



## **Circulation of North Atlantic Deep Water from the Labrador Sea to the tropical Atlantic**

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The spreading and dilution of North Atlantic Deep Water (NADW) from the Labrador Sea to the tropical Atlantic at 16°N is investigated using hydrographic and CFC data. Transit time distributions are fitted to propagate the signal of CFC and T/S anomalies from the Labrador Sea downstream and match the repeated observations from the deep western boundary current at 42°N and 16°N. For CFCs, the observational data prior to 1990 are sparse, so a CFC time history for the NADW within the Labrador Sea has to be reconstructed. This is done by calculating transit time distributions for the different NADW layers (Upper Labrador Sea Water (ULSW), Labrador Sea Water (LSW) and Lower North Atlantic Deep Water (LNADW)) based on the observations from the Labrador Sea after 1990. These distributions are then used together with the known atmospheric CFC time history to derive the CFC concentrations in the Labrador Sea before 1990. The greatest CFC and T/S anomalies in the Labrador Sea are due to enhanced LSW formation in the early 1990s. Observational time series show that this water has already passed the 42°N section and is now arriving at 16°N. These features can be well reproduced by transit time distributions. The attenuation of the anomalies at 16°N indicates a dilution of new NADW with older waters.