Ocean Sci. Discuss., 12, C70–C72, 2015
www.ocean-sci-discuss.net/12/C70/2015/

Ocean Science
Discussions
Open Access

Interactive comment on "Long-term variability of the South Adriatic circulation and phytoplankton biomass in relation to large-scale climatic pattern" *by* L. Shabrang et al.

Anonymous Referee #1

Received and published: 31 March 2015

Authors of the manuscript "Long-term variability of the South Adriatic circulation and phytoplankton biomass in relation to large-scale climatic pattern" try to link climate change represented with NAO (North Atlantic Oscillation Index) on the SAG (South Adriatic Gyre) circulation using statistical approach. Inter annual variability of the SAG is correlated with the NAO, implying different wind regime over the South Adriatic region. Furthermore, analyzing vorticity in the SAG region authors try to resolve it's origin from wind induced local dynamics and advection from the Ionian Sea. Finally, results were linked to the phytoplankton biomass and timing of bloom using wind speed as a proxy. As suggested by authors SAG circulation strength depends on many things, the most important local forcing, mainly due to atmosphere-ocean interaction, and indirect

reflecting influence from adjacent regions; Ionian Sea and northern – middle Adriatic Sea. Different northern Adriatic dense water production episodes introduce different outflow into SAG and have consequences for circulation in wide area. Recent studies using realistic numerical model simulations provide dynamical setup, development and the fate of the whole Adriatic Sea circulation, hence SAG as well (i.e. Benetazzo et al., 2014; Janekovic et al., 2014). Unfortunately, authors didn't use any of the data sets or studies, or even to relate and comment them in order to reinforce their findings. The focus of the study is to use remotely sensed winds over the sea and compute vorticity of the wind stress. Current vorticity is then related to the local wind stress curl and advection, as in eq. 8 of the manuscript. Using only lagged correlation between SAG and northern Ionian Sea vorticity they conclude about possible mechanism of advection from Ionian region into SAG. However, lagged correlation does not imply that mechanism, it just states that this two data sets are lagged correlated and having something in common with shifted phase in time. The same follows later in the manuscript for NAO index, which can easily be miss-interpreted as direct cause for dynamics, it is not following and is result from the analysis presented. This is my major objection with the manuscript; using simple statistical tool as correlation to give possible mechanism for complex phenomena of SAG and it's relation to different forcing sources and inter annual climate variability. To illustrate that, in Figure 3 there is correlation between low passed vorticity and wind stress giving range of -0.8 and 0.8 at small area (yellow-red region close to 19E, 41.5N). How does authors explain that results of almost uncorrelated to high correlated values in a such a small area? Then again in Figure 5 they give correlation coefs. in a rage of -0.2 and 0.1 for SAG region; how significant is that in statistical sense? Calculation of the wind stress vorticity shown at the Figure 6 is hard to anticipate, as there are large regions (i.e. below 41N) where wind stress vectors are parallel, however giving high vorticity (color). At the end of manuscript they briefly link the results with phytoplankton dynamics, for which I think needs more focused and extended study or even separate manuscript (like Yamada and Ishizaka; Navarro et al., 2012; Zhai et al.,2013).

Overall opinion is that manuscript needs major revision.

Interactive comment on Ocean Sci. Discuss., 12, 203, 2015.