

Interactive comment on “Effect of incubation time and substrate concentration on N-uptake rates by phytoplankton in the Bay of Bengal” by S. Kumar et al.

Anonymous Referee #2

Received and published: 1 November 2005

General comments: This manuscript reports on the results of three ^{15}N tracer uptake experiments in the Bay of Bengal in late summer - early fall. The duration, added isotopic concentration and incubation conditions (in situ vs. on-deck) were varied to determine the effect of these variations on the estimated uptake rates for nitrate, ammonium and urea. Although the measurement of nitrogen uptake is an important aspect of plankton ecology and surface biogeochemistry, changes in these and other measurement factors are known to impact the estimated rates. Despite the importance of the topic however, the current manuscript adds little new information to what is already known about the potential problems in measuring nitrogen uptake. For example, the rates are based on the assumption of constant isotopic enrichment in the ambient pool during the incubation. Glibert et al (1982) (a paper that is cited) provide evidence for

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper

the dilution of the added ammonium tracer during incubation, and thus the underestimate of uptake rates in some conditions. I suspect that at least some of the decrease in ammonium uptake rates with time in experiment 1 is due to such a dilution effect. A more extensive discussion of the applicable models of isotopic uptake and how they impact the current interpretations is needed. Also, due to the fact that the ammonium and urea concentrations are estimated from zooplankton data, the ammonium and urea uptake rates are not quantitative. The ammonium estimates are only based on macrozooplankton and it is likely that microzooplankton also contribute significantly to this pool.

The three stations do contribute important information on the plankton ecology of the Bay of Bengal (although the methodological limitations with the ammonium and urea estimates diminish this aspect as well). I suggest that the authors add basic information such as a station map, station dates, profiles of temperature and salinity (if available) if they wish to pursue this aspect of the work. I think that there is publishable information here if it is presented properly and without over-extending the capabilities of the data set.

Specific Comments: It is not clear if nitrate profiles are available. If so, they would be useful to show. The text often does not distinguish between specific (time⁻¹) and absolute (mass vol.⁻¹ time⁻¹) rates and makes the discussion difficult to follow. Incidentally, even though the absolute rates are more robust from a labeling perspective, the specific rates are still useful for comparison since they remove the biomass differences between samples.

Technical corrections: The paper is generally well written. There are many small issues relating to terminology, word choice and typos. However, some of the major conceptual issues need to be addressed before approaching these details.

Interactive comment on Biogeosciences Discussions, 2, 1331, 2005.

[Full Screen / Esc](#)[Print Version](#)[Interactive Discussion](#)[Discussion Paper](#)