

地球物理学报 » 2011, Vol. 54 » Issue (7) : 1745-1749

空间物理学★大气物理学★重力和大地测量学

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周新, 孙文科, 付广裕. 重力卫星GRACE检测出2010年智利 M_w 8.8地震的同震重力变化[J]. 地球物理学报, 2011, V54(7): 1745-1749, DOI: 10.3969/j.issn.0001-5733.2011.07.007

ZHOU Xin, SUN Wen-Ke, FU Guang-Yu. Gravity satellite GRACE detects coseismic gravity changes caused by 2010 Chile M_w 8.8 earthquake. Chinese J. Geophys. (in Chinese), 2011, V54(7): 1745-1749, DOI: 10.3969/j.issn.0001-5733.2011.07.007

重力卫星GRACE检测出2010年智利 M_w 8.8地震的同震重力变化

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Gravity satellite GRACE detects coseismic gravity changes caused by 2010 Chile M_w 8.8 earthquake

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摘要

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摘要 本研究通过对重力卫星GRACE观测数据的处理,采用去相关加300 km半径的高斯平滑,成功地提取了2010智利 M_w 8.8地震所产生的重力变化信号,最大变化幅度达到7 μ Gal,并且与位错理论计算结果具有较好的一致性.这是继GRACE检测出2004苏门答腊 $M9.3$ 地震重力变化后的又一个卫星观测地震的例证,说明GRACE具有检测出 $M<9.0$ 量级地震的能力,为利用GRACE研究地震以及其更广泛的应用提供了可靠的依据.

关键词: GRACE 同震重力变化 智利地震 位错理论

Abstract: The study successfully processed GRACE data using de-correlation and 300km radius Gaussian smoothing and extracted the coseismic gravity changes caused by the 2010 Chile M_w 8.8 earthquake. The peak to peak amplitude is 7 μ Gal for gravity and the results agree well with that calculated using a dislocation theory for a spherical earth model. It is a new illustration of GRACE in detecting coseismic signals since it successfully detected the coseismic gravity changes caused by the 2004 Sumatra $M9.3$ earthquake. The result reported in this paper implies that GRACE is capable of detecting a coseismic signal caused by a magnitude $M<9.0$ earthquake, and it is expected a wide application in studying seismic mechanism and other geophysical investigations.

Keywords: GRACE Coseismic gravity changes Chile earthquake Dislocation theory

Received 2010-10-14;

Fund:

中国科学院“千人计划”专项经费资助.

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