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基于InSAR、GPS形变场的长白山地区火山岩浆囊参数模拟研究

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摘要 利用差分合成孔径雷达干涉测量技术（DInSAR）获取长白山地区的形变场.结果显示1995～1998年期间，位于长白山东南侧的间白山火山存在6～12 cm的视线向形变，而长白山天池火山处于平静期，没有明显形变.利用2002～2003年的GPS和水准获取的形变数据，分别采用Mogi单源、双源模型反演了长白山地区火山的岩浆囊参数.其中双源模型拟合效果较为理想，两个点源一个位于长白山天池老火山口下方7.9 km处，另一个位于间白山火山下方5.5 km处.对双源模型反演得到的岩浆囊参数进行适当调整，拟合得到与InSAR形变场基本吻合的结果.上述研究结果表明长白山地区火山活动存在时间上的间歇性和空间上的迁移性，为进一步研究长白山地区火山活动机制提供了参考和依据.

关键词 InSAR 长白山火山 Mogi点源模型 火山岩浆囊参数

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A modeling of the magma chamber beneath the Changbai Mountains Icanic area constrained by InSAR and GPS derived deformation

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Abstract We use a differential interferometry synthetic aperture radar (D-InSAR) technique to obtain the deformation field in the Changbai Mountains region, which revealed a 6~12 cm line-of-sight (LOS) deformation in the Jianbai Mountain region from 1995 to 1998, which is located southeast of the Mt. Changbai volcano, but little deformation in the Tianchi volcano region. The single Mogi source and double Mogi source models are used to invert the parameters of the magma chamber of the Tianchi volcano in the Changbai Mountains, respectively. The models are constrained by a GPS derived horizontal velocity field and leveling measurements from 2002 to 2003. The double Mogi source model fits the observations better, with the two Mogi sources located ~7.9 km below the Tianchi volcanic crater, and ~5.5 km below the Jianbai volcanic crater, respectively. Furthermore, we adjust the parameters to obtain a reasonable forward-modeling result, which is generally consistent with the InSAR derived deformation field. In conclusion, the volcano activity in the Changbai Mountain region is characterized by a temporal intermittence and spatial migration. Our results provide a basis for further research on the volcanic mechanism of this regin.

Key words InSAR; Mountain Changbai volcano; Mogi source model; Parameters of magma chamber

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