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Interactive comment on “Hydrological changes in the Ligurian Sea (NW Mediterranean, DYFAMED site) during 1995–2007 and biogeochemical consequences” by J. C. Marty and J. Chiavérini

Anonymous Referee #2

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General Comments This is a very interesting study of the hydrological changes and their impact on phytoplankton biomass production in the Ligurian Sea based on the DYFAMED station data. The paper is well organized and it presents the type of interdisciplinary study that is consistent with the scope of the journal. Furthermore a well written and in depth discussion of the data analysis results is provided. I think that the paper is suitable for publication in this journal after minor revision.

Specific comments a) The authors use freshwater input data in the Ligurian Sea such as precipitation and River Roya runoff in order to link surface salinity changes and winter convection intensity. However, the River Roya annual discharge seems to be

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quite small as compared to Evaporation-Precipitation fields to control surface salinity in the area. Furthermore heat fluxes could also be investigated during the considered period as a key parameter regulating winter convection. Therefore in order to further strengthen the paper the authors could use available evaporation-precipitation fields and heat fluxes variations derived from atmospheric databases (such as ECMWF, ERA40) to find links between air-sea fluxes variations and the observed salinity and temperature variations in the DYFAMED station during the 1995-2007 period.

b) Figure 9 shows that during winter 2006 the large nitrate concentration increase in the surface layer (induced by the intense mixing) resulted in a large increase of annual mean microphytoplankton biomass whilst, in contrast, pico- and nano-phytoplankton biomasses remained in lower levels than in previous years when less intense winter mixing occurred. The authors should comment on the different response of the three phytoplankton size categories to winter mixing intensity.

Technical corrections

- Page 1378 Abstract, lines 21-23: “Our results suggested that the NW Mediterranean Sea could have an increased productivity ‘and was not deriving towards’ the decreased productivity predicted by models.” Please rephrase
- Page 1379 line 21: “...in the ‘characteristic’ of the inflowing...” Change “characteristic” into “characteristics”
- Page 1379, line 27: “Gulf of Lion ...” Change “Lion” into “Lions”
- Page 1382, line 19: “On note is that the...” Please rephrase
- Page 1387, line 10: “ ... the convection reached the > 2000m depth in 2006” Please rephrase.
- Page 1391, line 27: “...could go against the decrease of production predicted by models”. Provide references for the modelling studies in the area.

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- Fig. 2, Fig. 4, and Fig.5: Axis/Legends fonts need to be enlarged
- Fig. 9 caption "...A. pico: 'annal' 'picophytoplankton';..." Change "annal" into "annual" and "picophytoplankton" into "picophytoplankton"
- Reference List: Tsimplis (2000) is cited in the text but not in the Reference List

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