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Water mass properties and their variability along 53ºN in the North Atlantic

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Hydrographic, dissolved oxygen and silicate data collected in 1962, 2001 and 2002 are examined to analyze interannual and interdecadal variability of water masses at 53ºN in the North Atlantic. Special attention is given to the circulation throughout the Charlie-Gibbs Fracture Zone (CGFZ). Data comparison between 1962 and 2001 shows strong cooling and freshening of water at 1500-2500 m depth due to intensive Labrador Sea Water (LSW) formation in the middle of nineties. Dissolved oxygen and silicate data indicate more intensive southward penetration of the Iceland-Scotland overflow (ISOW) and Denmark Strait overflow water (DSOW). It is also shown stronger Mediterranean Water (MW) contribution to water mass formation in comparison with 1962.

2000 and 2001 data reveal a gradual destruction of the LSW with upper LSW renewal in the Western North Atlantic Basin, while there is no the upper LSW penetration to the Eastern Basin yet. ISOW also becomes colder and fresher in the vicinity of CGFZ. It is shown two relatively weak cores of the ISOW in the Eastern Basin that indicates the circulation of this water throughout Rockoll Trough. Decrease in silicate concentration reveals Antarctic Bottom Water (AAIW) replacement by ISOW. ISOW is characterized by salinity maximum and flows over the northern flank of the North Channel. Our data indicates that the bottom water flowing through the CGFZ is a product of the ISOW, DSOW and LSW mixing. Thus, recirculation and intense mixing of deep water of different origin are observed in this region.