

*Geophysical Research Letters*

Supporting Information for

**Role of geostrophic currents in future changes of coastal upwelling in the California Currents System**

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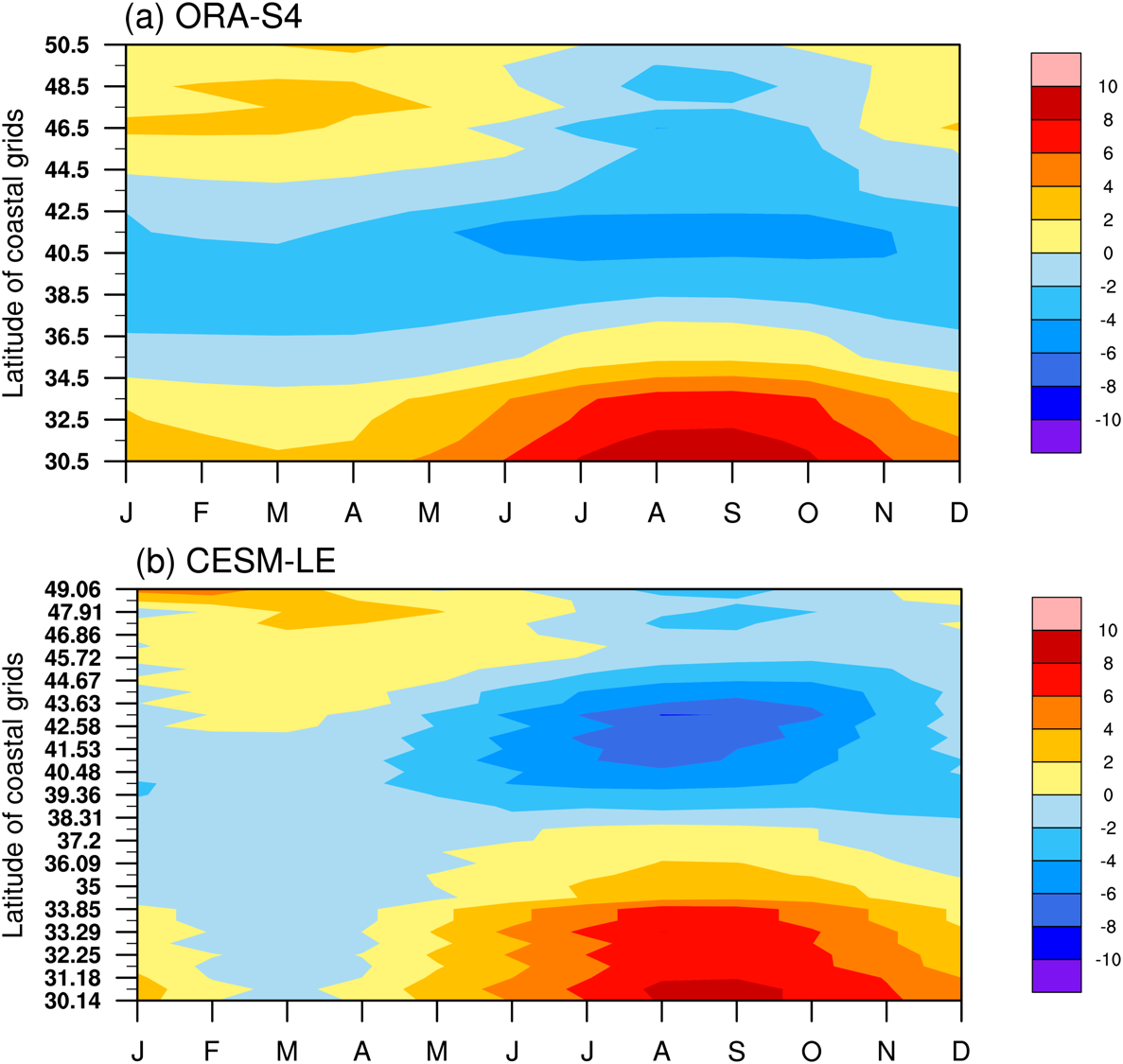
1. CIRES, University of Colorado, Boulder, Colorado

2. NOAA Earth Systems Research Laboratory, Boulder, Colorado

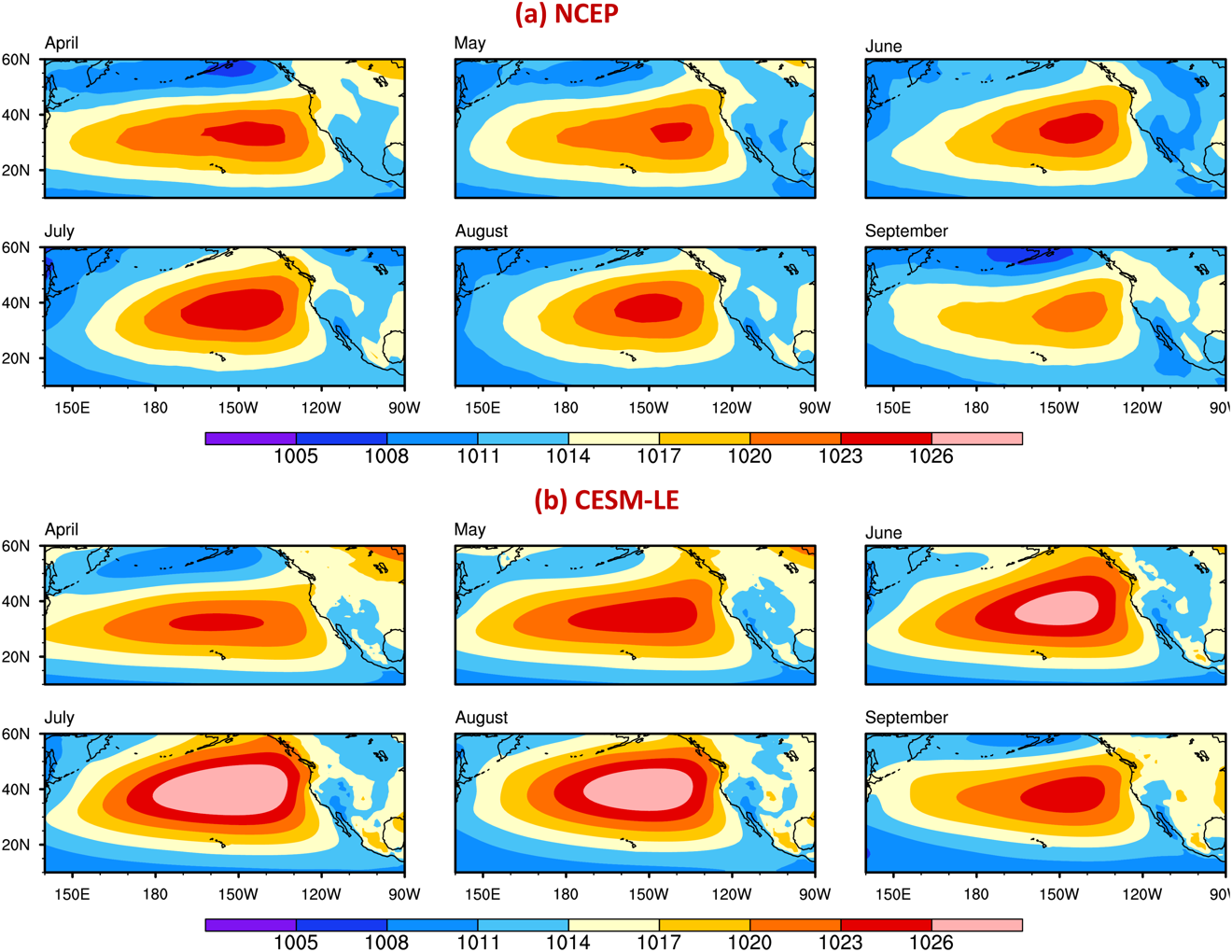
3. NOAA Southwest Fisheries Science Center, Monterey, California

**Contents of this file**

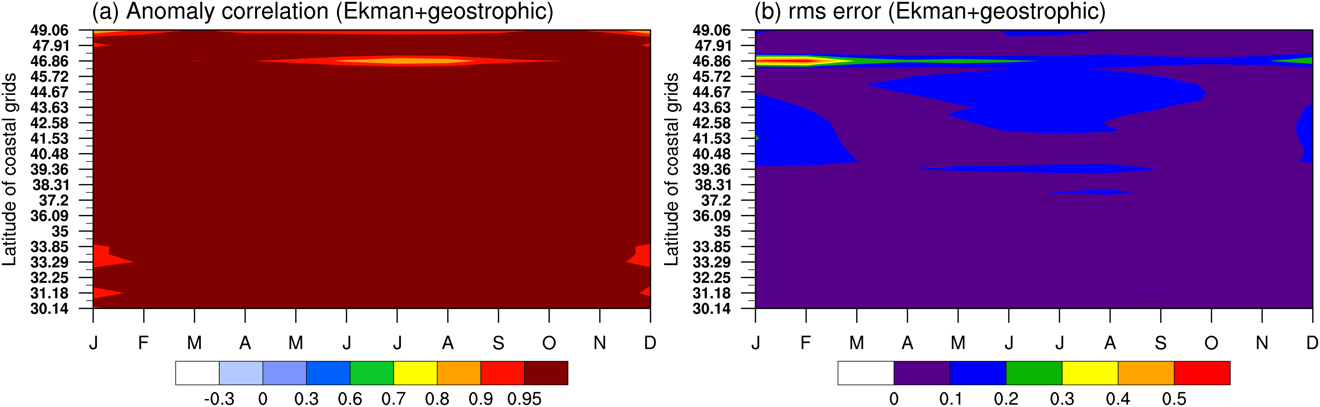
Figures S1 to S5

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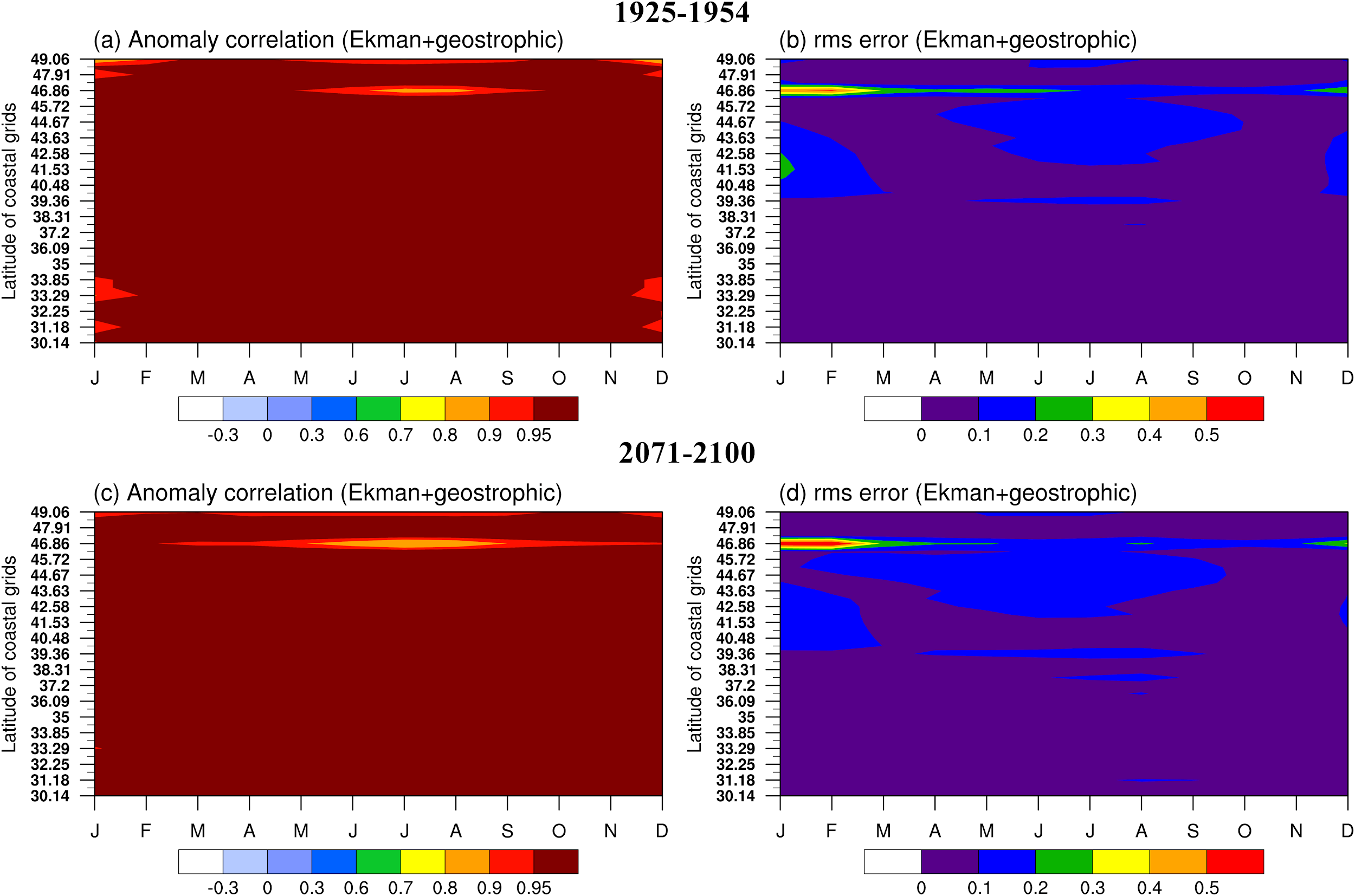
**Figure S1**. Sea surface height monthly climatological state from the first offshore grid, calculated from (a) ECMWF Ocean Reanalysis System 4 (ORA-S4; Balmaseda et al., 2013) and (b) CESM-LE. Mean values over the coastal grid cells have been removed from each grid cell to highlight alongshore sea level gradient. Abscissa indicates calendar month; tick marks on ordinate indicate actual latitude of grid cells. Data during 1958-2017 are used to calculate the climatological state. Unit is cm.



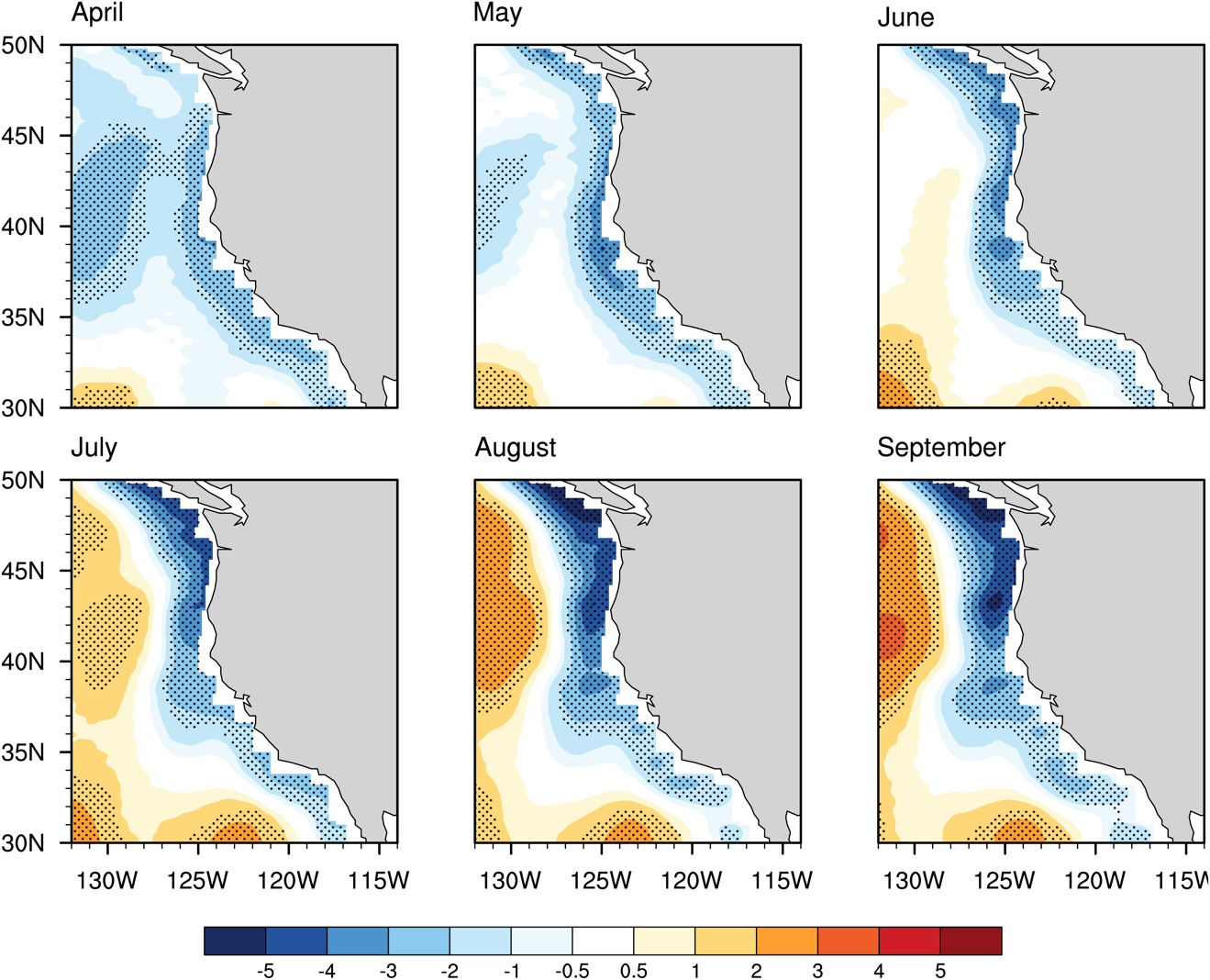
**Figure S2**. Sea level pressure monthly climatological state for April-September, calculated from (a) National Centers for Environmental Prediction reanalysis (NCEP; Kalnay et al., 1996) and (b) CESM-LE. Data during 1958-2017 are used to calculate the climatological state. Unit is hPa.



**Figure S3.** (a) Anomaly correlation (after removing monthly climatology) and (b) full-field room-mean-square error between vertical transport at 30m depth and the combination of Ekman and geostrophic components of the vertical transport. Data during 1920-2100 are used.



**Figure S4.** The same as Fig. S3 except for using data during (a, b) 1925-1954 and (c, d) 2071-2100, respectively.



**Figure S5.** Monthly epoch difference (2071-2100 minus 1925-1954) for sea surface height for April-September near the United States west coast. Dots indicate 95% significance. Unit is cm.