

地震学★地球动力学★地热学

堪察加地区现今地壳运动与变形特征研究

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摘要 利用俄罗斯堪察加地区1995~2005年的GPS观测数据,研究了该区现今地壳水平运动速度场特征.在球坐标系中解算了各应变率分量,分析了应变率场的空间分布特征,并与地震学和地质学研究结果进行了综合对比分析.结果表明,堪察加半岛北部的微板块边界并不明显,堪察加南部测站运动速度大于中部和北部地区,愈靠近东部板块汇聚区,测站速度越大.从东海岸到西海岸,测站水平速度存在明显的梯度衰减特征,水平运动方向与太平洋板块向西北的俯冲方向基本一致.各应变率分量具有东部海岸大于中部和西海岸、从东至西呈梯度衰减的特点.堪察加大部分地区处于EW和NS向压缩状态,局部存在拉张.面应变率结果显示绝大部分为压缩区;刚性转动结果表明大部分地区表现为顺时针转动,北部地区和南端顺时针旋转性明显.东部有效应变率明显大于西部地区,东西向梯度衰减关系明显.主压应变率明显大于主张应变率,特别是在东海岸地区.主压应变率方向与中等以上地震的主压应力轴在水平方向的投影方向基本一致.地壳变形场在空间分布上的不一致性主要与太平洋板块在堪察加半岛东南侧的俯冲深度、俯冲方位角、俯冲倾角和俯冲带的耦合强度有关.

关键词 [堪察加地区](#) [地壳运动](#) [GPS](#) [应变率场](#)

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Research on characteristics of present-day crustal motion and deformation in Kamchatka area

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**Abstract** We have collected GPS data in the period of 1995~2005 in Kamchatka, Russia to study the characteristics of present-day crustal horizontal motion velocities in this area. Strain rate components are computed in spheric coordinate system. Analyses of the spatial distribution of strain rate fields derived from GPS measurements are carried out in contrast with seismological and geological results. Results show that microplate boundaries are not clear in the north part of Kamchatka peninsula. Site velocities in southern Kamchatka peninsula are generally greater than in the middle and north of this area. The closer to the eastern subduction zone the sites are, the greater their velocities are. Horizontal velocity field obviously exhibits gradient decrease across the peninsula from east to west. Generally the horizontal motions have same direction as the Pacific plate subducting to the southeast. All strain rate components have the features of getting less in EW direction. Generally, Kamchatka peninsula is undergoing compression in terms of EW and NS strain rate components, with extension in certain local zones. Dilation rates show that almost all Kamchatka peninsula are contracting; Rigid rotation rates in most regions are clockwise, especially in north zone and southern end. Effective strain rates in eastern zone are greater than in west, and it exhibits remarking gradient decrease in EW direction. Principal compression strain rates are apparently greater than principal extension strain rate, especially in eastern zone. In general, the directions of principal compression strain rate are congruent with horizontal projection of principal compress axis derived from medium and large earthquakes. Spatial non-uniform of crustal deformation field is related to the subduction depth, orientation, dip angle and coupling strength of Pacific downthrust to the southeast of Kamchatka peninsula.

**Key words** [Kamchatka area](#); [Crustal motion](#); [GPS](#); [Strain rate field](#)

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