

Intense coastal development and mass tourism in the Gulf of Thailand result in overfishing and eutrophication. These factors cause uncontrolled proliferation of algae in coral reefs and lead to phase shifts that include oxygen deficiency and subsequent potential death of reef organisms. The Gulf of Thailand is a highly under-investigated area that experiences increases in anthropogenic stressors. Our study aims to link the top-down factor predation by the fish community and the bottom-up factor inorganic nutrient availability with sediment properties and chlorophyll a concentration of the reef sediments along with quantification of sedimentary O<sub>2</sub> fluxes (consumption/production). I expect that simulated overfishing and eutrophication significantly influence chlorophyll a, organic matter content and O<sub>2</sub> consumption rates. Therefore, overfishing and eutrophication were simulated in-situ over a period of 11 weeks from February to Mai 2012 in the patch reef of Mae Haad, located in the Northwest of the island Koh Phangan, a typical bay influenced by tourism and river input. The experimental set-up consisted of 4 plots with 4 respective subplots subjected to different treatments: control (A), nutrient enrichment via the addition of fertiliser (B), fish exclusion via cage deployment (C) and nutrient enrichment combined with fish exclusion (D). Sediment samples were collected weekly in each subplot in addition to the assessment of key environmental parameters including background concentrations of inorganic nutrients, fish biomass and diversity, benthic community composition and water movement. My results show a significant effect of fish exclusion on the sedimentary chlorophyll a content (as a measure of microphytobenthos) in treatment C and D, increasing the concentrations considerably, compared to both control and the nutrient enrichment treatment. Unfortunately too little is known about limitations of microphytobenthos, a direct link between fish exclusion and microphytobenthos growth could not be established. O<sub>2</sub> fluxes and organic carbon content were not significantly different between the treatments. The observed lack of nutrient enrichment effects may indicate that nutrients are already present in high concentrations at the study location. These results could be correlated to the measured background environmental parameters. Mae Haad is a reef already impacted by pollution and fishing. Own supplementary measurements confirmed that high phosphate concentrations are entering the bay via river input. For future investigation, an understanding of benthic foodweb relationships is essential, since it has implications not only for fundamental ecology but also for properly interpreting and predicting the effects of environmental perturbations.