Effects of the Changjiang River discharge on planktonic community respiration in the East China Sea

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ABSTRACT

Planktonic communities tend to flourish on the western margins of the East China Sea (ECS) fueled by substrates delivered largely in summer from the Changjiang River, the fifth largest river in the world. To reveal the effects of the Changjiang River discharge on planktonic community respiration (PCR), physical-chemical variables and key processes were measured in three consecutive summers in the ECS. Results showed that concentrations of nitrate and Chl *a*, protozoan biomass, bacterial production, as well as PCR in the surface water were all negatively correlated with sea surface salinity, reflecting the strong influence of river discharge on the ECS shelf ecosystem. Moreover, mean values of nitrate, and Chl *a* concentrations, and PCR rates were proportionally related to the area of Changjiang diluted water (salinity $\leq$ 31.0 psu), an index of river discharge rate. Presumably, higher river flow delivers higher nutrient concentrations which stimulate phytoplankton growth, which in turn fuels PCR. PCR exhibited significant monthly and inter-annual variability and rates appear to be dominated by bacteria and phytoplankton. Although the ECS plume's plankton community was relatively productive (mean = 0.8 mg C m^{-2} d^{-1}), the mean ratio of production to respiration was low (0.41). This suggests that planktonic community metabolism in the ECS plume is supported by river discharge of both inorganic and organic carbon.