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Poleward flows along the transitional region of the Northeastern Pacific

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Typical current flows along Eastern Boundary Upwelling Systems depict an equatorward, relatively cold and less saline surface flow that meet relatively warm and salty water along its path. Below the surface (200-400 m), a poleward countercurrent that carries relatively salty waters along the shelf break is a robust feature. However, surface poleward flows are not always clearly distinguished. Poleward flows are important since they contribute to the global property (heat, salt, etc) balances. To study the seasonal variability of surface and subsurface poleward flows along 12 cross-sections off the Baja California Peninsula in the Northeastern Pacific, between 24-30 N, we present an analyses of historical (1950-1978) and recent (1997-2011) hydrographic data sets. Geostrophic calculations indicate that subsurface poleward flows occur throughout the year, weaker and deeper in winter-spring and stronger in summer and fall. Autumn subsurface flows shallow and are brought to the surface to clearly depict a near-shore poleward flow. Ancillary data (SSH, winds) suggest that such surfacing occurs due to the seasonal weakening of the clockwise northeastern Pacific atmospheric circulation, which favors the advection of waters from the eastern edge of the Subtropical (Str) central Pacific. The poleward excursion of Str surface waters is limited to latitudes of 28N which favors the seasonal existence of ecological provincial boundaries between subarctic and Str domains. Poleward, alongshore surface advection of Str warmer waters is intensified during El Niño events when it may reach higher latitudes.