

LASG耦合气候系统模式FGCM-1.0

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摘要 本文描述了中国科学院大气物理研究所大气科学和地球流体力学数值模拟国家重点实验室(LASG)最新发展的一个耦合气候系统模式的基本性能. 该模式是在LASG灵活的全球耦合气候系统模式(英文缩写为FGCM)的初始版本FGCM-0的基础上发展而来的,是该系列耦合模式的第二个版本,即FGCM-1.0. FGCM-1.0通过一个通量耦合器将大气、海洋和海冰三个分量模式耦合在一起,其中海洋分量模式是LASG发展的一个涡相容分辨率(eddy-permitting)全球海洋环流模式,大气和海冰分量模式则为美国国家大气研究中心(NCAR)的大气环流模式CAM2和海冰模式CSIM4. 耦合模式完整地考虑了海气界面上的动量、热量和淡水通量交换,尽管在模式中没有使用任何形式的人为的通量调整或者通量距平方案,模式还是比较合理地模拟出基本的气候形态. 通过对该耦合模式长期积分结果的进一步分析发现,模式能够比较好地模拟出厄尔尼诺-南方涛动(ENSO)以及印度洋偶极子事件的基本特征;与FGCM系列耦合模式的最初版本FGCM-0相比,FGCM-1.0模拟的北赤道逆流(NECC)和ENSO循环更加真实.

关键词 [气候系统模式,海洋模式,厄尔尼诺-南方涛动\(ENSO\)](#)

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LASG coupled climate system model FGCM-1.0

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Abstract The latest version of a coupled climate system model developed at the State Key Laboratory of Numerical Modeling for Atmospheric Sciences and Geophysical Fluid Dynamics (LAGS) and its basic performance are described in this study. The coupled model is configured based on the initial version of LASG flexible coupled GCM (FGCM-0), and it is the second version of FGCM and named as FGCM-1.0. FGCM-1.0 includes three component models—atmosphere, ocean and sea ice models coupled together with the NCAR flux coupler, in which the oceanic component model of FGCM-1.0 is a global eddy-permitting oceanic general circulation model developed at LASG, and both the atmospheric and sea ice models are the NCAR atmosphere model CAM2 and CISM4, respectively. Momentum, heat and fresh water fluxes are exchanged at the air-sea interface in the coupled model, although there is not any artificial flux correction or flux anomaly coupling scheme used in the coupled model, the model reproduces basic climatological state. Further analysis based on a long term integration of the coupled model suggest that it can simulate basic behavior of El Nino Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD); compared with the initial version of FGCM (FGCM-0), FGCM-1.0 simulate a more realistic North Equatorial Counter Current (NECC) and ENSO cycle.

Key words [Climate system model](#) [Ocean model](#) [El Nino-Southern Oscillation \(ENSO\)](#)

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