Impacts of heavy metal pollution on benthic communities on the coast of Zanzibar, Tanzania

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The world today has a population of over 7 billion people, with more than half of that number living in coastal areas, which accounts for only 5% of the inhabited land. This aspect is clearly reflected when one realises that of the 33 biggest megacities in the world, 22 are on the coast (UNEP, 2011). Especially in developing states such as Zanzibar, sewage still flows untreated into the sea, causing pollution of coastal habitats. The Zanzibar Archipelago, consists of two main islands – Unguja and Pemba with a combined population of nearly one million, while the urban population which is concentrated in Stone Town is around 200,000 (National Bureau of Statistics, 2002). The study focuses on the impact of trace metal pollution derived from dumping of household and industrial sewage, on the benthic communities found in the intertidal zone along the coast of Zanzibar. This study also serves as an extension to the paper by Rumisha *et al.* (2012) which assessed the influence of trace metal pollution on the community structure of soft bottom molluscs at the Dar es Salaam coast, across the Zanzibar Channel.

Sampling was conducted in July 2012 and covered 5 stations in Unguja island and 2 stations in Pemba island. Three replicates were taken from each station comprising the upper, middle and lower intertidal zones. Small portions of the sediment sample were stored in plastic containers for further analysis of grain size distribution, heavy metals and organic content. The sediments that were left over were sieved for benthic organisms, which were stored in ethanol. Water samples were also taken to measure abiotic parameters such as salinity and pH. Sediment sample analysis is currently being performed. Identification of the benthic fauna yielded 25 species representing arthropoda, mollusca and annelida. Biological data analysis will involve calculating the density, evenness, Simpson dominance index and Shannon-Wiener diversity indices, using PRIMER for each station. If the data are normally distributed, an ANOVA will be used for site comparisons, otherwise a non-parametric Kruskal-Wallis ANOVA by ranks will be used. To determine the relationship between the biodiversity indices and trace metals a correlation analysis will be used, and further regression analysis will be performed for parameters which show a strong correlation. Abiotic parameters will be analysed in the same fashion. Later relationship between selected species and trace metals will be analysed using redundancy analysis (RDA) and the significance tested using Monte Carlo permutation tests.

References
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