



Weakening of the Yellow Sea Warm Current during 1951~2000

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The Yellow Sea Warm Current (YSWC) plays a critical role in heat and mass transport in the Yellow Sea and has great impacts on ecosystem and sedimentation. The YSWC is mainly driven by the East Asian winter monsoon (EAWM) and shows strong intra-seasonal and inter-annual variability. However, how it varies on longer timescale, in particular decadal timescale under the influence of global climate change, has not yet been revealed. Here we show a significant slowdown in the YSWC during 1950s-1990s. Weakening of the EAWM and the spatial variation of bathymetry are the key factors in the change of the YSWC. The change is further verified with the variation of the thermal front to the east of the Shandong peninsular. The anomalous heat transport induced by the weakening of the YSWC enhances the warming trend in the sea surface temperature (SST) in the western Yellow Sea but suppresses that in the eastern Yellow Sea. Our findings demonstrate how the current and SST in a marginal sea respond to the global climate change. The weakening of the YSWC may have serious consequences on self-cleaning capacity of the Yellow Sea if the global warming persists considering the increasing pollutant discharge due to the fast growing economy of the coastal cities.