

Identification of sentinel species for coastal biomonitoring in tropical China, Hainan

Abstract

Conservation and biomonitoring are important topics in times of global changes and growing impacts from anthropogenic land and sea use. As a result of China's rapidly growing economy, especially coastlines are burdened by a diverse pollution-matrix from industrial and public effluents as well as agri- and aquacultural run-off, combined with simultaneous loss of recreational areas such as mangrove forests, sea grass meadows and coral reefs. The sino-german joint venture, Environmental Change Affecting Coastal Ecosystems of Tropical China during the Anthropocene (ECOLOC), is dedicated to record the current environmental conditions in China's Hainan province and maintain or improve the ecological situation. Within this project, the structure of macro benthic communities in Qinlang Lagoon, north east Hainan, was investigated to find patterns and probable sentinel species. Soil content of the metallic contaminates As, Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb, and Zn, as well as Nitrogen and Carbon concentrations served as indicators of changed environmental conditions. Correlation analysis was used to identify relationships of these factors with the community structure. Within a mangrove area of the lagoon, mollusc abundance was highly negatively correlated with metallic contamination. Collected molluscs were controlled for metal intake and alterations that could be related to metal toxicity. The Mangrove clam *Geolina erosa* showed to be capable of dose dependent accumulation of metallic contaminants As, Cd, Co, Fe, Ni, Pb, and Zn in its tissues. For Cr, Cu and Mn, however, the accumulation was not dose dependent. The mass of hepatopancreas, gills and gonads were significantly higher in the group exposed to higher metal concentrations. Sequentially, *G. erosa* is affected by metal contamination, and showed changes in biomass and body size that could be related as metal induced effect. The findings in the recent as well as in concordant studies endorse the use of *G. erosa* as bioindicator for metal contamination in further studies on mangroves or mudflats of Hainan Island.