Ocean Sci. Discuss., 3, S241–S243, 2006
www.ocean-sci-discuss.net/3/S241/2006/

Ocean Science Discussions

Interactive comment on “DINEOF reconstruction of clouded images including error maps. Application to the Sea-Surface Temperature around Corsican Island” *by* J.-M. Beckers et al.

Anonymous Referee #2

Received and published: 26 July 2006

The paper is an extension of the DINEOF method to allow an estimation of mapping error. It is well written but I suggest to simplify and limit the number of mathematical expressions. It would also be better to follow the data assimilation notations (B, H, R).

I have some general comments on the methodology that should be clarified by the authors.

1. DINEOF method. DINEOF uses an EOF decomposition and then project the data onto the selected EOFs. DINEOF thus cannot handle non homogeneous or correlated observation errors. If this is true, this should be stated somewhere. DINEOF uses a limited number of EOFs and basically provides a large scale/low frequency inter-

polation. It cannot map the fine scale structures (or the number of EOFs would be prohibitive). It is not clear also how DINEOF can handle much larger areas (e.g. a global map of SST, see specific comment). In practice, DINEOF, OI and krigging are similar methods to solve an interpolation problem but OI (and krigging) are much more general (as shown by the paper OI can yield the same results as DINEOF depending on the assumption on the covariance matrices).

2. The "OI version of DINEOF" which is used to estimate the error field is now very different from the DINEOF method itself. The main issue for any OI is to define and invert the data covariance matrix and this is done in an efficient way here using the SVD decomposition of DINEOF. The paper actually deals with the estimation of the inverse of the data covariance matrix and not on an extension of the DINEOF method itself. If the covariance matrix is well represented by the N selected EOFs and for constant and non-correlated observation errors, OI and projection onto EOFs are indeed equivalent.

3. In any OI, one would remove first the seasonal signal and possibly a large scale signals (mean or trend) (as a first guess) and then analyze the residuals. I assume this should be done in the same way here (otherwise the first EOFs probably represent the seasonal signal).

Specific comment:

Page 739. 5. OI is often used in a sub-optimal way, i.e. only data that are correlated with the estimation point are kept. However, this does not really degrade the results as only useful data are kept. I assume this is also needed for DINEOF when dealing with larger areas (extracting local EOFs) (otherwise only large scale EOFs will be kept and mesoscale features will be filtered out).

The assumption that the first N EOF retain the signal and that the remaining ones correspond to noise is a very strong one. Remaining EOFs mainly correspond to mesoscale/submesoscale signals which are filtered out by the method.

Interactive comment on Ocean Sci. Discuss., 3, 735, 2006.

OSD

3, S241–S243, 2006

Interactive Comment