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Interactive comment on “Chlorophyll signatures and nutrient cycles in the Mediterranean Sea: a model sensitivity study to nitrogen and phosphorus atmospheric inputs” by M. Pacciaroni and G. Crispi

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These are interactive comments to some general points raised by Referee #1 and by Referee #4 for BGD 2007-4-909.

We are considering separately the interpretations of the ecological model in the Mediterranean: the primary production processes, treated in our ecomodel as factorised of the nitrogen and phosphorus limitations; the role of the light penetration in different regions; uncertainties introduced by the chlorophyll to carbon ratios; the oxygen profile. We must consider that the model spans, by means of a generic parameterization, both oligotrophic regions and mesotrophic ones, such as those in the

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north-western area and at Alboran Sea. We are at present working on two general topics:

- 1) the impact of the physics on the biogeochemistry. We are considering the relative positions of the features, and also the vertical evolution is under consideration with data of the same period of the forcing functions. The main characteristics of the circulation are reproduced; the fluxes of the inverse estuarine circulation at Gibraltar Strait and Sicily Channel are embedded, with values near to experimental estimates. We will add more references in the text, to show physical results and to reduce consistently the description of the OGCM equations, fully reported in those works.
- 2) The references date to the starting of the ADIOS Project, in the year 2001. Now we are taking into consideration recent works in the field of air-sea fluxes, for improving some our conclusions. Recent different works open new perspectives also for future applications and studies, useful in our introduction.

A related issue to these general points is that this biogeochemical model is representative of the eighties for two specific reasons. It uses data before 1990, when the Eastern Mediterranean transient took place (Roether, Manca, Klein, Bregant, Georgopoulos, Beitzel, Kovacevic and Luchetta, 1996, *Science*, 271, 333-335). Thus we verify model's results by means of field measurements (MEDAR, 2002) and satellite estimates (Feldman, McClain and Esaias, 1994; Sturm, Barale, Larkin, Andersen and Turner, 1999) acquired in the same pre-1990 period. Secondly, the results are anchored to the released ecomodel version (ADIOS, Deliverable 40). We agree that ecological descriptions now move toward high frequency responses. Some collaboration with these neighbouring approaches is now under verification for improving analyses of the processes toward eddy permitting/eddy resolving scales (Crispi, Pacciaroni and Viezzoli, 2006, *Ocean Science*, 2, 123-136). We will continue to work on all the raised relevant points, which will be an integral part of the revised version of this manuscript.

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