To estimate the size of the meridional overturning circulation and the meridional heat, freshwater and Mov salt transports in the South Atlantic, we made a new transatlantic hydrographic section along 24°S in 2009 and we compare the resulting transports with those estimated for a historical section made in 1983. For the two sections, the overturning is estimated to be 21.5 Sv (2009) or 16.5 Sv (1983), the heat transport is northward at 0.7 PW (2009) or 0.4 PW (1983), and the freshwater transport is small but northward at 0.04 Sv (2009) or 0.17 Sv (1983). The differences in transports are primarily due to the different strengths of the southward Brazil Current transport during the occupation of the sections, 4.9 Sv (2009) or 12.2 Sv (1983). The Mov salinity transport is estimated by two different methods for each of the two sections and is always southward ranging from -0.09 Sv to -0.34 Sv which means that the Atlantic meridional overturning circulation transports freshwater southward at 24°S. On the basis of theoretical studies, such southward Mov salinity transport at the southern boundary of the Atlantic Ocean implies that the Atlantic overturning circulation is in a state of multiple equilibrium.