

**Spatial and temporal variability of phytoplankton community composition in the tropical and subtropical Atlantic Ocean (40 degrees N to 40 degrees S).
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Routine measurements of the phytoplankton community from the first 10 cruises (1995 - 2000) of the Atlantic Meridional Transect (AMT) programme were examined in the context of spatial and temporal variations in community composition within the subtropical (10 - 40°N/S) and tropical equatorial (10°N - 10°S) Atlantic Ocean. Measurements include size-fractionated chlorophyll *a* concentration, phytoplankton pigments (determined from High-Performance-Liquid-Chromatography) and nano- / micro-phytoplankton (>5 µm) species' abundances. Ancillary measurements (density structure, nutrient concentrations and light levels) are used to examine spatial and temporal variations in the hydrographic environment and provide a spatial framework for analysis of variations in the phytoplankton community composition. Multivariate statistical analysis (Bray-Curtis similarity) of phytoplankton pigment measurements and identifiable phytoplankton (>5 µm) species show both latitudinal and vertical differences in composition; an upper ('sun') and deep ('shade') flora in subtropical and equatorial Atlantic waters with a reduction in depth differences in upwelling waters off NW Africa. Such spatial differences are associated with regional changes in the mechanisms involved in the formation of the ubiquitous chlorophyll *a* maximum. Analysis of time-series measurements collected in South Atlantic Subtropical Waters (0 - 30°S) show marked interannual (post-winter) differences in the depth of the mixed layer. Analysis of the phytoplankton community in South Atlantic Subtropical Waters indicates interannual variations in the phytoplankton community composition. It is hypothesised that a decrease in winter mixing associated with climatic variability in the South Atlantic Ocean led to a reduction in seasonal new nutrient inputs and favoured oligotrophic components (taxa) of the phytoplankton community.