Figure S1: Mean surface wind stress curl in common logarithm scale (10-7 N m-3) averaged over 2005-2012 in (a) OFES2 and (b) OFES forced by JRA55-do and NCEP reanalysis respectively.

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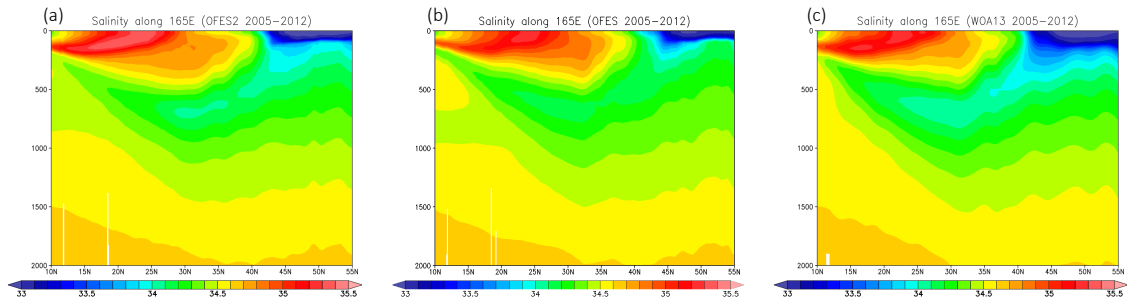
10   **Figure S2: Meridional section of salinity (psu) along 165°E in the North Pacific in (a) OFES2, (b) OFES, and (c) WOA13 observations averaged over 2005-2012. The salinity distribution of the NPIW is slightly improved in OFES2 with the tidal mixing scheme compared with OFES.**

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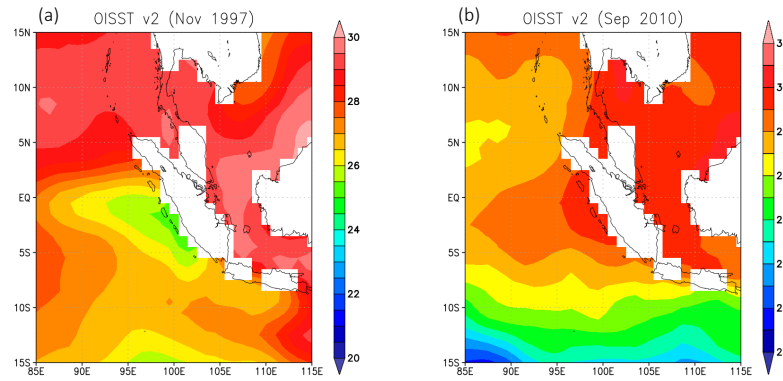
Figure S3: SST (°C) in the region including IOD eastern pole (90°-110°E and 10°S-0°) in mature month of (a) 1997 positive IOD event (Nov 1997) and (b) 2010 negative IOD event (in Sep 2010) based on OISST v2 (Reynolds 1988).