

1000-year sedimentary record of cyanobacterial fluctuation in Verlorenvlei, South Africa

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We reconstructed the palaeoproductivity for last 1000 years in Verlorenvlei, one of the largest natural wetland along the coast of South Africa. We verified the application of a number of geochemical proxies to investigate the source and preservation of sedimentary organic matter (OM). The major source of OM in the oxic lake sediments is algae although increased contribution from macrophytes since early 1900s is evident from $\delta^{13}\text{C}$ values [1] (Fig. 1). Cyanobacteria has been the dominant plankton species in the nitrogen (N) limited lake and alternative dominance of cyanobacteria and green algae is reflected from the organic carbon (C), N and organic phosphorus (OP) ratios [2] (Fig. 1), and total inorganic carbon (TIC) concentrations [3] (Fig. 1). The variation in cyanobacterial population is most likely controlled by the supply of P from external sources because internal P loading is negligible in Verlorenvlei. Cyanobacterial dominance has decreased in recent years although primary productivity has steadily increased. The upward decrease in $\delta^{15}\text{N}$ indicates increased $\delta^{15}\text{N}$ -depleted supply of DIN from fertilisers.

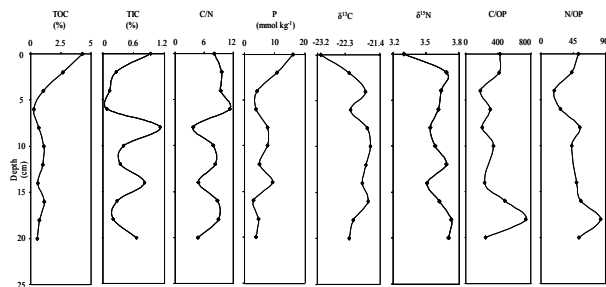


Figure 1: Depth variation of total organic C (TOC), TIC, C/N, P, $\delta^{13}\text{C}$, $\delta^{15}\text{N}$ and C/OP and N/OP ratios in Verlorenvlei sediments.

[1] LaZerte & Szalados (1982) *Limnol & Oceanogr* **27**, 413-418. [2] Pick & Lean (1987) *New Zealand J Mar Freshwat Res* **21**, 425-434. [3] Das *et al.* (2008) *J Paleolimnology* (DOI 10.1007/s10933-008-9241-3)

Geochemical characterization of groundwater from Patancheru industrial area, Medak district, Hyderabad, India

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Patancheru industrial area is one of the more industrial development areas around Hyderabad City, which have been developed by the Andhra Pradesh State Government India. This is also one of the contaminated areas identified by the Central Pollution Control Board, New Delhi and frequently referred to as an area of ecological disaster. Geochemical investigations on 46 groundwater samples, collected from bore wells and agriculture wells located on the Patancheru Industrial Area, have been carried out for pH, EC, Ca^{2+} , Mg^{2+} , K^{+} , Na^{+} , SO_4^{2-} , Cl^{-} , CO_3^{3-} , HCO_3^{-} , NO_3^{-} , TH and TDS. The major ions were analyzed by Ion Chromatography. The results have been utilized for the characterization of groundwater quality based on USSSL, Wilcox and Piper classification methods. Groundwater is assessed for pollution by various methods. Base exchange and permeability were also calculated.

In general the groundwater quality is affected by many factors such as physico-chemical characteristics of soil, rainfall, soil erosion, weathering of rocks, chemical reactions below land surface, role of microorganism, human and agricultural wastes and industrial effluents. During its slow movement through the different layers below the ground, the percolating water reacts with number of minerals, organic and inorganic compounds and carries them along with it in dissolved state. At the same time groundwater gets rid of most of the microorganisms and other suspended matter through the natural filtration process. The distribution of various elements and characteristics of the groundwater from Patancheru Industrial Area is discussed in detail in this paper.