

Deep structure of the transition zone from Asian continent to the Pacific Ocean

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Research was carried out along three geotraverses i.e. deep cross-sections of the lithosphere made on the base of complex interpretation of geological and geophysical data. The first geotraverse across the structures of the Japan Sea and the Honshu Island was prepared jointly with Japanese scientists. The second geotraverse across the North China Plain, Philippine Sea and Mariana Island Arc was carried out jointly with Chinese and Japanese specialists. The third geotraverse being under preparation now runs across the Sea of Okhotsk. Using seismological, geothermal and electromagnetic methods the asthenospheric layer is distinguished in the upper mantle of the transition zone. This layer is more fully manifested under tectonical active structures such as interarc troughs and deep basins of marginal seas. The top of the asthenosphere varies in depth from 30 km under Neogene basins to 50-80 km beneath Paleogene basins. Under interarc basins of island arcs the anomalous mantle reaches the crust. The base of the deep basins comprises rift structures associated with upwelling of the asthenosphere causing extension stresses in the lithosphere and magmatic activity. The following relationship has been elucidated: upwelling of the asthenosphere in the upper mantle - magma chambers in the crust ; rift structures on the surface - tholeiite eruption and hydrothermal activity with sulfide deposits.