

Response to reviewer 2

+ Section 1 and 2:

The introduction has been entirely rewritten to take into account the reviewers comments, namely:

- The validation issue has been removed from the objectives in order to focus on the monitoring issues (reviewer 1 comment)
- The description of the SLTAC has been shifted to section 2. (reviewer 2 comment)
- The scientific context has been improved. In particular, references to peer-reviewed articles have been added for each existing indicators cited. (reviewer 2 comment)
- Some examples of application/purpose of the indicators have been added. (reviewer 2 comment)
- The advantage of using altimetry for defining these indicators has been better stressed: First (lines 35-37) it is a very well suited observational system (global and continuous) and second (lines 58-60), it is quite relevant to monitor changes in circulation patterns that imply –as it is the case in the Kuroshio and Ionian Sea areas- strong changes in the Eddy Kinetic Energy, a quantity that is easily derived from altimetry. (reviewer 2 comment)

+ Section 3: Monitoring ENSO

The introduction of section 3.1 is very well written, but addresses a broader audience which is not well placed for a scientific paper. This needs to be changed, and the actual scientific background important for the paper needs to be introduced. As suggested, this could be placed in the introduction.

- ➔ This subsection has been kept in order to be consistent with the other two indicators, yet the introduction has been modified in order to suppress its marked general public nature, e.g: the topic sentence has been removed and five scientific citations have been added.

In particular, the question needs to be addressed: Why is there a need to develop a new ocean indicator for the ENSO phenomena, what is the advantage of using altimetry for this purpose? Page 2088,

- ➔ Develop a new indicator based on altimetry: el nino is a good candidate since well referenced, and prepare the field for other areas. The correlation between SST and altimetry time series indices is 0.88 which is very high, thus there is not much advantage in using altimetry with respect to SST for ENSO. However, in some other area it seems to be either better or worse depending on the physics involved in the processes to depict with an indicator.

L10-L11: : : 'even though it is very small': This is not true, the tidal aliasing signal can be very important in some areas, especially in the equatorial basin.

- ➔ Agreed and this has been changed in the paper

Moreover, this needs to be in the data/method description, as the signal is removed for each indicator???

- ➔ We have not put this comment in the data/method description, since this signal has not been removed for the two other indicators.

- o In the “Ionian indicator” case, a 100 days Loess low-pass time filter has been applied on the SLA, therefore the 60 days non-geophysical period is also removed.
- o In the “Kuroshio Indicator” case, a quantitative study has shown that the amplitude of the 60 days EKE signal is negligible compared with the standard deviation of the total signal. The amplitude of the 60 days EKE signal has been deduced from the total signal thanks to a polynomial fitting method. In the Kuroshio area the ratio signal/noise is 4.9%. Moreover the “Kuroshio Indicator” is only based on the first EOF mode that accounts for 30% of the total variance, meaning that the real impact of this 60 days signal on the indicator is probably lower than 5%.

+ Section 4:

- As suggested, a part of the introduction of this section has been placed in chapter 1: “Prediction and monitoring of the path of the Kuroshio is of huge importance for local fisheries and hence local economies (Kagimoto et al.,2008).”
- Page 2089, a citation has been added concerning the first 5 lines (Qiu, 2003).
- Page 2089, “characterized” has been replaced by “forced”.
- Page 2090, two citations have been added : Qiu (2003) and Qiu and Chen (2005).
- Page 2090, L27-28 “... favor baroclinic instabilities... “ has been replaced by “... favor instabilities...”, which is more correct. The next sentence “... this clearly indicates that the baroclinic instability is not the dominant mechanism...” has been suppressed and replaced with a more precise and correct one including a reference : “This negative relationship between the strength of the KE jet and the EKE level is likely due to the interaction of the inflow KE jet with the Izu-Ogasawara shallow Ridge south of Japan (Qiu and Chen, 2005).”.

+ Section 5:

- A reference has been added in the introduction (Pujol (2006)) and some others have been moved in order to be more evidenced. Moreover, other passages without references have been suppressed since the introduction has been shortened.
- The introduction has been shortened in order to be balanced with the other two indicators, more particularly: (i) the description of transiting water masses connecting the Western and the Eastern Mediterranean basins with the Adriatic and the Aegean Seas has been suppressed, and (ii) the detail of the mechanisms of origin of the decadal oscillation has been shortened.
- Page 2095 L3-9, Tests have not been performed relative to a clim, instead for comparison purpose we have successfully reproduced the spatiotemporal characteristics obtain in Pujol (2006) for the two first mode, with the same SLA products, but for a shortest period (1993-2003). Yet, as asked by reviewer #1, these few lines have been suppressed in order reduce section 5.2 trying to avoid comments on results that are not shown or not particularly relevant to the main results.
- Page 2095 L10-11, a standard method (a 13-months moving average) has been applied to the SLA in order to filter seasonal variabilities so as to concentrate only on inter-annual-to-interdecadal variabilities thereafter in the study.
- Figure numbering/referencing have been checked

+ Specific comments:

- All specific comments have been taken into account.