

MASTER OF SCIENCE IN PHYSICAL OCEANOGRAPHY

DIAGNOSTIC INITIALIZATION GENERATED EXTREMELY STRONG THERMOHALINE SOURCES AND SINKS IN THE SOUTH CHINA SEA

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Ocean modeling is usually constrained by the lack of observed velocity data for the initial condition. The diagnostic initialization is widely used to generate velocity data as initial condition for ocean modeling. It integrates the model from known temperature (T_c), salinity (S_c), and zero velocity fields and holds (T_c , S_c) unchanged. After a period of the diagnostic run, the velocity field (V_c) is established, and (T_c , S_c , V_c) fields are treated as the initial conditions for the numerical modeling. During the diagnostic initialization period, the heat and salt “source/sink” terms are generated at each time step. In this thesis, the Princeton Ocean Model implemented to the South China Sea demonstrated extremely strong thermohaline sources and sinks generated by the diagnostic initialization. Such extremely strong and spatially non-uniform initial heating/cooling (salting/freshening) rates in the ocean model may cause drastic change in thermohaline and velocity fields initially (after the diagnostic run). There is a need to overcome such problems or find alternative methods as diagnostic initialization is extensively used.

KEYWORDS: Ocean Modeling, Diagnostic Initialization, Thermohaline, POM, LEVITUS, SCS

