Monitoring a Polluted Tropical Coastal Bay – The Case of Guanabara Bay, Brazil

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On our third participation on EMECS conference, an overview of the experience accumulated in the past 10 years of monitoring Guanabara Bay (Brazil) will be presented, added by new data with a microbial biogeochemical approach. In this study were presented data from a polluted coastal bay on the perspective of bacterial populations associated with water chemistry. Bacterial abundance (syto13 and Flow Cytometry), metabolic activity (3H-leucine incorporation), and chemical parameters were measured weekly at two strategic sites in Guanabara Bay, from April 1997 to December 2000. The sites represent the best (eutrophic) and the worst (hypertrophic) water quality scenarios in this bay. A tight coupling between bacterial abundance (9.44 105 cell mL-1) and bacterial production (1.95 µgC L-1 h-1) was observed at the eutrophic site, where bottom-up processes control bacterioplankton populations. The increase in bacterial abundance was due to active cells, and bacteria were found to be correlated to phytoplankton. At the hypertrophic site, bacterial abundance and production were generally one fold higher. However, they were not correlated, indicating top-down control of bacterial populations. P and N recycling were measured during estuarine mixing, and correlations with bacteria were observed. Differences in water quality between eutrophic and hypertrophic sites, associated with predation, salinity and other inactivation factors, may explain the patterns of bacterial abundance and activity found along the estuary. As bacterial mediated processes governs the biogeochemistry of nutrients, understanding bacterial populations dynamics might be a powerful tool on comprehension of environmental process related to coastal eutrophication.