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Thermocline profile and water masses of southern South China Sea from 60 years dataset of World Ocean Database

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This study was conducted based on 60 years datasets from World Ocean Database 13 (WOD13) covering the region of southern South China Sea (SSCS). The water characteristics of shallow continental shelf water were examined to understand the seasonal influence especially on the mixed layer depth profile and thermocline changes. From inter-annual analysis, sea surface temperature (SST) and bottom water temperature (50 m) generally increased from 1951 until 2014. From monthly averaged data, May recorded the highest SST while January recorded the lowest. Different pattern was observed at the bottom water where September recorded the highest while February recorded the lowest. Surface distribution of temperature shows the presence of thermal front of cold water at southern part of Vietnam tip especially during peak northeast season (December-January), the appearances of warm water obviously seen during generating southwest monsoon from May to June. Thermocline study revealed the deepest isothermal layer depth (ILD) during peak northeast and southwest monsoon. Temperature threshold at shallow area reach more than 0.8 °C during transitional period. On the other hand, water mass study provides another perspective of water distribution and transport within the region. Water mass during southwest monsoon is typically well mixed compared to other seasons while strong separation according to location is very clear. During transitional period between northeast monsoons to southwest monsoon, the increasing of water temperature can be seen at Continental Shelf Water (CSW) which tends to be higher than 29 °C while vice versa condition during transitional period between southwest monsoons to northeast monsoon. Dispersion of T-S profile can be seen during southwest monsoon inside Tropical Surface Water (TSW) where the salinity and temperature become higher than during northeast monsoon. The use of WOD13 has allowed comprehensive study on the water characteristics of the region as a whole which never been addressed before.

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