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Microbiology of a tropical coral reef system (Mactan; Philippines) ***L.-A. Meyer-Reil¹, W. Schramm¹ and G. Wefer²**¹ Institut für Meereskunde an der Universität Kiel, Kiel, Germany² Geologisch-Paläontologisches Institut, Universität Kiel, Kiel, Germany

Pilot studies of the microbiology of a tropical coral reef system (Mactan; Philippines) were based on different approaches:

- (i) Short-term variations in the extracellular decomposition of polysaccharides. In an enclosed body of water overlying a seagrass community, short-term variations of the activity of α -amylase were analysed. Enzyme activity followed a diurnal cycle showing maximum values in the early morning.
- (ii) Microbial activity as influenced by tidal flux. At a fixed station in the shallow reef system, moving bodies of water caused by tidal changes were analysed for microbial uptake of ¹⁴C-labelled glucose. Lowest values of microbial uptake activity were recorded at high tide, highest values of microbial activity at low tide.
- (iii) Microbial activity in sediments. Two sediment profiles (1, 5, 10, 20, 30 m below water surface) were investigated for the following parameters: concentrations and decomposition rates of proteins and carbohydrates, microbial biomass, and net uptake of ¹⁴C-glucose. The two sediment profiles differed considerably in the values of the individual parameters measured, obviously greatly dependent on the weather conditions. On a cool and rainy day, concentrations and decomposition rates of proteins and carbohydrates considerably decreased with increasing sediment depths. On a sunny day, however, even in deeper sediments, relatively high decomposition rates of proteins and carbohydrates were measured, which coincided with low substrate concentrations.
- (iv) Proteins and carbohydrates associated with different fractions of sediment. Sediment samples from the shallow reef system were fractionated and analysed for dry weight, proteins and carbohydrates. Whereas coarse sediment fractions were rich in proteins and poor in carbohydrates, fine fractions were characterized by a higher content of carbohydrates compared to proteins.

Light and tidal flux are obviously two of the predominant factors controlling uptake of dissolved organic substances and decomposition of particulate organic matter by microorganisms. Generally, microbial biomass and uptake activity were twice as high as those found in the Kiel Bight; the activity rates of α -amylase and proteolytic

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enzymes were higher by a factor of 3 to 10, which demonstrates the high decomposition rates of carbohydrates and proteins in the tropical coral reef. Whereas protein concentrations were comparable to those measured in the Kiel Bight, the two regions differed considerably in the concentrations of carbohydrates, which were 2 to 5 times higher in the coral reef. One of the main distinguishing features of both regions is their different protein to carbohydrate ratio.