

PHOSPHORUS SPECIATION IN NAMIB DESERT DUST PARTICLES

Khanneh Wadinga Fomba* (1), Hartmut Herrmann (1)

(1) Leibniz Institute for Tropospheric Research, Leipzig, Germany

Mineral dust is a source of nutrients to the biota in the oceans, however, the bioavailability of the nutrients to the marine organisms has been found to depend on the form in which these nutrients are present. Amongst these nutrients, phosphorus like iron are amongst the most predominant mineral dust-associated nutrients but their presence in the dust is often in mineral forms that are not highly soluble and readily available. Studies have shown that the forms in which these nutrients exist may influence their solubility and bioavailability. However, data in many mineral dust source regions are limited. In the current study, the different forms of phosphorus including their inorganic, organic, and soluble forms are determined to quantify their levels in dust samples collected for one year from the Namib Desert, a region highly understudied but an important dust source in the South of Africa.

The results show that total phosphorus concentrations could be as high as 230 ng/m³ and are often dominated by inorganic phosphorus with organic phosphorus content making less than 20% of the total phosphorus concentration. The soluble phosphorus content of the dust was higher during periods of increased biomass burning in the nearby region, indicating that combustion sources may influence the solubility of phosphorus in this region. The solubility showed strong seasonal patterns with a strong correlation with aerosol composition and properties such as conductivity and acidity. The obtain trends differ from those observed in other desert regions in Africa and indicate a likely heterogeneity of dust impact on marine biogeochemistry.