



Nutrient distribution and nitrogen and oxygen isotopic composition of nitrate in water masses of the subtropical South Indian Ocean

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The vast subtropical gyres are important areas for the exchange of carbon between atmosphere and supposedly for the influx of reactive nitrogen to the ocean by dinitrogen fixation. Subtropical gyres are oligotrophic regions that are likely to expand and to adjust to continued warming by increased stratification, reduced upward nutrient supply across the thermocline, and decreased biological production. The Indian Ocean Subtropical Gyre (IOSG) has been sparsely investigated and little information is available on nutrient sources and transformation processes. We investigated the nitrogen cycle of the IOSG including concentrations of nutrients and stable isotope composition of nitrate along a transect from $\sim 30^\circ$ S to the equator. We determined (1) the lateral influence of water masses entering the IOSG from the northern Indian Ocean and from the Southern Ocean on the nutrient supply and the isotopic fingerprints, and (2) the significant external input of reactive nitrogen by N_2 -fixation in the surface layer. As one of the five subtropical gyres in the world's ocean, the IOSG is a promising research area to get a better understanding of the processes in the nitrogen cycle. Due to the expected strengthening and extension of the oligotrophic regions in future warmer times, these areas are becoming increasingly important concerning the nutrient supply in the upper water column and the nitrogen budget of the entire ocean system.