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南海 18°N 断面 上的体积和热盐输运

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- 摘要
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摘要 以2005—2008年4年中南海北部开放航次所获得的水文观测资料为基础，结合卫星高度计遥感资料，采用动力计算方法计算南海18°N断面的经向地转流，并与声学多普勒流速剖面仪(AcousticDopplerCurrentProfilers, ADCP)走航观测资料进行对比，进而计算出通过南海18°N断面1000m以浅的各站位以及断面上总的经向地转体积、热、盐输运量。结果表明，2005—2008年南海北部开放航次期间18°N断面上的经向地转流呈相间带状分布，各站位经向地转流流速垂向分布和ADCP观测的大体一致。从卫星高度计获得的海面高度场可知，经向地转流流向的空间变化与海洋中尺度涡旋的活动密切相关。2005—2007年航次期间南海18°N断面上1000m以浅总的经向地转体积、热、盐输运均为南向输运，其3年的平均输运量分别为-11. 8Sv(1Sv=$10^6 m^3 \cdot s^{-1}$)、-0. 38PW、-418. 8Gg·s^{-1}; 其年际间差别较大，经向地转体积、热、盐输运量均为2005年最大，2006年次之，2007年最小。2008年110°—117°E之间1000m以浅总的海水地转体积、热、盐输运量分别为-7. 3Sv、-0. 22PW、-259. 4Gg·s^{-1}。

关键词： 18°N断面 南海 体积输运 热输运 盐输运

Abstract: Thermal wind relation is applied to compute the upper 1000-m layer meridional geostrophic velocity across the 18° section in the South China Sea (SCS), based on the hydrographic data collected during the open cruises of northern SCS from 2005 to 2008 and merged altimetry data. The geostrophic velocity is compared with the Acoustic Doppler Current Profilers (ADCP) observations, and the upper 1000-m layer geostrophic volume, heat and salt transports across the 18° section in the SCS are estimated. The results indicate that the meridional geostrophic velocities display belt distribution along the section during the cruises . The estimated geostrophic velocities are in good agreement with the ADCP data except at few stations. Sea surface height distribution derived from altimeter data shows that the distribution of meridional geostrophic velocities is closely related with mesoscale eddies. T he total geostrophic volume, heat and salt transports of 2005 - 2007 in the upper 1000 m are all southward across 18°, and the three-year-averaged values are - 11.8 Sv, - 0.38 PW, and - 418.8 Gg° $^{-1}$, respectively. However, the transport varies greatly from year to year. The volume, heat and salt transports of 2005 were the largest, while those of 2007 were the smallest. The geostrophic volume, heat and salt transports of 2008 from 110° to 117° are - 7.3 Sv, - 0.22 PW, and - 259.4 Gg° $^{-1}$, respectively.

Keywords: 18°, section, South China Sea, volume transport, heat transport, salt transport

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