

Sea surface temperature trend in the East China Sea during the 20th century simulated by a regional ocean model

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It has been reported that the East China Sea is one of the region where the sea surface temperature (SST) trend during the 20th century is a couple of times larger than the global mean SST trend. However, the detailed spatial structure of the SST trend in the East China Sea, especially in the early 20th century, and its quantitative mechanism have not been understood. The present study examines the SST trend in the East China Sea from 1901 to 2010 by using a regional ocean modeling system (ROMS) with an eddy-resolving horizontal resolution (0.1°) from 1871 to 2010. The spatial pattern of our simulation resembles that of the observations. That is, our simulation can reproduce the SST rise along the Kuroshio axis and over the continental shelf along the coast of China. The amplitude of the SST trend in the simulation is within the range between the two observations. The heat budget analysis revealed that the oceanic advection induced the SST rise in both regions. More specifically, the acceleration of the ocean currents plays an important role in the warming of the SST in both regions. In contrast, surface net heat flux acted as the damping of the SST rise.

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