



The distribution of organic-walled dinoflagellate cysts in marine surface samples of the eastern Indian Ocean in relation to environmental conditions

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The eastern Indian Ocean is characterised by a complex system of surface currents that move according to the monsoon-dominated wind regime and show a strong seasonality. The Indonesian Throughflow, which originates in the northwestern and tropical Pacific and passes through the Indonesian archipelago into the Indian Ocean, is the only low-latitude oceanic connection between the Pacific and Indian Oceans and represents a key element in the global thermohaline circulation and hence the global climate system.

In recent decades it has become increasingly important to understand the atmospheric and oceanographic processes involved in climate variations. Assemblages of organic-walled dinoflagellate cysts (dinocysts) from marine surface samples provide insights into the relationship between the spatial distribution of dinocysts and modern local environmental conditions (e.g. sea surface temperature, sea surface salinity, productivity). These information are of great value for the interpretation of past variations in surface water conditions.

We present an extensive data-set of marine surface samples (n=116) from the Eastern Indian Ocean. The conducted Principal Component Analysis (PCA) illustrates the variation of species association between the sites and reveals a geographical affinity of the samples to the regions of (1) Western Indonesia, (2) Java, (3) the Indonesian Throughflow and (4) Western Australia including the Timor Sea. The results of the PCA further indicate the existence of two environmental gradients in the study area, a nutrient gradient increasing from Western Indonesia towards the Indonesian Throughflow region and a temperature gradient increasing from Western Australia towards Western Indonesia. The Redundancy Analysis indicates the presence of three dominating taxa in the sample set, namely *Spiniferites* spp., *Operculodinium centrocarpum* and *Brigantedinium* spp., and reveals significant correlations of the three dominant taxa to specific environmental parameter. While *Spiniferites* spp. strongly correlates with the silicate concentrations of the surface water between April and June, *O. centrocarpum*, *T. vancamptoe* and *Impagidinium* species show a negative correlation with the annual sea surface temperature. *Brigantedinium* spp. as well as nearly all other heterotrophic cyst species and *L. machaerophorum* show a positive correlation with the chlorophyll-*a* concentration between July and September, hence indicating an affinity of these species with seasonal upwelling.