



An Possible Influence of Ocean Heat Content Fluctuation on Euro-Asian Climate

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Spatial patterns in multi-decadal variability in upper ocean heat content for the last 60 years are examined using a numerical model developed at the Institute of Numerical Mathematics of Russia (INM Model) and sea water temperature-salinity data from the World Ocean Database. Both the model and the observational data show that the heat content of the Active Upper Layer (AUL) in particular regions of the Atlantic, Pacific and Southern oceans have experienced prominent simultaneous variations on multi-decadal (25–35 years) time scales. These variations are compared earlier revealed climatic alternations in the Northern Atlantic region during the last century. We found that from the middle of 1970s to the end of 1990s the AUL heat content decreased in several oceanic regions, while the mean surface temperature increased on Northern Hemisphere continents according to IPCC. This means that the climate-forcing effect of the ocean–atmosphere interaction in certain energy-active areas determines not only local climatic processes, but also have an influence on global-scale climate phenomena. Here we show that specific regional features of the AUL thermal structure are in a good agreement with climatic conditions on the adjacent continents. Further, the ocean AUL in the five distinctive regions identified in our study have resumed warming in the first decade of this century. By analogy inference from previous climate scenarios, this may signal the onset of more continental climate over mainlands.

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