

## 联合卫星测高和模式资料研究海水热含量变化

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## Inferring ocean heat content variations from satellite altimetry and model data

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摘要

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**摘要** 本文在考虑洋底压力变化的情况下,利用2003~2008年融合多颗卫星的测高资料估计了全球和中国近海的海水热含量变化.顾及洋底压力(OBP)变化以及热膨胀系数随海水深度变化的影响,提出的改进方法提高了对中高纬度地区热含量变化的估算精度.在OBP变化较为明显的北太平洋区域I(30°N~50°N,170°E~190°E)、南印度洋区域II(40°S~60°S,100°E~120°E)和南太平洋区域III(40°S~60°S,100°W~120°W),改进方法的均方差较传统方法分别降低了16.3%、60.5%和48.4%.同时研究表明,卫星测高的精度以及盐度变化是影响中高纬度地区热含量估计精度的重要因素.在中国近海地区,东海和黄海的热含量主要表现为周年变化;南海区域的热含量除周年变化外,还存在半年项和年际变化项,且南海的海水热含量近年有增加的趋势.

**关键词:** 卫星测高 洋底压力变化 海水热含量 热容海平面 热膨胀系数

**Abstract:** Considering ocean bottom pressure change, we estimate the heat content variations of the global ocean and the China Sea by using merged altimetric data from 2003 to 2008. The improved method includes the effect of ocean bottom pressure (OBP) variations and the effect of thermal expansion coefficient variations with ocean water's depth. The estimation accuracy of ocean heat content variation is improved in mid and high latitude areas. In North Pacific Region I (30°N~50°N,170°E~190°E), South Indian Region II (40°S~60°S,100°E~120°E) and South Pacific Region III (40°S~60°S,100°W~120°W) where OBP changes significantly, the root mean squares of the improved method reduce by 16.3%,60.5%, and 48.4%. The study also indicates that the accuracy of satellite altimetry and the effect of salinity are the main factors which affect heat content estimation accuracy in mid and high latitude areas. Ocean heat content mainly changes annually in the East China Sea and the Yellow Sea. Besides the annual variation, semiannual and interannual variations exist in the South China Sea. There exists an increasing tendency of heat content in the South China Sea.

**Keywords:** Satellite altimetry Ocean bottom pressure change Ocean heat content Thermosteric sea level Coefficient of thermal expansion

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