



Florida Strait and Yucatan Channel transports during 2001-2006 from shipboard ADCP

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The transports through the Yucatan Channel and Florida Strait are compared by analyzing data collected in the Caribbean Seas between May 2001 and May 2006. This data set arises from the Royal Caribbean Cruise Ship Explorer of the Seas, equipped with two hull mounted Acoustic Doppler Current Profilers (ADCPs), which collect underway velocity to depths of 1200 m. From 163 sections, the mean transport of the Florida Current at 26°N is estimated to be 31.1 ± 4.3 Sv. Adding the NW Providence Channel transport which is currently estimated to be about 1.2 ± 2 Sv, this compares very well with the transport of 32.4 ± 3.2 Sv from cable measurements at 27°N during the same period.

For the Yucatan Channel, ADCP tracks are not directly across the Channel, but vary in incidence angle and miss some flow at the coasts and at depth, hence transport is more difficult to estimate. Therefore, a numerical simulation is used to estimate the errors caused by these biases. We have chosen HYCOM 1/12° with data assimilation from the Navy Coupled Ocean Data Assimilation (NCODA). The resolution in our domain is 8 km. Preliminary results show the transport through the Yucatan Channel is 30.3 ± 8.8 Sv, from 81 crossings. Of this estimate 30.8 Sv is from direct measurements, with a "correction" of only 0.5 Sv given by the (simulated) missing flows. Hence, contrary to former experiments, no discrepancy is found between the Florida and Yucatan transports and no missing flow need be found in minor passages. The variability of the Yucatan current is far greater than that of the Florida Current and the reason is still under investigation. A complete transport budget, including NW Providence and Old Bahama Channels is ongoing.