GLOMAR

Ph.D. Defence

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Title of the Thesis Colloquium:

Response of seagrasses to aquaculture effluents and the filtering capacity of seagrass meadows for anthropogenic nitrogen in Hainan, China

1 February 2022 - 14.00 hrs.
online via Zoom

Response of seagrasses to aquaculture effluents and the filtering capacity of seagrass meadows for anthropogenic nitrogen in Hainan, China

The excessive release of land-derived nutrients causes eutrophication in coastal waters, one of the main reasons for global seagrass decline. An emerging but previously underestimated source of nutrients in coastal zones is the aquaculture industry. Seagrasses inhabiting coastal waters serve as natural filters for land-derived nutrients, but are themselves negatively affected by the high nutrient load and low light availability. A combination of long-term observations and short-term manipulative experiments provides insights into the effects and processes of aquaculture effluent-induced eutrophication on seagrass meadows in NE Hainan, China.

Within only eight years, 90 % of the seagrass biomass was lost, while nitrogen concentration in the water increased. The loss was highest at sites with a long-term exposure (years to decades) to concentrations frequently surpassing a threshold of 8 µM dissolved inorganic nitrogen in the water. We found harmful effects on seagrass growth, biomass, and morphology also due to short-term eutrophication (weeks). By impairing seagrass growth, eutrophication reduces the nitrogen filter function of the plants, inducing positive feedback processes. This further intensifies eutrophication with negative consequences for the entire coastal ecosystem.