Geophysical Research Abstracts
Vol. 17, EGU2015-5013, 2015
EGU General Assembly 2015

Increased oceanic heat transport in the main Atlantic inflow branch to the Nordic Seas 1993-2013

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The flow of warm and saline water from the Atlantic Ocean, across the Greenland-Scotland Ridge, into the Nordic Seas - the Atlantic inflow - is split into three separate branches. The most intensive of these branches is the flow between Iceland and Faroes - the IF-inflow - which according to the latest estimates accounts for about half the total volume transport of the Atlantic inflow. The Atlantic inflow transports heat and salt into the Arctic region and is an integral part of the North Atlantic thermohaline circulation, projected to weaken during the 21st century, which might conceivably reduce the oceanic heat transport towards the Arctic. Since the late 1980s, the hydrographic properties of the IF-inflow have been monitored on regular CTD cruises along a section north from the Faroes and ADCPs have been moored on the section since the mid-1990s. From these in situ observations, time series of volume and heat transport have previously been reported, but the high variability of the heat transport has made identification of trends difficult. Here, we present the results from a new analysis of the IF-inflow where the in situ observations have been combined with data from satellite altimetry. The new time series show no indication of reduced volume transport and show a clear trend in heat transport. From 1993 to 2013, the heat transport relative to 0°C of the IF-inflow increased by more than 10%. This increase was mainly caused by increased temperatures of the inflow, which has been attributed to the weakening of the subpolar gyre, but small variations in the volume transport delayed the increase in heat transport so that it mainly occurred between 2003 and 2005.