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***Interactive comment on “On the impact of the Bimodal Oscillating System (BIOS) on the biogeochemistry and biology of the Adriatic and Ionian Seas (Eastern Mediterranean)” by G. Civitarese et al.***

**Anonymous Referee #2**

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General comment This paper contains valuable information about the effects of changes in thermohaline properties in the intermediate layers of the Ionian Sea and associated reversals of the upper layer circulation from cyclonic to anticyclonic. It is suggested that the shift of the northern Ionian gyre results in advection of either low salinity but nutrient-richer Modified Atlantic Water into the southern Adriatic during anticyclonic upper-layer circulation or of more salty, nutrient- poorer water of Levantine/Cretan origin during cyclonic upper-layer circulation. The feedback mechanism between the Adriatic and the Ionian Seas has been called "The Bimodal Oscillating System" and the paper

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seeks to demonstrate the importance of BiOS for the nutrient pool, plankton production and biodiversity in the southern Adriatic. The BiOS mechanism has been described in two previous papers (Borzelli et al. 2009, Gacic et al. 2010) and is summarised in the Introduction section and partly in the section following Material and Methods as well as in the Abstract. However, without reading the two mentioned papers I found it difficult to understand the BiOS mechanism and thus the basis of this paper. This paper brings valuable new ideas linking decadal variations in circulation with nutrient conditions and plankton in the two interconnected seas that have more general significance and therefore I consider it publishable. Some specific comments are below: - Abstract reads more like discussion than a concise summary of work done - Summary of BiOS mechanism should be explained more clearly - Material and Methods section should contain more detailed information on how Authors constructed the time series of nutrient data and how they were averaged. Some information (number of nutrient samples including depth and season) could be added to Table 2 (which in my opinion should become Table 1) - Section on possible impact of the BiOS mechanism on Adriatic biodiversity seems to me the weakest part: linking observations of changes in plankton community structure with years of the recorded presence of particular species cannot be considered as confirmation of the BiOS switching system. There is no systematic long-term biological data set, i.e. monitoring of biota with relevant spatial and temporal coverage in the Adriatic, that could assure dating of biological records as presented in table 1. Moreover, it is very difficult to link changes in community structure or the appearance of a particular short-lived mesozooplankton organism in the middle/northern Adriatic with a particular BiOS phase (operating on a multiyear time scale) so the title of Table 1 (Possible relationships between biological records and NIG circulation) is inappropriate.

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**BGD**

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