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Black and Aegean Seas: an impact of the large-scale atmospheric forcing on the long-term variability of winter surface temperature

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Satellite and reanalysis data for the last two decades of 20th century were used to study the long-term variability of the winter-mean sea surface temperature (SST) in the Black and Aegean Seas and its connection with the major large-scale atmospheric forcing: surface air temperature (SAT), surface wind and North Atlantic Oscillation (NAO) and East Atlantic-West Russia (EAWR) teleconnection patterns. In spite of some differences, the general tendencies of SST variability in the both basins are similar. The major climatic event (i.e. SST decrease below the climatic mean followed by the sharp SST increase, occurred during the period of 1986-99) and its connection with the atmospheric forcing are evident both in the Black and Aegean Seas. During the investigated period Southern-Western wind regime occurred over the Black Sea and Northern-Eastern wind regime over the Aegean. It is shown that the variability of the meridional component of the surface wind (which provides the most of the atmospheric heat transport into the basins) is well correlated with the large-scale atmospheric patterns (NAO, EAWR). The major difference is that in the Black Sea the NAO intensification/weakening results in the weakening/strengthening of the Southern wind, while in the Aegean Sea EAWR/NAO intensification/weakening produce strengthening/weakening of the Northern wind. The long-term variability of SST is well correlated with the variability of the SAT, which in turn is highly correlated with the meridional component of the surface wind. However, remarkable feature is that in the Black Sea an increase/decrease of the SAT is associated with the strengthening/weakening of the Southern wind. On the contrary, in the Aegean Sea an increase/decrease of the SAT is provided by the weakening/strengthening of the Northern wind. Simple basic scheme of influence of the large-scale atmospheric forcing on the long-term SST variability during the positive NAO and EAWR phase is proposed.