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Deep water bottom current evolution in the northern South China Sea during the last 150 kyr: Evidence from sedimentary sortable silt and magnetic fabric

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Deep water bottom current (DWBC) plays a central role in global climate. Relative to the Atlantic, the evolution of Pacific deepwater circulation is still unclear. Luzon Strait with a sill depth of about 2600 m serves as the only important deep connection between the South China Sea (SCS) and the Pacific, providing a unique opportunity to monitor the western Pacific deep water circulation. We present a magnetic and grain size analysis of two sediment cores (PC111 and PC83) located in Xisha Trough, northern SCS in order to reconstruct past changes of DWBC during the last 150 kyrs. Variations in the mean size of sortable silt and the magnetic grain size was interpreted to indicate past changes of DWBC, which suggest abrupt, millennial-scale increasing DWBC strength corresponding to Heinrich Stadials (HS1, HS2, HS3, HS4. HS5, HS6, HS7, HS8, HS9, HS10, HS11) for past 150 kyr, times of weak North Atlantic Deep Water formation. The direction of DWBC reconstructed from the anisotropy of magnetic susceptibility (AMS) is mostly N–S direction in core PC111 from 30 to 0 ka and NW–SE direction in core PC83 from 50 to 0 ka, which are parallel to the local topography. The good relationship between DWBC strength and the relative positive value of the planktonic foraminifera δ18O suggests the evolution of DWBC in northern SCS, sourced probably from North Pacific Deep Water, closely linking to the global climate.