



## **Macrofaunal colonization patterns across the India margin oxygen minimum zone**

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The effects of a pronounced oxygen minimum zone (OMZ) on benthic community structure have been studied in both the Western and Eastern Arabian Sea, however the dynamics of the slope populations, including their potential to recover from disturbance, remain unexplored. To examine the influence of oxygen and phytodetritus on short-term (4-9 da) settlement patterns, we conducted colonization experiments with sediment trays along two cross-OMZ transects on the West Indian continental margin that cross the lower OMZ oxygen transition from 0.02 ml/l (542 m) to 0.5 ml/l (1147 m). All trays contained local defaunated sediments; half of the trays at each depth also contained  $^{13}\text{C}/^{15}\text{N}$ -labeled phytodetritus mixed into the sediments. Community composition and abundance of colonizing macrofauna changed with increasing depth and oxygen concentration. Macrofaunal colonizer densities ranged from an average value of 0 individuals per square meter at 542 m where oxygen was lowest and macrofauna were absent in background sediments, to 142 ind. m<sup>-2</sup> at 800 m, and 2841 m<sup>-2</sup> at 1147 m, where oxygen concentration was highest. These were equal to 4.3% and 140% of the ambient background density at 800 m and 1147 m, respectively. Polychaetes constituted 92.4 % of the total colonizers, followed by crustaceans (4.2%), mollusks (2.5%), and echinoderms (0.8%). *Capitella* sp. accounted for 88.5% of all polychaetes at 1147 m, contributing to an opportunist overshoot, but they were rare in the background community. Colonists at 800 m and 1147 m also included ampharetid, spionid, syllid, lumbrinerid, cirratulid, cossurid and sabellid polychaetes. Macrofaunal community structure of settlers was unaffected by the presence of algae in sediment trays, although  $\delta^{13}\text{C}/\delta^{15}\text{N}$  analyses indicated significant phytodetritus consumption by *Capitella*, a cumacean, spionids and amphipods. Foraminifera (*Uvigerina* sp., *Cristellaria* sp. and a trochospiral form) present within the colonization trays at 542 and 800 m also consumed phytodetritus at low oxygen levels. Isotope signatures of the background macrofauna (polychaetes) reflect changes in trophic level and diet as a function of oxygen regime, with lighter  $\delta^{15}\text{N}$  and  $\delta^{13}\text{C}$  signatures at 650-800 m than at 835-2000 m. These preliminary experiments suggest that bottom-water oxygen concentrations may strongly influence faunal lifestyles and rates of colonization by benthos following disturbance.