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论文

由空间大地测量得到的太平洋板块现今构造运动与板内形变应变场

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摘要 推导了板块的弹性运动方程.根据太平洋板块(PCFC)上空间大地测量的观测结果，建立了PCFC的弹性运动模型，该模型与板块实际运动状态的符合程度明显地优于刚体运动模型.研究表明：PCFC现今旋转的角速度比过去3Ma的平均值大0 037°/Ma；在PCFC内部存在明显的水平形变，在15°S以北和204 5°E以西地区存在一致的向西形变，北西与南西方向的形变速率分别为0 8～3 5 mm/a与1 0～3 4 mm/a；在板块的东南区存在一致的向东形变，北东与南东方向的形变速率分别为1 5～1 8 mm/a与2 8～9 1 mm/a.PCFC内部水平应变场的空间变化是有规律的，在PCFC的西北部，主压应变轴为NW-SE方向，主压应变率大于主张应变率；在PCFC的东南部，主压应变轴为NE-SW方向，主张应变率大于主压应变率；PCFC的东南边界是扩张边界，边界附近的主张应变率最大（平均为1 51×10 -9 /a），主张应变轴基本上与洋中脊的扩张方向一致；PCFC的西北边界是俯冲边界，边界附近的主压应变率最大（平均为0 75×10 -9 /a），主压应变轴基本上与太平洋板块的俯冲方向一致.

关键词 太平洋板块 弹性运动方程 两种模型 板内形变 应变场

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Current day tectonic motion and intraplate deformation strain field obtained from space geodesy in the Pacific Plate

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Abstract In this paper we present a plate elastic motion equation, and based on the space geodetic data of the Pacific plate (PCFC), create an elastic motion model for the PCFC. The coincidence of this model with the plate real motion status is obviously better than that of the rigid motion model. Our research indicates that the angular velocity of the current day rotation of the PCFC is 0 037°/Ma larger than the average in the past 3 Ma. The horizontal deformation within the PCFC is evident. In the region to the north of 15°S and to the west of 204 5°E, there exists a consistent west trending deformation with the rates of 0 8～3 5 mm/a and 1 0～3 4 mm/a in the NW and SW directions, respectively. In the southeastern region of the plate, there exists a coincident east_trending deformation with the rates of 1 5～1 8 mm/a and 2 8～9 1 mm/a in the NE and SE directions, respectively. The spatial variation of horizontal strain field within the PCFC is regular. In the northwestern part of the PCFC, the principal compressive strain axis is NW-SE and the principal compressive strain rate is larger than the principal tensile strain rate; while in the southeastern part of the PCFC, the principal compressive strain axis is NE-SW and the principal tensile strain rate is larger than the principal compressive strain rate. The southeast boundary of the PCFC is a spreading one. The principal tensile strain rate near the boundary is the largest (average: 1 51×10 -9 /a) and the principal tensile strain axis is basically consistent with the extending direction of the oceanic ridge; the northwest boundary of the PCFC is an underthrusting one. The principal compressive strain rate near the boundary is the largest (average: 0 75×10 -9 /a) and the principal compressive strain axis is basically coincident with the underthrusting direction of the PCFC.

Key words PCFC; Elastic motion equation; Two kinds of models; Intraplate deformation; Strain field

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