Wind Forcing



Kallberg et al. 1995 (ERA-40 reanalysis)

Ocean Currents

Time-averaged (16-year) ocean circulation

Ekman Pumping (m/y)

Tuesday, March 12, 13

Floating marine debris surface drift: Convergence and accumulation toward the South Pacific subtropical gyre

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Fig. 2. FMD spatial distribution averaged on a 1° resolution grid. (a) Initial time, (b) after 1 year, (c) after 2 years, (d) after 4 years, (e) after 6 years and (f) after 8 years. On (a) is plotted the box corresponding to the convergence zone ([150°E; 70°W] & [20°S; 40°S]). It is divided (dashed line) in two regions: its western part ([150°E; 140°W] & [20°S; 40°S]), and its eastern part ([140°W; 70°W] & [20°S; 40°S], i.e. the accumulation area).

Time(1):"22-Aug-2001" Time(2):"22-Aug-2001

s of Absolute Dynamic Topography Merged (cm) from madt cer_abs h merged(1) - Maps of Sea Level Anomalies Merged (cm) from msia cer h mer

Sverdrup Flow: $\beta \overline{v} = (\nabla_h \times \boldsymbol{\tau}^w) \cdot \hat{k}$

$$\nabla_h \times \boldsymbol{\tau}^w > 0 \longrightarrow \overline{v} > 0$$

counter-clockwise circulation

$$\begin{vmatrix} \nabla_h \times \boldsymbol{\tau}^w < 0 \longrightarrow \overline{v} < 0 \\ \text{clockwise circulation} \end{vmatrix}$$

Subpolar gyre

Subtropical gyre

Journal of Marine Research, 69, 417-434, 2011

The decadal mean ocean circulation and Sverdrup balance

by Carl Wunsch¹

Sverdrup balance holds (< 20% error) over at least 40% of the ocean