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# Observations of circulation and transport in the northwestern subpolar North Atlantic

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Labrador Sea and Newfoundland Basin in the northwestern subpolar North Atlantic are a key region for the Atlantic Meridional Overturning Circulation. Warm and salty water is imported from the subtropics and in return cold and fresh water is carried along the continental slope by a system of deep boundary currents and eventually exported to subtropics east of Newfoundland. Here we use hydrographic and current measurements from a total of 14 cruises that were carried out between 2003 and 2018. The data set comprises about 600 stations along a line that first follows approximately 47°N from Flemish Cap off the Grand Banks of Newfoundland to the Mid-Atlantic Ridge and from there turns northwestward to the southern tip of Greenland. The major currents that exchange heat and freshwater in this area are the North Atlantic Current (NAC) that flows through a chain of semi-permanent eddies towards the Mid-Atlantic Ridge, the deep Labrador or deep western boundary current (DWBC), and the East Greenland Current (EGC). The results show the mean transports and pathways of the major currents: The DWBC carries cold water along the continental slope of North America and partly recirculates toward the north, the bottom reaching NAC and its recirculation at 47°N as well as the NAC crossing the Mid-Atlantic Ridge. South of Greenland the EGC shows a surface intensified core and a bottom intensified core. Further a strong deep reaching eastward recirculation is located off shore of the EGC. The measurements are used to calculate a mean budget of in- and outflow into the northwestern subploar North Atlantic and to estimate water mass conversion rates.