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Discussions

Interactive comment on "Long term trends in the sea surface temperature of the Black Sea" *by* G. I. Shapiro et al.

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General comments. This paper deals with an important for the Black Sea ecosystem issue i.e., long term variability of SST and its possible association with the large-scale atmospheric processes. The authors analyzed SST variability over the 20th century in two contrasting regions of the sea and contribute many new interesting results. They show that the deep Black Sea was cooling during the first three quarters of the century and was warming in the last 15–20 years and on average there was a statistically significant cooling trend. The SST variability over the Western shelf does not show statistically significant trends. Very interesting result is that cooling of the Black Sea is an opposite to the general positive trend in the North Atlantic and may be related to the decrease of westerly winds over the Black Sea, and a greater influence of the Siberian

anticyclone. The authors provided careful analysis to confirm the statistical significance of obtained results. The paper is written clearly and easy to read. Therefore it is worth publishing after considering particular comments that follow below.

Specific comments. 1. There are a number of published studies on the subject not cited in this paper. E.g., the SST trends in the Black Sea during 1980-2004 were analyzed in:

Ginzburg A.I., Kostianoy A.G., Sheremet N.A. Seasonal and interannual variability of the Black Sea surface temperature as revealed from satellite data (1982-2000) // J. Mar. Systems. 2004. V. 52. P. 33-50. Ginzburg A.I., Kostianoy A.G., Sheremet N.A. Sea Surface Temperature Variability // In: Kostianoy A.G., Kosarev A.N. (Eds.). The Black Sea Environment. The Handbook of Environmental Chemistry. Vol. 5: Water Pollution, Part Q. Springer-Verlag, Berlin, Heidelberg, New York. 2008. P. 255–275.

Those authors obtained the results, quantitatively very similar to those presented in manuscript. It is especially important since the above-mentioned papers are based on different type of the data (satellite measurements). The overall negative trend of SST in the Black Sea in 20th century was reported in (it is in Russian, but author can easily read it):

Polonsky A.B., Lovenkova E.A. Temperature and salinity trends in the active layer of the Black Sea in the second half of the 20th century and their possible causes. Izv. RAN, Fizika atmosfery i okeana, 2004, T.40, N6 P. 832-841.

The long-term variability of SST in the Black Sea and its association with the large-scale atmospheric processes (NAO) was also discussed in:

Kazmin, A.S. and A.G. Zatsepin, 2007. Long-term variability of surface temperature in the Black Sea, and its connection with the large-scale atmospheric forcing. J. Mar. Syst.,68 (1-2), 293-301,doi:10.1016/j.jmarsys.2007.01.002. Kazmin, A.S., A.G. Zatsepin and H.Kontoyiannis. Comparative analysis of the long-term variability of winter

surface temperature in the Black and Aegean Seas during 1982-2004 associated with the large-scale atmospheric forcing. Int. J. of Climatol.,2009, DOI: 10.1002/joc.1985.

The proper citation of above-mentioned works would be desirable.

2. The authors produced the time series of monthly SST anomalies. Therefore it would be very interesting to analyze and discuss the question: how do the anomalies depend on month or season (in other words, what months or seasons provide the most input into the revealed long-term variability). We suggest that authors consider the possibility of including of this analysis to the paper.

Interactive comment on Ocean Sci. Discuss., 7, 91, 2010.