Productivity Characteristics of Autotrophic and Heterotrophic Microbial Communities and Their Role in Carbon Cycling in the Bay of Bengal

N Ramaiah
National Institute of Oceanography
Dona Paula, Goa India
Email: ramaiah@nio.org

Lowered surface-salinities due to large influx of freshwater, generally weak winds and almost always warmer SST stratify and shallow the mixed layer in the northern Bay of Bengal (BoB). This stratification leads to low or no nutrient injections into the surface and, on an annual scale, the chlorophyll production is lower than many similar tropical basins. Heavier, prolonged cloud cover may be another reason for low autotrphic production. Occassional but large-scale churning of stratified layer by tropical stroms do induce enhanced productivity. Our recent, comprehensive studies on the biology of BoB are useful to suggest that bacterioplankton and microplankton in particular in the regions of localised cold core eddies in ushering in of comparable biomasses of mesozooplankton and aiding substantial carbon flux to deeper zones. On the annual scale, bacterioplankton carbon in the 0-120 m column was about similar in the central Bay (CB: 104-677 mg C m^{-2}) and western Bay (WB: 95-662 mg C m^{-2}). Additionally, their high biomass in the WB implies that there is a substantial input of allochthonous heterotrophic bacteria which appear to be far more important in the food web dynamics of the coastal BoB. Bacterial productivity was about similar in its pattern to that of abundance ranging 30 to 233 mg C m^{-2} in WB and, 22-327 mg C m^{-2} in CB accounted for 53% in WB and 58% in CB of primary production in the 0-120 m column. The high BP:PP ratios and lower abundance of microzooplankton suggest a central role of heterotrophic bacteria in microbial loop, trophodynamics as well as biological productivity. Interestingly, both abundance and production of bacteria in 250-1000m layer are high. These characteristics of bacteria along with high sedimentation rates, and sizable mesozooplankton biomass in the deeper layers are useful to suggest higher carbon fluxes into the deep. Using these and other observations, basin-wide and seasonal characteristics of carbon production and estimated flux rates below 1000m will be presented.