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Biogeosciences Discussions

Interactive comment on "Nutrient control of N_2 fixation in the oligotrophic Mediterranean Sea and the impact of Saharan dust events" *by* C. Ridame et al.

Anonymous Referee #1

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This paper presents the results of a field study attempting to examine the limiting potential of P, DFe, and/or Saharan dust on the nitrogen fixation rate of diazotrophs within three regions of the Mediterranean Sea. The authors conduct microcosm nutrient addition experiments to test which nutrient controls this rate. This is a continuation of several previous experiments conducted globally that have shown either P, Fe, or co-limitation dependent upon region. They conclude that DFe is not limiting, P is frequently limiting, and at one station neither is limiting, attributing increases in nitrogen fixation rates during dust additions to other trace elements. While this study is a basic set of experiments (an understatement given the complexity of trace metal clean methodology), their findings are unique and important. The document is well written and succinct,

and I believe it to be an important contribution the state of knowledge. I fully support publication of this paper as written. I have included a few comments for discussion and thought.

1) Mo is generally considered conservative relative to salinity. Given the high salinities reported, it is a safe assumption that it can be excluded as a limiting factor.

2) Consideration might be taken into account of the interactive properties of P and Fe given their propensity to precipitate when added as high concentrations. How could this have affected bioavailability within the microcosms?

3) Many of the "newly" discovered unicellular diazotrophs are found at maximum concentrations deeper in the water column (below the SML). Did you attempt to quantify concentration versus depth before choosing SML samples? I would be curious to see the results of the same experiments from deeper water samples, both as a function of biomass and the change in dust/nutrient availability farther from the atmospheric source. How would one quantify trace nutrient availability as dust particles settled through the water column?

Interactive comment on Biogeosciences Discuss., 8, 2629, 2011.