



Circulation, heat and volume transport at 36°N in the Atlantic

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In spring 2005 a hydrographic section along the line of latitude 36°N in the Atlantic was occupied. The cruise objectives were to determine the transport and storage of heat, nutrients and anthropogenic carbon in the sub-tropical north Atlantic. Here we explain the water masses encountered across the section. We also describe the overturning transport, heat and freshwater transports.

By constructing an inverse model of the velocity field we derive our preferred transport field from our measurements and appropriate constraints from previous investigations of the circulation in the region. For this solution, we conclude that the overturning transport at 36°N is 18 ± 2 Sv, at 1200m. The total heat transport across the section 1.2 ± 0.1 PW, this is partitioned in to an overturning and horizontal heat transport of 0.8 ± 0.1 PW and 0.4 ± 0.01 PW respectively. The freshwater flux across the section is 1.65 ± 0.01 Sv southwards, implying a net input of freshwater north of 36°N of 0.8 Sv. The upper and lower transports uncertainties correspond to the upper and lower limits of the imposed Gulf Stream transport of 88 ± 17 Sv.

Changes in the section transport are considered by comparison of the 2005 section with data from the most recent previous complete occupation of the section in 1981. For a comparable calculation, we see a 20% increase in the strength of the overturning transport.