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论文

我国海域大地水准面的计算及其与大陆大地水准面拼接的研究和实施

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摘要: 研究和实施了由卫星测高数据计算垂线偏差, 用莫洛 金斯基 (Molodensky) 公式反演 大地水准面高, 由此求得我国海域大地水准面高. 为了检核, 将测高垂线偏差利用逆维宁迈 纳斯 (Vening Meinesz) 公式反演重力异常, 与海上船测重力值进行了外部检核; 同时还用 司托克斯 (Stokes) 公式, 将上述反演的重力异常计算大地水准面高, 与莫洛金斯基公式直接解得的相应结果进行比较作为内部检核. 在积分计算中充分应用了FFT的严格公式. 由重力和GPS水准数据确定的陆地大地水准面, 和主要由卫星测高数据确定的海洋大地水准面, 二者之间一般都存在以系统误差为主的拼接差, 本文分析了产生这一现象的主要原因, 并结合我国在陆海大地水准面拼接区重力资料稀疏的实际, 提出了新的拼接技术, 最后将拟合参数校正中国全部海域的重力大地水准面, 以最大限度地削弱拼接点和制约测高海洋大地水准面可能存在的系统误差.

关键词: 大地水准面 海洋 大陆 卫星测高 重力

GEOID DETERMINATION ON CHINA SEA AND ITS MERGE WITH THE GEOID IN CHINA MAINLAND

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Abstract: Geoid determination on the China

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Sea is conducted by calculating deflection of the verticals obtained from satellite altimeter data, inversely solving Molodensky formula. In order to examine the accuracy of the geoid two measures have been applied. Firstly the gravity anomalies are computed by using the same data set of the deflection of the verticals with the inverse Vening Meinesz formula.

Then the obtained gravity anomalies are compared with the real measured gravity data on the sea for external examine. Secondly the geoid on the China Sea is also computed on the basis of the gravity anomalies and Stokes formula. The comparison of the two geoids is internal examine. The mean square errors of the external and internal examines are  $\pm 9\text{mGal}$  and  $\pm 0.025\text{m}$ , respectively. Geoid on the land is determined by gravity and GPS leveling data, and geoid on the sea is determined mainly by altimeter data. If the two geoids are merged together, then the difference, mainly systematic error, between the two kinds geoid can be usually found. This phenomenon and its main causes are discussed and the so called extended merge technique is suggested in the paper, especially this technique is suitable to those coastal and shallow sea areas with sparse gravity data. The results of the computation with this technique demonstrate that the systematic error has been reduced well in the merge between the geoids of China mainland and China Sea.

Keywords: Geoid Ocean Mainland Satellite altimeter Gravity.

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