

EGU2020-10620

<https://doi.org/10.5194/egusphere-egu2020-10620>

EGU General Assembly 2020

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## Decadal physical-biogeochemical changes in the Newfoundland and Labrador ecosystem

**Frédéric Cyr**, Olivia Gibb, David Bélanger, Guoqi Han, Gary Maillet, and Pierre Pepin

Fisheries and Oceans Canada, Northwest Atlantic Fisheries Centre, Canada ([frederic.cyr@dfo-mpo.gc.ca](mailto:frederic.cyr@dfo-mpo.gc.ca))

Located on a crossroads of some of the main currents associated to the Atlantic meridional overturning circulation (AMOC), Newfoundland and Labrador (NL) shelves are specially affected by changes in large-scale ocean circulation. Such circulation changes impact not only the regional climate, but also the overall water masses composition, with consequences on physical conditions, nutrient availability, oxygen content, pH, etc. Systematic hydrographic observations of this system have been carried out by Canada and other countries since 1948. The observational program was reinforced in 1999 with the creation of the Atlantic Zone Monitoring Program (AZMP), ensuring enhanced seasonal coverage and new biogeochemical observations. In 2014, this monitoring was augmented with the monitoring of ocean acidification parameters. Here we review historical physical-biogeochemical changes on the NL shelves, with an emphasis on low frequency variability and cycles. Results suggest, for example, that the cold intermediate layer (CIL), a cold mid-depth layer that is a key feature of the NL ecosystem, exhibited profound changes during the last 70 years. In the mid 60's, the CIL was anomalously warm compared to the rest of the time series. This warm period was followed by a cold period centered in the early 90's. Historical salinity records also suggest that fresher waters are found during warmer years, and vice-versa. Nitrate/Phosphate ratios suggest recent changes in water masses composition towards less Arctic waters flowing on the shelves. This is concurrent with a reduction in nutrients concentration on the NL shelves since about 2012, together with changes in the strength of the Labrador Current along the shelf.