



A two-equilibrium theory for the Antarctic Circumpolar Current(ACC) and its associated meridional circulation

Yaokun Li (1,2) and Jiping Chao (3,4)

(1) State Key Laboratory of Numerical Modeling for Atmospheric Sciences and Geophysical Fluid Dynamics, Institute of Atmospheric Physics, Chinese Academy of Sciences, (2) Graduate University of the Chinese Academy of Sciences, (3) National Marine Environmental Forecasting Center, (4) The First Institute of Oceanography, State Oceanic Administration

The Antarctic Circumpolar Current(ACC) and its associated meridional circulation is investigated through using nonlinear inertia theory. The model consists of two layers—an upper mixture layer(Ekman layer) mainly driven by sea surface wind stress and a lower thermocline controlled by ideal fluid nonlinear equations which can be solved by identifying the form of universal functions. The results show that the thermocline exists a two-equilibrium solution though the same Ekman layer condition is given beyond it. Compared to the first equilibrium, the second one has a heavy intensity and deeper circulation which seems to close to the existing data.