTOC whereas it is deeper at HOT (around 110 m).

High chlorophyll a concentrations can be observed from surface to 100 m, located at the isopicnals 26 to 26.1 kg m^{-3} at BATS and 26.4 to 26.5 kg m^{-3} at ESTOC during

the time of convective mixing. In contrast, this seasonality is not evident at HOT. The Deep Chlorophyll Maximum (DCM) is located between 75 and 100 m depth at BATS and ESTOC during summer and fall located below the seasonal thermocline and above the nitracline and linked to a wide range of isopycnals, while it is deeper than 100 m at HOT during the whole year. Two high chlorophyll a events are notable at the time-series. One is observable at BATS time-series caused by mesoscale feature passage during summer time reaching winter chl-a values and the other occurred at the ESTOC time-series and corresponded to a strong anomalous Chl-a event (around 200% increase) likely linked a large scale oceanic circulation in the area.