

## ***Interactive comment on “Observing The Mediterranean Sea from space: 21 years of Pathfinder-AVHRR Sea Surface Temperatures (1985 to 2005). Re-analysis and validation” by S. Marullo et al.***

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This manuscript describes a study that determines the accuracy of the Pathfinder sea-surface temperature fields in the Mediterranean Sea, the generation of a new set of SST fields that are optimally interpolated to the grid of the MFSTEP OGCM model, and the error characteristics of the gridded fields. The paper includes a useful discussion of the optimal interpolation. The error statistics, determined by comparison with a range of in situ temperature measurements, are good in that they are comparable to those of other studies undertaken elsewhere (e.g. Kearns et al., 2000; Kumar et

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al., 2003). Some seasonality in the mean bias errors is found, which is not surprising, even though the Pathfinder SST uses temporally varying coefficients in the atmospheric correction algorithm; but the application of these globally optimized coefficients in a regionally-constrained study will likely lead to non-zero bias errors (Minnett, 1990). The atmosphere over the Mediterranean is very particular to the area, being influenced by continental airmasses dependent on the dominant wind direction. These can include factors that can lead to larger SST retrieval errors, such as anomalous water vapor distributions, and Saharan dust, which unfortunately is not dealt with explicitly in the manuscript. The importance of this work is in determining the accuracies of the SST retrievals, both the Pathfinder SSTs and the new OI fields, which paves the way for future analyses. It also sets limits on the type of studies to which these data sets can and cannot be applied.

An interesting result is that the actual statistics of the satellite SST errors varies to some degree on the data set being used to validate the satellite retrievals. This may be caused by the way the different validating data sets sample the oceanic and atmospheric variability, but it could be that the contribution of the error statistics from uncertainties in the validating data is non-negligible. This means that the satellite data are more accurate than these, and other, results indicate. The data used here, the independent validation data sets, may provide more information about the error characteristics of the validating and satellite data sets independently.

It is a surprise to me that the XBTs contribute such small errors to the SST validation. My expectation is that they would be much larger, given the thermal shock of entering the water, especially if the XBT has been sitting in the launcher in the sun for hours before launch.

Some minor points:

P 1194 - should 'diurnal mixing layer' be 'diurnal heating layer' ?

P 1195 - give the wavelengths of the different AVHRR channels

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P 1198 - 'XBT were launched from ships of opportunities' should be 'XBTs were launched from ships of opportunity'

P 1202 - how does the interpolation scheme deal with large islands?

P 1203 - Marullo et al is not in the reference list

P 1205 - 'observation originate' should be 'observations originate'

P 1206 - MBE is usually expressed as 'satellite - in situ' which is an 'error', whereas 'in situ-satellite' as used here, is a 'correction'

P 1208 - 'more o less' should be 'more or less'

P 1213 - the term 'Julian Day' is misused

P 1217 - Figure 2 is on its side?

P 1217 - Figure 6 caption 'behaviours' should be 'behaviour'

P 1222 - Figure 7 is on its side?

I prefer to use K to indicate a temperature interval, such as errors, and not degree C, as this indicates a temperature related to the freezing point of water.

Please check the spelling of names in citations and references.

Kearns, E. J., J. A. Hanafin, R. H. Evans, P. J. Minnett, and O. B. Brown, 2000: An independent assessment of Pathfinder AVHRR sea surface temperature accuracy using the Marine-Atmosphere Emitted Radiance Interferometer (M-AERI). *Bulletin of the American Meteorological Society*, 81, 1525-1536.

Kumar, A., P. J. Minnett, G. Podesta, and R. H. Evans, 2003: Error characteristics of the atmospheric correction algorithms used in retrieval of sea surface temperatures from infrared satellite measurements; global and regional aspects. *Journal of the Atmospheric Sciences*, 60, 575-585.

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Minnett, P. J., 1990: The regional optimization of infrared measurements of sea-surface temperature from space. *J. Geophys. Res.*, 95, 13,497-13,510.

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Interactive comment on *Ocean Sci. Discuss.*, 3, 1191, 2006.

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