

# The meridional oceanic transport of heat and nutrients in the South Atlantic

J. HOLFORT and G. SIEDLER

## ABSTRACT

The meridional transports of mass, heat and nutrients across zonal WOCE and pre-WOCE sections in the South Atlantic are calculated using an inverse model. Direct current measurements from a mooring array at about 28°S are used to estimate the Brazil Current transport ( $\sim 10 \times 10^6 \text{ m}^3 \text{ s}^{-1}$ ) and the Antarctic Bottom Water transport through the Vema Channel ( $\sim 5 \times 10^6 \text{ m}^3 \text{ s}^{-1}$ ). These values are used as constraints in the inverse model. Further constraints are salt and silica conservation, a prescribed southward salt flux of  $27.6 \times 10^6 \text{ kg s}^{-1}$  and a net southward transport of phosphate of 2 to 4  $\text{kmol s}^{-1}$ . Errors in the transports are dominated by uncertainties in the wind stress and temporal variability. At 30°S the meridional mass or freshwater transport is  $0.53 \text{ Tg s}^{-1}$  southward and the heat transport is 0.28 PW northward, oxygen and nitrate are transported southward, while the silica transport is to the north. The mass compensation of the southward flowing North Atlantic Deep Water occurs to a greater extent in the warm surface waters ( $9 \text{ Tg s}^{-1}$ ) than in the Antarctic Intermediate Water ( $6 \text{ Tg Tg s}^{-1}$ ).