



Active faults and minor plates in NE Asia

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Stated nearly 40 yr ago the uncertainty with plate boundaries location in NE Asia (Chapman, Solomon, 1976) still remains unresolved. Based on the prepositions that a plate boundary must, first, reveal itself in linear sets of active structures, and, second, be continuous and closed, we have undertaken interpretation of medium-resolution KH-9 Hexagon satellite imageries, mostly in stereoscopic regime, for nearly the entire region of NE Asia. Main findings are as follows.

There are two major active fault zones in the region north of the Bering Sea. One of them, the Khatyrka-Vyvenka zone, stretches NE to ENE skirting the Bering Sea from the Kamchatka isthmus to the Navarin Cape. Judging by the kinematics of the Olyutorsky 2006 earthquake fault, the fault zones move both right-laterally and reversely. The second active fault zone, the Lankovaya-Omolon zone, starts close to the NE margin of the Okhotsk Sea and extends NE up to nearly the margin of the Chukcha Sea. The fault zone is mostly right-lateral, with topographically expressed cumulative horizontal offsets amounting to 2.5-2.6 km. There may be a third NE-SW zone between the major two coinciding with the Penzhina Range as several active faults found in the southern termination of the Range indicate.

The two active fault zones divide the NE Asia area into two large domains, which both could be parts of the Bering Sea plate internally broken and with uncertain western limit. Another variant implies the Khatyrka-Vyvenka zone as the Bering Sea plate northern limit, and the Lankovaya-Omolon zone as separating an additional minor plate from the North-American plate. The choice is actually not crucial, and more important is that both variants leave the question of where the Bering Sea plate boundary is in Alaska.

The Lankovaya-Omolon zone stretches just across the proposed northern boundary of the Okhorsk Sea plate. NW of the zone, there is a prominent left-lateral Ulakhan fault, which is commonly interpreted to be a portion of the plate northern boundary. With this, we have discovered no active faults or fault zones of the Ulakhan fault strike, which could be the portion of the boundary between the Lankovaya-Omolon zone and either the western margin of the Komandor basin or the westernmost Aleutians.

We conclude that there is a certain disagreement between active faulting pattern and plate models for NE Asia, relating to the extent of the plates and missing portions of the plate boundaries.

The research was supported by grant # 110500136-a from the Russian Foundation for Basic Research.