

Variation of North Pacific subtropical gyre heat transport caused by the interior flow change

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The subtropical gyre of the North Pacific consists of the northward flowing Kuroshio and the southward interior return flow. The variation of the net heat transport of the gyre is caused by the changes of the volume transport distribution with respect to temperature in the Kuroshio and the interior flow in addition to the gyre volume transport change. In this study, we focused on the volume transport distribution change in the interior flow, which can be taken into account by the volume transport-weighted temperature. By applying the altimeter-derived gravest empirical mode method to hydrographic and altimetric data from San Francisco to 30N, 145E via Honolulu, we estimated the geostrophic interior flow of the subtropical gyre between 1993 and 2012. Anomaly of the volume transport-weighted temperature from the seasonal mean cycle is caused by the change of the volume transport in a layer just above the isopycnal of 25.5sigma-theta. Peaks in a quasi-decadal variation of the volume transport-weighted temperature are found approximately one year before peaks of sea surface temperature in the tropical western Pacific warm pool region.

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