**Ocean Science
Discussions**

Interactive
Comment

# *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 #1**

Received and published: 9 August 2006

This paper presents an extension of the DINEOF method to interpolate cloudy satellite images and to provide an estimation of the error of the reconstructed data. The latter information is obtained by analogy with the OI method. The method is then applied to SST images of the Ligurian Sea.

In general, the manuscript is well written and well structured. The figures are clear and provide good support to the written statements. The paper addresses an important data analysis tool to better interpret satellite observations, which is well within the scope of OS. It includes new and improved concepts which are important to share with the oceanographic community.

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I recommend that this work be published in OS after a minor revision in which the authors consider the general and specific comments listed below.

GENERAL COMMENTS

The mathematics included in sections 2 to 5, although crucial to this work, are not easy to digest by common oceanographers. I myself had problems following them, especially in section 5! I concur with the other reviewers of the OSD that some of them must be moved to an appendix in order to make the overall paper more readable. Please keep the essential maths in the main text, eventually with better explanations to help readers with less mathematical background.

Please add somewhere in the text that DINEOF and extended DINEOF are not able to reconstruct entirely cloudy images whereas OI can if both spatial and temporal decorrelation scales are known. Maybe the missing images can be obtained by interpolation of the EOF amplitudes in time, but this involves the choice of a temporal decorrelation scale.

By comparing Figs. 3a and 3b, it appears that, in addition to the reconstruction of the missing values, some kind of spatial smoothing has been applied to the image since the data structure (e.g., near 43N and 7.5E has disappeared. If this is true, this should be explained and motivated in the text.

To show the strength of the extended DINEOF method I would also show the results on the inter-annual SST variability (Figs 9 to 11) as calculated from the original (non interpolated) images, and I would discuss the differences quantitatively using the error estimates obtained with the reconstructed images.

SPECIFIC COMMENTS

Page 737 Line 11. "not too large gaps": relative to what?

Page 741. Lines 23 and 24. Eqn. 13 and math expressions before are not clear and must be derived in more details.

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Page 742. Lines 2 and 3. "because the reconstructions is only valid Ě, but (13) remains valid". This is not obvious to me, please clarify.

Page 743. Lines 6 and 7. "we assumed that the first N EOFs contain signals and the remaining EOFS some noise". This important information should have been clearly stated before!

Page 752. Line 12. Change to the " the SST seasonal cycle in the Ligurian".

Page 752. Line 14. The modified AW is generally colder that the Med waters. Are you sure that we have modified AW north of the front? I would put the cooler AW south of the front? Also, please add references to support this statement.

Page 752. Line 18. Which main characteristics? The WCC, ECC and NC? Clarify.

Page 756. Lines 4-5. Why can we expect that the SST scale is larger (same magnitude) than the SST error length scale? Please explain in text.

Page 756. Lines 13-14. Explain how an internal Rossby number of 4-7 km can give a wavelength of 25-44 km.

Page 761. Line 4. Add that the highest error appears in winter because it is during this season that we have the minimum number of images (I presume!).

Page 766. Figure 1. Please indicate by a rectangle the location of the study area in the whole Med inset. Add the following names to help with geography: Tyrrhenian and Ligurian Seas, Sardinia, Corsica, France. Please show the typical location of the Liguro-Provencal Front.

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

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