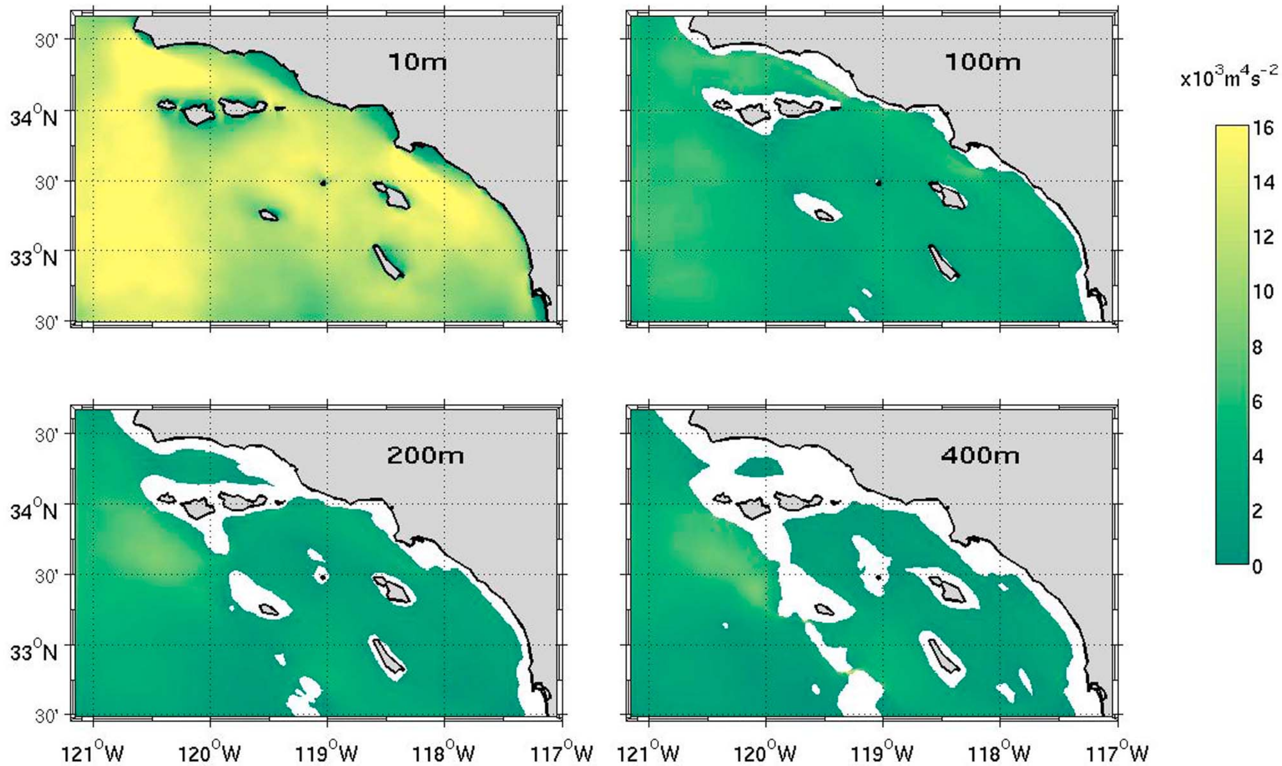

Figure 2. The mean eddy kinetic energy (EKE) at four levels (10 m, 100 m, 200 m, and 400 m). The mean EKE is averaged over the 12 years from 1996 to 2007. The EKE is calculated from high-passed (90 days) velocity fields (unit, 10^3 m^4 s^{-2}).

circulation, as well as its inter-annual (mainly as a local manifestation of an ENSO event), seasonal, and intraseasonal (eddy-scale) variations. The simulation also exhibits three subdomain-scale, persistent (i.e., standing), cyclonic eddies related to the local topography and wind-forcing: the Santa Barbara Channel Eddy, the Central-SCB Eddy, and the Catalina-Clemente Eddy. We find high correlations of the wind stress curl with both the alongshore pressure gradient and the eddy kinetic energy level in their variations on seasonal and longer time scales. The model exhibits intrinsic eddy variability with strong topographically related heterogeneity.

[8] The high-resolution numerical product has been used by the oceanographic community. Besides it was used for the study of island wakes [*Dong and McWilliams*, 2007] and upwelling events [*Dong et al.*, 2011], it was applied to studies of Lagrangian assessment of surface current dispersion in the coastal ocean [*Ohlmann and Mitarai*, 2010], for quantifying connectivity [*Mitarai et al.*, 2009] and for potential larval connectivity in the SCB [*Watson et al.*, 2010, 2011]. The model configuration is also applied to a real time forecast for the oceanic circulation in the SCB, see its website: ourocean.jpl.nasa.gov/SCB.

[9] In summary, the high-resolution (1 km) numerical product used for the present study has been validated. It is sampled as daily averages with a 1-km horizontal resolution and 40 vertical levels with an s-coordinate system. Specially for this present study, velocity fields are linearly interpolated onto 9 vertical levels: 10 m, 50 m, and then all the way to 400 m with a uniform interval of 50 m (due to the surface-intensified setting of the model configuration, the vertical resolution might not be enough to resolve the variation beyond 400 m).

2.2. General Analysis of Eddy Variation

[10] Prior to the identification of individual eddies using eddy detection schemes, we use a general way to examine eddy variations by extracting high-pass (90 days) velocity fields. The 90-days high-pass scale is the intraseasonal-scale variation, which is considered as an eddy scale. The kinetic energy calculated from the high-pass velocity data is defined to be the eddy kinetic energy (EKE). Its distributions at four levels (10 m, 100 m, 200 m and 400 m) are plotted on Figure 2. The mean EKE at the surface is the largest in the western portion of the Santa Barbara Channel, within the channel between the Palos Verdes Peninsula and Catalina Island, and around the headlands; around islands and near the shoreline, however, the EKE is relatively low. Similar mean EKE patterns at the surface using eight-year (1996–2003) data are given by *Dong et al.* [2009a]. The pattern extends to 100 m. On the levels of 200 m and 400 m, the higher EKE locations are immediately south of the western entrance of the Santa Barbara Channel and near the edge of the shelf. The EKE distribution suggests that it is related to the topography in the SCB. Figure 2 also shows the magnitudes of the EKE decrease sharply away from the surface. The vertical profile of the mean EKE averaged over the area of water at each level is plotted in Figure 3. From the surface to 50 m (nominally the bottom of the Ekman layer), the EKE drops by 1/3, to 100 m (in the middle of the thermocline) by 2/3. Below the thermocline (150 m), the EKE remains