



Influence of Aleutian fracture Zone on the Ocean Floor

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The system of fracture zones south of the Komandorsky Islands becomes increasingly complicated from east to west. The Steller Basin is bounded by the Pikezh and Naturalist fracture zones. It is cut into sub-basins by the Aleutian fracture zone. The rhomb-shaped basin is several hundred meters deeper than the surrounding seafloor. Here, the Aleutian Trench reaches its maximum depth of 6800 m. To the east, the basin is marked by north-northwest-south-southeast normal faults, which were recorded during deep dives with the MIR submersible. The geometry of the basin, its location between major fracture zones, and the existence of bordering normal faults are evidence for a pull-apart origin in a dextral, transtensional setting.

The seafloor between the Pikezh and Steller fracture zones is characterized by highs and troughs. These highs form en-echelon ridges along the southern slope of Aleutian Ridge. The ridge related to the Steller fracture zone extends from the western side of the Steller pull-apart basin up to the Kamchatka Mys Peninsula continental rise. No significant compressional deformation is observed on seismic profiles crossing this segment of the trench in general, reflectors in the sedimentary cover of the Pacific plate may be traced across the Aleutian Trench into the Aleutian Ridge outer slope. Nevertheless, Seliverstov (1987) suggests that, close to Kamchatka, blocks of oceanic crust from the Pacific plate may overthrust the Aleutian Ridge from the south as a result of displacement along the Pikezh and Steller fracture zones.

The Naturalist fracture zone is located on the Pacific plate and consists of two parts. The northeastern branch can be traced along the western side of the Steller Basin and the outer slope of the Aleutian Trench, where deformation of sedimentary cover and seismic activity are observed. The southeastern branch corresponds to a linear basement high that can be traced from the Steller Basin up to the Kuril-Kamchatka Trench

axis. In contrast to the general dextral sense of motion along the Komandorsky fracture zone system, left-lateral displacement of the trench axis is observed in this segment of the fracture zone. The Naturalist fracture zone is being subducted under Kamchatka, causing fracturing of the overriding plate. The upper part of the Kamchatka continental slope in the continuation of the Naturalist fracture zone is cut by canyons corresponding to east-west faults. These faults can be traced to the middle part of the slope and fore-arc basins. The lower part of the continental slope off Kamchatka is composed of deformed sediments typical of accretionary wedges with ridges parallel to the trench axis and separated by thrusts faults.