CHANGES IN EARTHQUAKE SOURCE PROPERTIES ACROSS A SHALLOW SUBDUCTION ZONE: KAMCHATKA PENINSULA

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This paper studies the source properties of earthquakes originating within the shallow subduction zone near Kamchatka peninsula. It was used the regional catalog of 1962-1993 Kamchatkan earthquakes completed by the Institute of Volcanology, Russia. Our investigations allow us to show a gradual change in source properties of earthquakes from trench to coast.

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It was demonstrated that (1) the earthquake epicenters of events, which were occurred at the depth interval from 0 to 60 km, distributed here within two main bands, and II, between the Kurile-Kamchatka trench and Kamchatka Peninsula. The first continuous band goes along the coast of Kamchatka. The second band consists of several dense groups of earthquake foci and goes along the western slope of the trench. (2) The coastal seismic band is characterized by compressive stresses and thrust faulting while the near-trench seismic band is characterized by extensional tectonics with strike-slip and normal faulting. (3) Average apparent stresses are greater in the coastal zone near Kamchatka than in near-trench zone with a difference of a factor of 6. (3) The swarm sequences change to the mainshock-aftershock sequences from trench to coast. The source area of aftershock sequences are generally smaller than the swarm areas for the same magnitude Ms of the mainshock or clue event of the swarm. (4) Study of the Ms-Ks relation, where Ks is the energy class for Kamchatkan earthquakes, reveals that the events radiate relatively higher frequencies from trench to coast.