

Ocean Model Initialization Using the P-Vector Method

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An initialization process can produce balanced initial conditions that do not excite inertial-gravity oscillations in a model integration. In this paper, I will present the recently developed P-vector method (Chu, 1995; Chu et al., 1998a,b) for initializing 3-D ocean velocity field from initial temperature and salinity data with geostrophic and hydrostatic balance. This method can be applied to any ocean numerical model: z-coordinate, sigma-coordinate, or isopycnal coordinate models. Here, I use the initialization of the South China Sea isopycnal surface circulation from Navy's Monthly GDEM T, S data as an example for illustration (Chu, 2000; Chu and Li, 2000). The representative pattern is a persistent basin-scale cyclonic circulation away from the surface, and a seasonally varying circulation with a weak anticyclonic gyre in the summer and a strong cyclonic gyre in the winter near the surface. This pattern is consistent with a classic view of mean cyclonic circulation in large stratified lakes and semi-enclosed marginal seas by Emery and Csanady and with a recent numerical simulation using the Navy's Layered Ocean Model (NLOM) by Metzger and Hurlburt. The difference of circulations between z-level and isopycnal level will also be discussed.

Reference

- Chu, P.C., "P-vector method for determining absolute velocity from hydrographic data," *Journal of Marine Technological Society*, 29 (2), 3-14, 1995.
- Chu, P.C., C.W. Fan, C.J. Lozano, and J. Kerling, "An airborne expandable bathythermograph (AXBT) survey of the South China Sea, May 1995," *Journal of Geophysical Research*, 103, 21637-21652, 1998a.
- Chu, P.C., C.W. Fan, and W.J. Cai, "Evaluation of P vector method using modular ocean model (MOM)," *Journal of Oceanography*, 54, 185-198, 1998b.
- Chu, P.C., and R.F. Li, 2000: South China Sea isopycnal surface circulations. *Journal of Physical Oceanography*, in press.
- Chu, P.C., 2000: P-vector spirals and determination of absolute velocities. *Journal of Oceanography*, in press.

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