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Geodynamic and Metallogeny in the Pacific Mobil Belt

Alexander Rodnikov (1), Natalia Sergeyeva (2), and Ludmila Zabarinskaya (3)

(1) Russian Academy of Sciences, Geophysical Center, Moscow, Russian Federation (rodnikov@wdcb.ru), (2) Russian Academy of Sciences, Geophysical Center, Moscow, Russian Federation (nata@wdcb.ru), (3) Russian Academy of Sciences, Geophysical Center, Moscow, Russian Federation (mila@wdcb.ru)

The distinctive feature of the deep structure of the Pacific Mobil Belt is the presence of an asthenosphere in the upper mantle. The tectonically active regions, such as the island arcs and the rifts of the marginal seas, correlate with a thick asthenosphere. The asthenosphere resides in a depth of 50-80 km under the old Paleogene deep basins of the marginal seas, at about 30 km under the Neogene basins, and at a depth of 10-15 km under the Pliocene-Quaternary basins and recent inter-arc basins, causing the breaks of the lithosphere, the formation of rifts, basalt lava eruptions, and hydrothermal activity. The asthenospheric diapirs are marked on the surface by rift formations and mainly tholeiitic magma eruption. Rifts in the marginal seas and island arcs may by accompanied by intense mineralization. The asthenospheric diapirs represent the channels by which hot mantle fluids from the asthenosphere penetrate to the geological structures of the transition zone from Eurasian Continent to the Pacific Ocean. A rupture of lithosphere continuity, rifts, tholeiite effusions and formation of sulfides are developed where the asthenospheric diapirs upwelling to the crust. The crust of the deep basins is similar to that of crust of the oceans. They are characterized by a thinner crust, distribution of rift structures, upwelling of asthenosphere and higher heat flows. The tectonic processes are apparently analogous to the processes active in the mid –oceanic ridges. Manifestations of hydrothermal activity are restricted to active interarc troughs (Mariana and Lau troughs) and deep basins (Okinawa, Japan, Philippine deep basins and Manus deep basins in Bismarck Sea). Beneath these structures the asthenosphere is closest to the crust, as, for instance, in the Pliocene – Quaternary Mariana and Lau troughs, where it lies at the depth of 10-15 km. The following relationship has been established: upwelling of the asthenosphere to the crust – origin of magma chambers in the crust – formation of rift structure –basalt eruption - formation of «black and white smokers» - hydrothermal manifestations of zinc, copper, lead and iron sulfides in tectonically active interarc troughs and deep basins of marginal seas West Pacific.