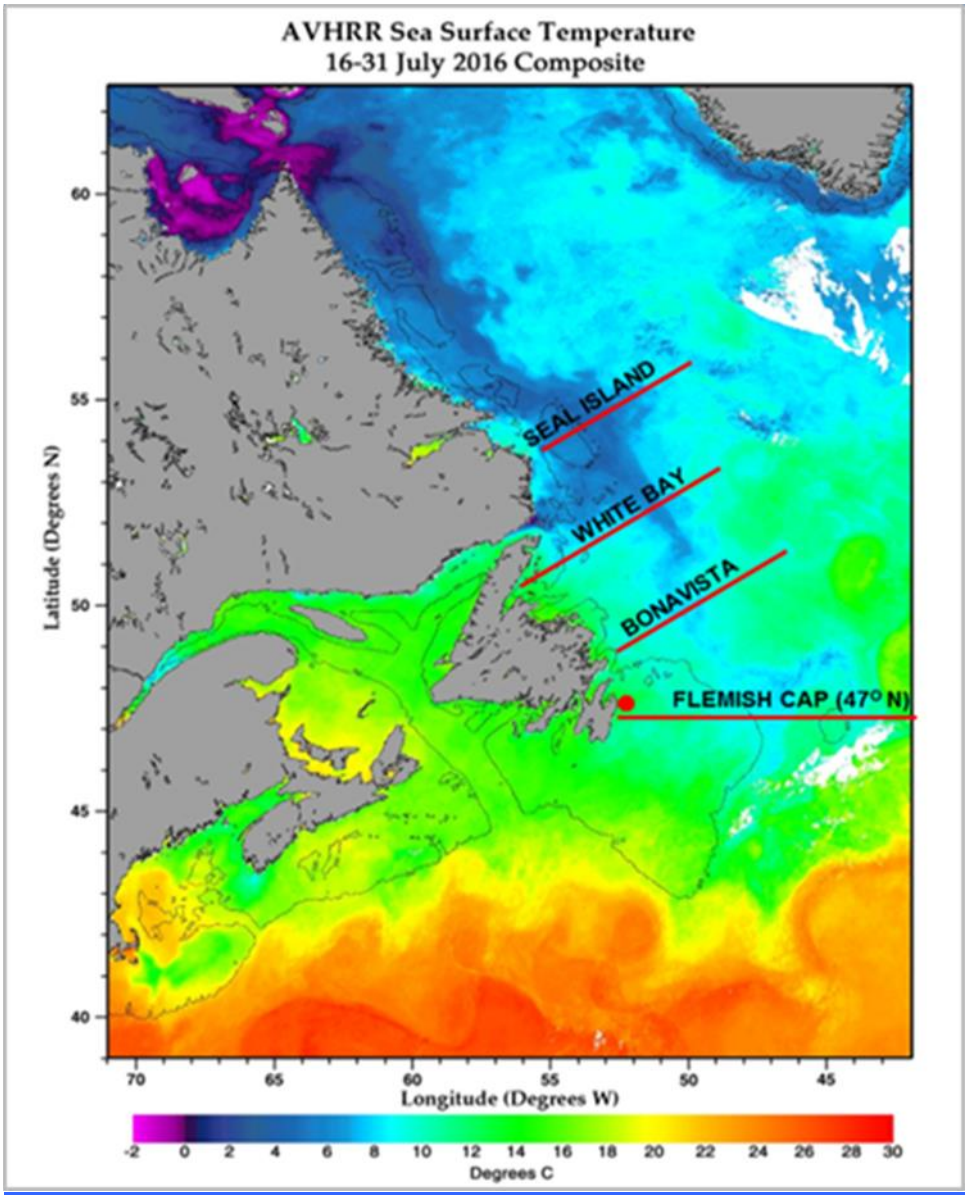
Ocean Climate in S. A. 3

Newfoundland Shelf and Grand Banks

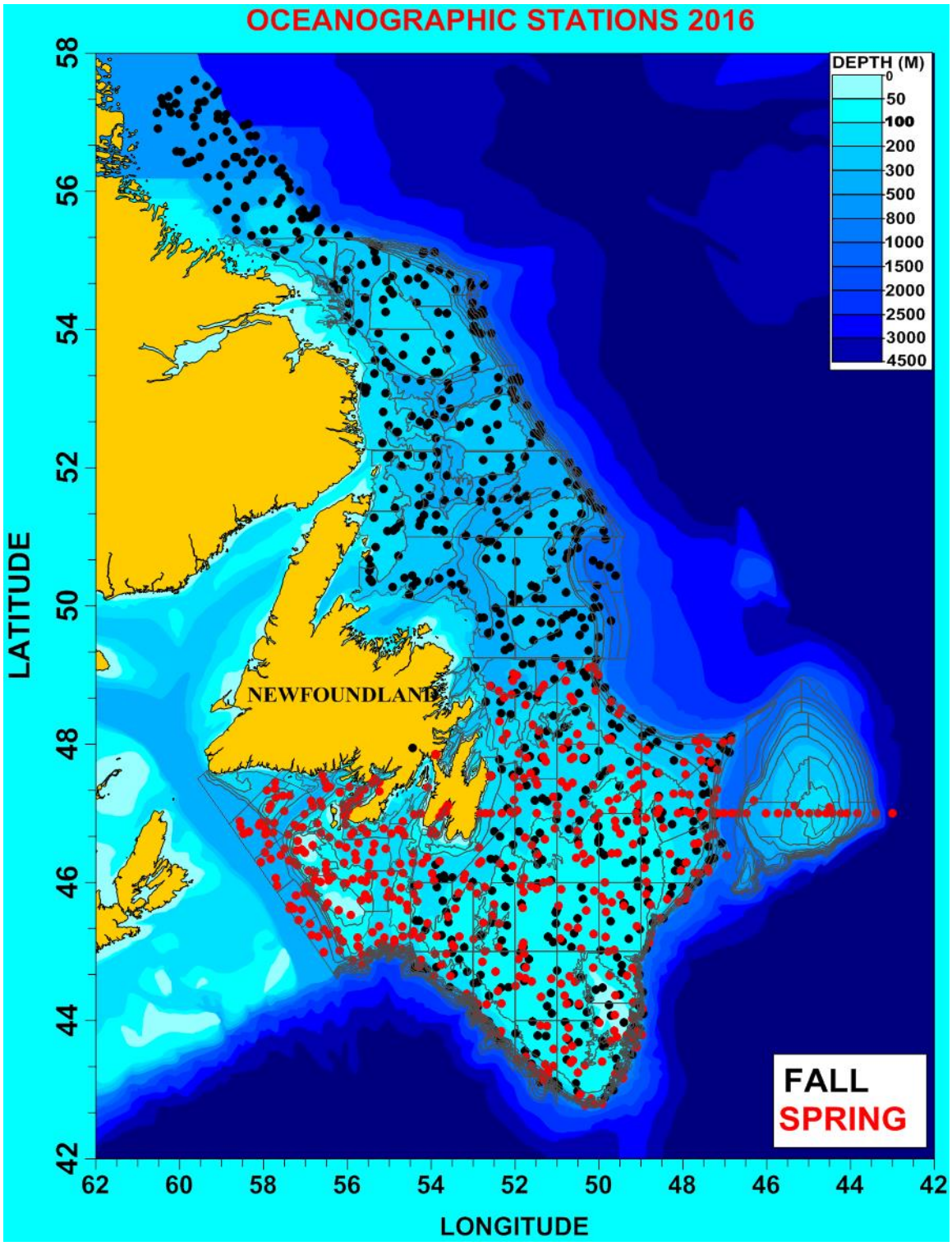
Map of the Labrador and Newfoundland Region

Red lines represent Standard Sections sampled during the summer of 2016 together with and the summer Sea-Surface-Temperature (SST) during July 16-31, 2016 (SST map courtesy of the Marine Ecosystem Section, Bedford Institute of Oceanography, BIO).

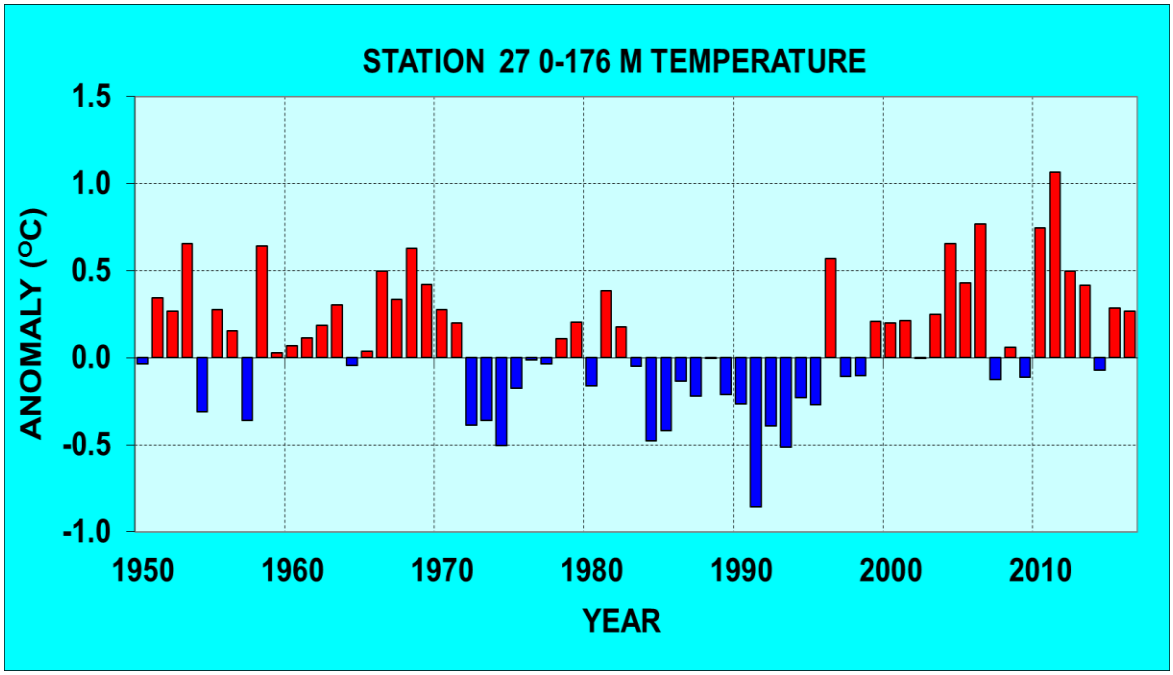
The Location of the AZMP fixed monitoring site Station 27 is also shown as the red dot.



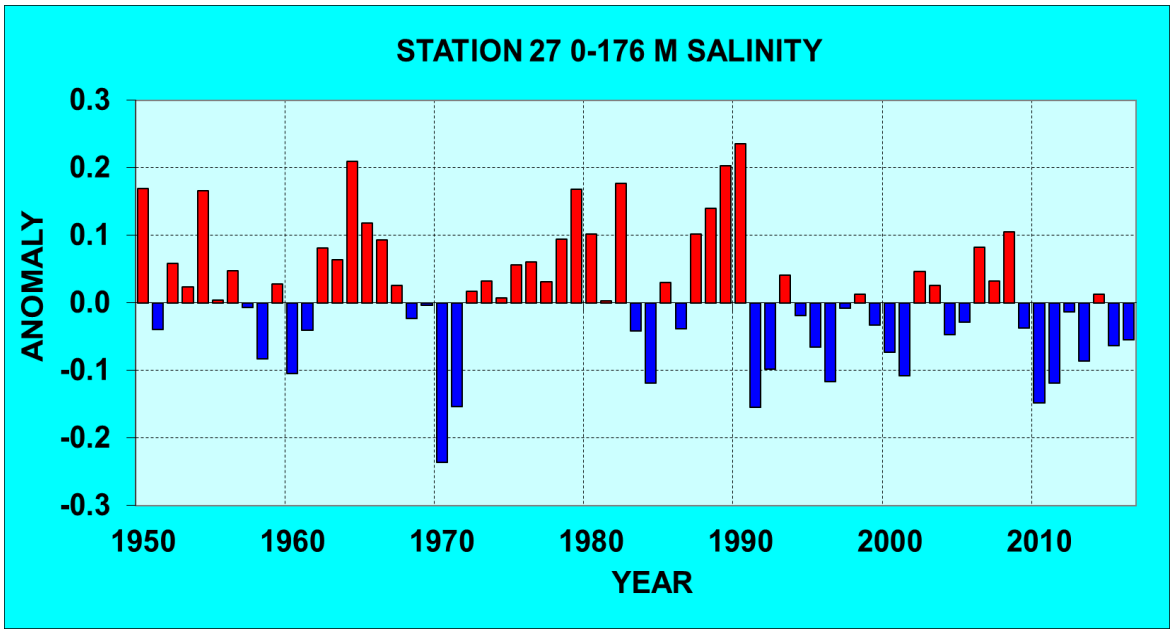
Map showing the positions of trawl-mounted CTD profiles obtained from spring (red dots) and fall (black dots) multi-species assessment surveys during 2016 on the NL Shelf.



The water column (0-176 m) annual averaged temperatures at Station 27 off St. John's NL decreased in recent years from the record high during 2011, but remained above normal in both 2015 and 2016 by about 0.3°C.

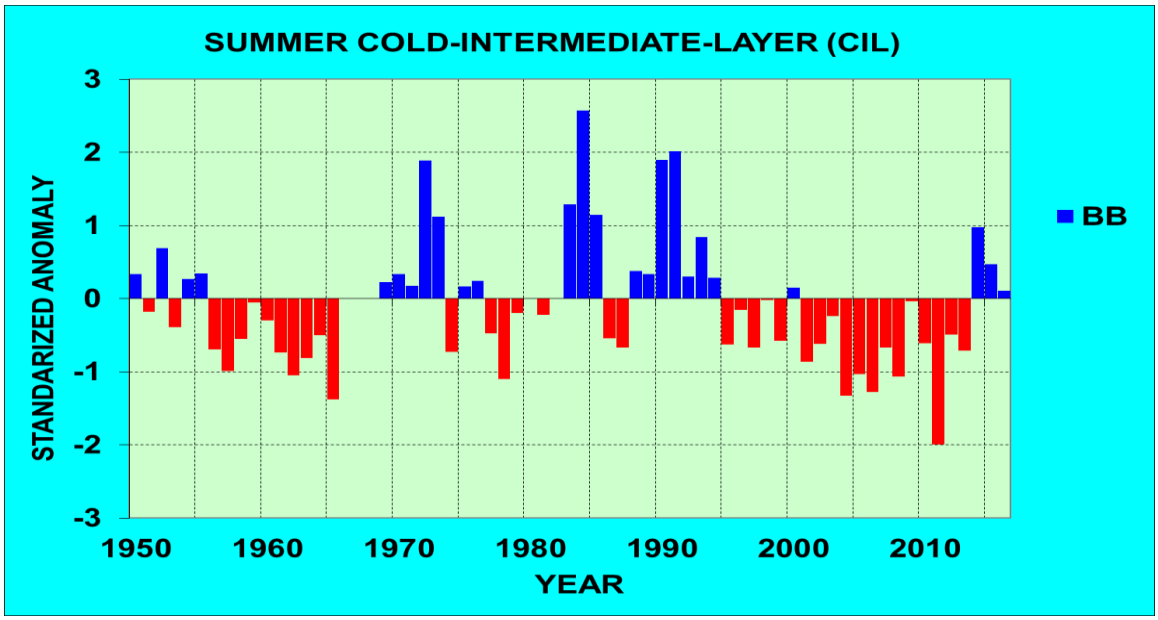


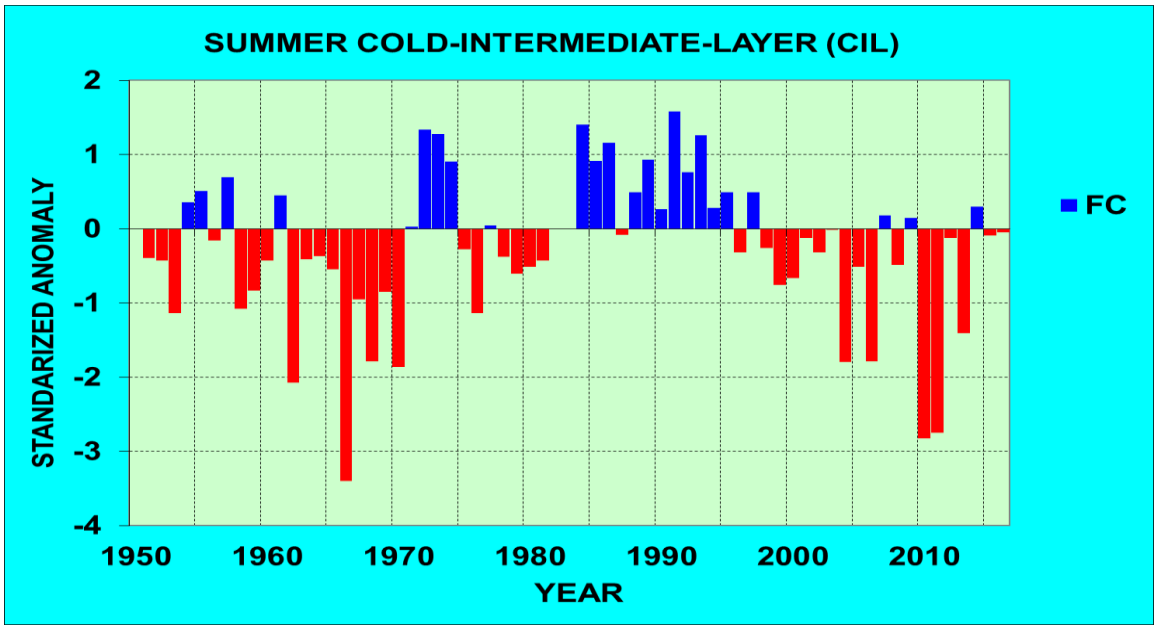
The water column (0-176 m) annual averaged salinities at Station 27 off eastern Newfoundland were either near-normal or below normal during the past 8-years.



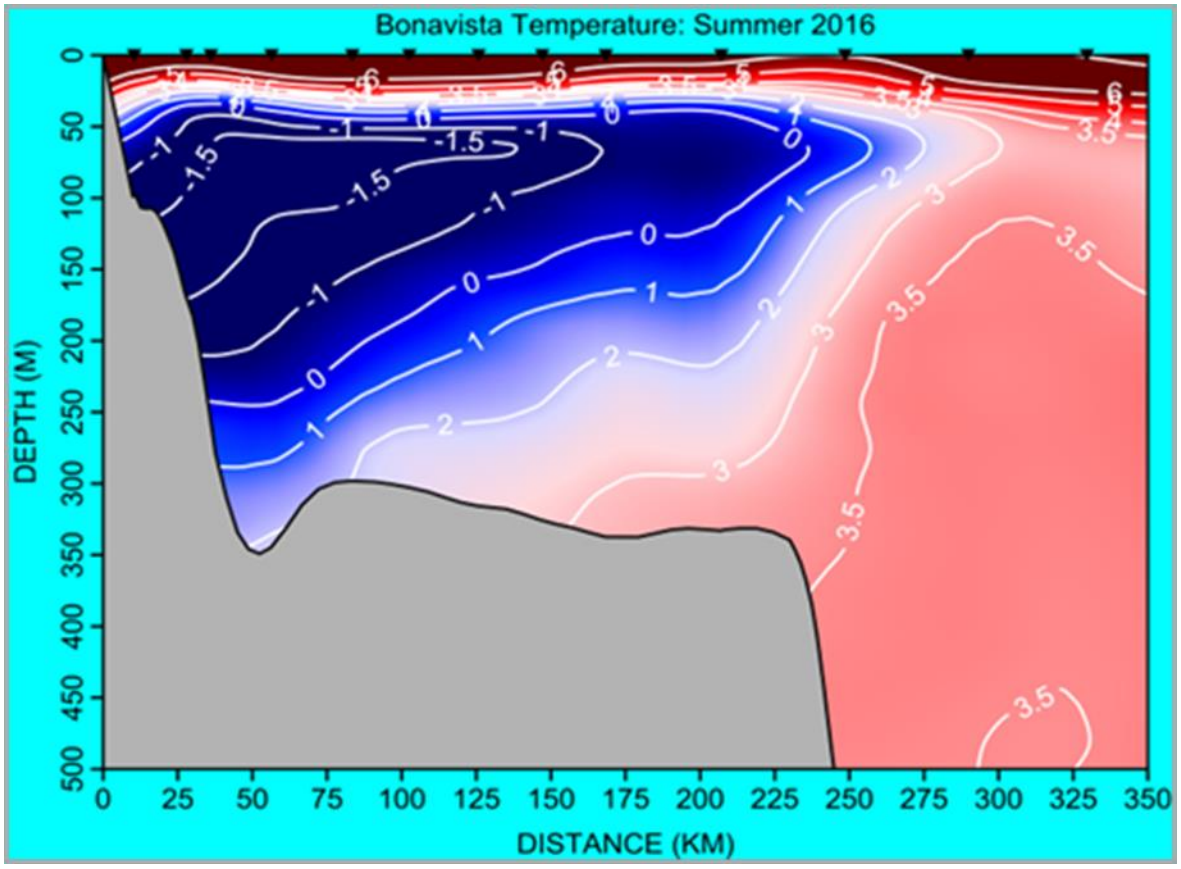
The extent of the cold-intermediate-layer (CIL) of <0°C water the eastern Canadian continental shelf generally corresponds to trends in the NAO, Air Temperatures and Sea-Ice extent.

Summer CIL (water <0°C) cross sectional area during 2011 was among the lowest on record (warmer than normal water column temperatures). It has increased during the past 3-years reaching above the long term mean in 2014 and 2015 and about normal in 2016 off Bonavista (BB). On the Grand Bank (FC 47°N) the summer CIL was near normal in 2015 and 2016.

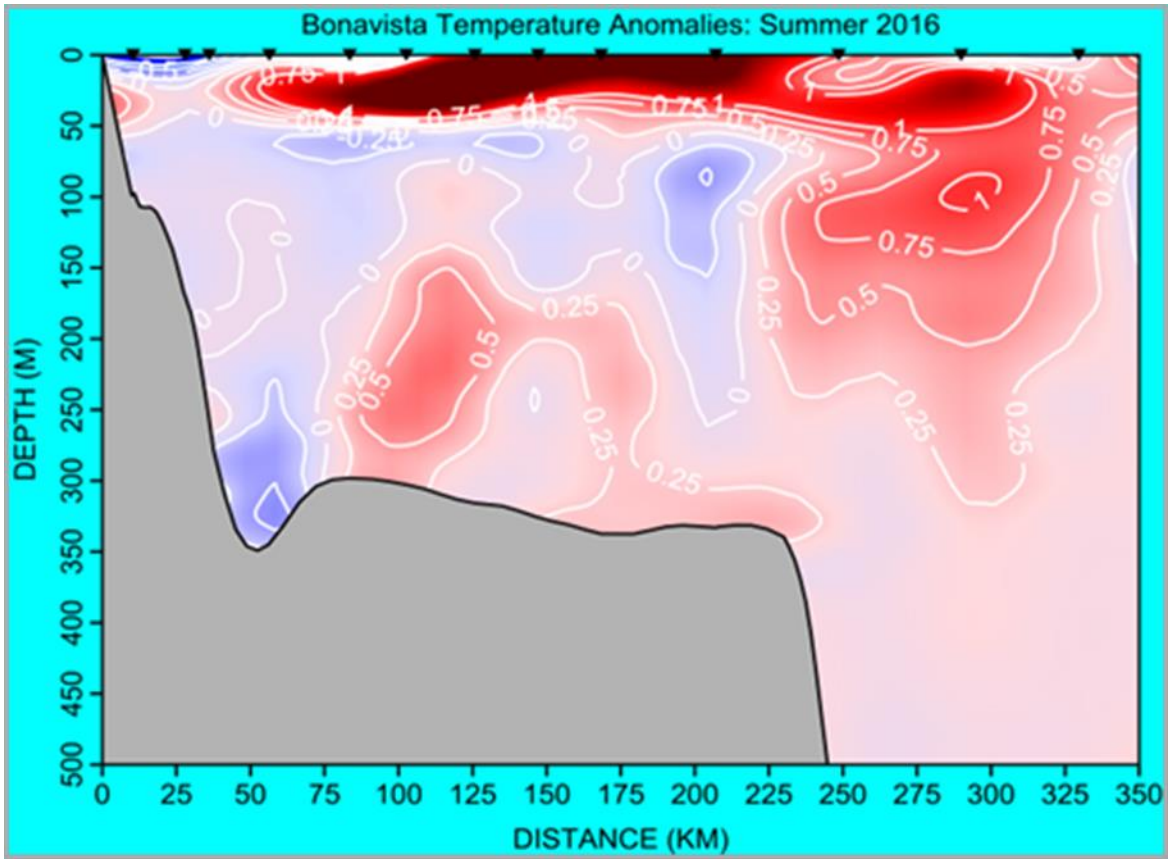




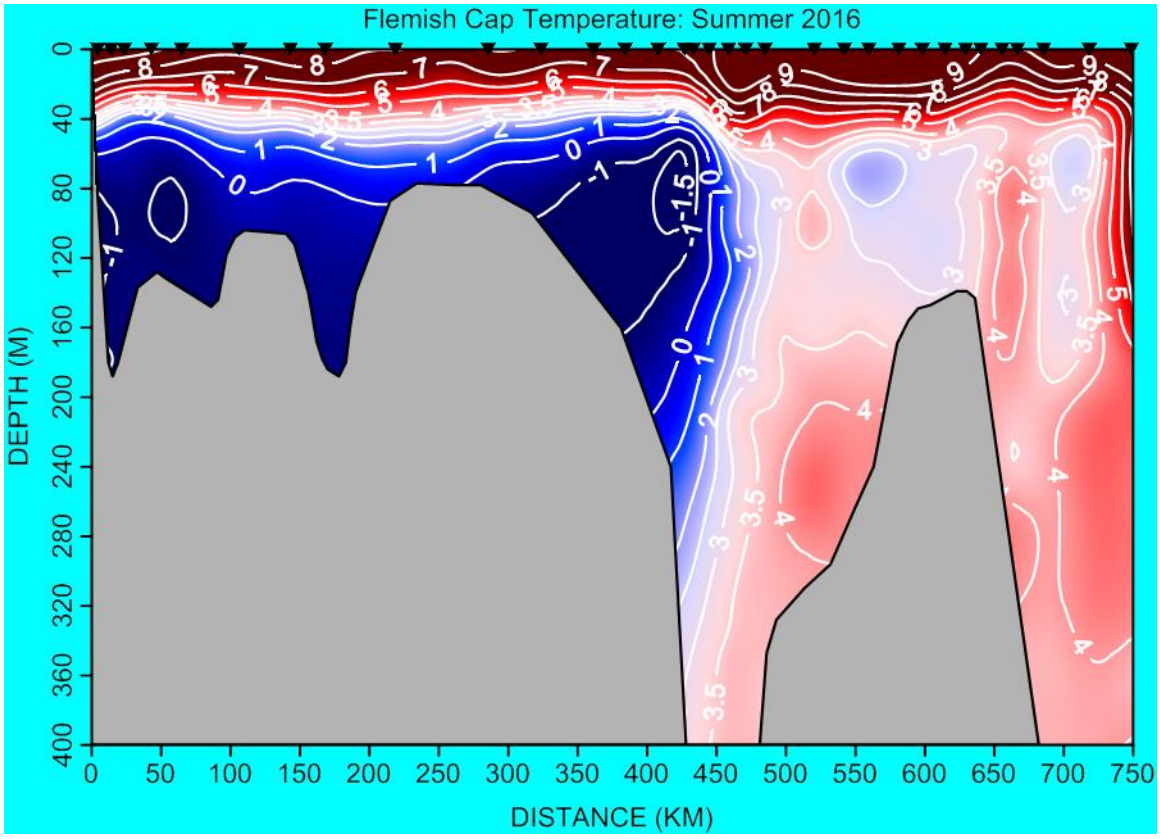
A vertical cross-section of the Temperature structure off Eastern Newfoundland (Bonavista Section) during the summer of 2016. The dominate thermal feature is the cold intermediate layer (CIL) extending over 225 km offshore.



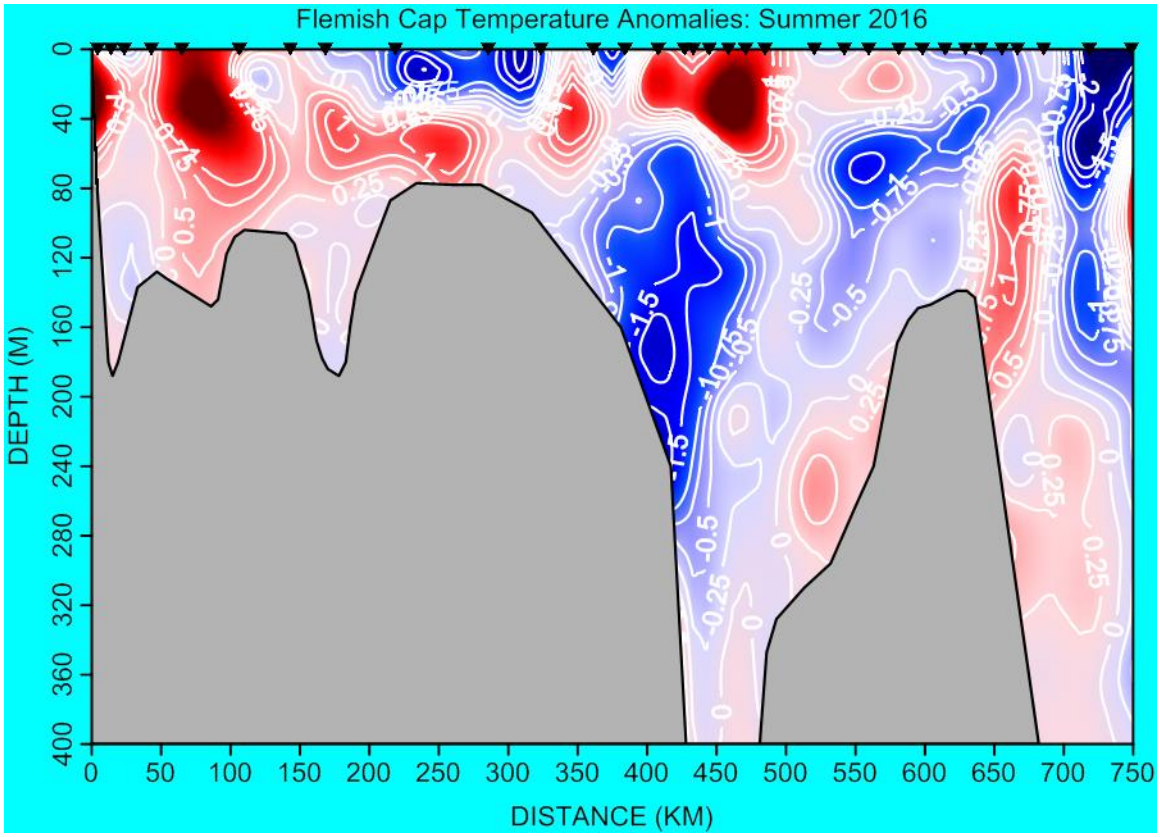
A vertical cross-section of Temperature Anomalies off Eastern Newfoundland (Bonavista Section) during 2016 showing warmer than normal conditions, particularly in the offshore waters. Temperatures in the intermediate waters over the shelf were about normal.



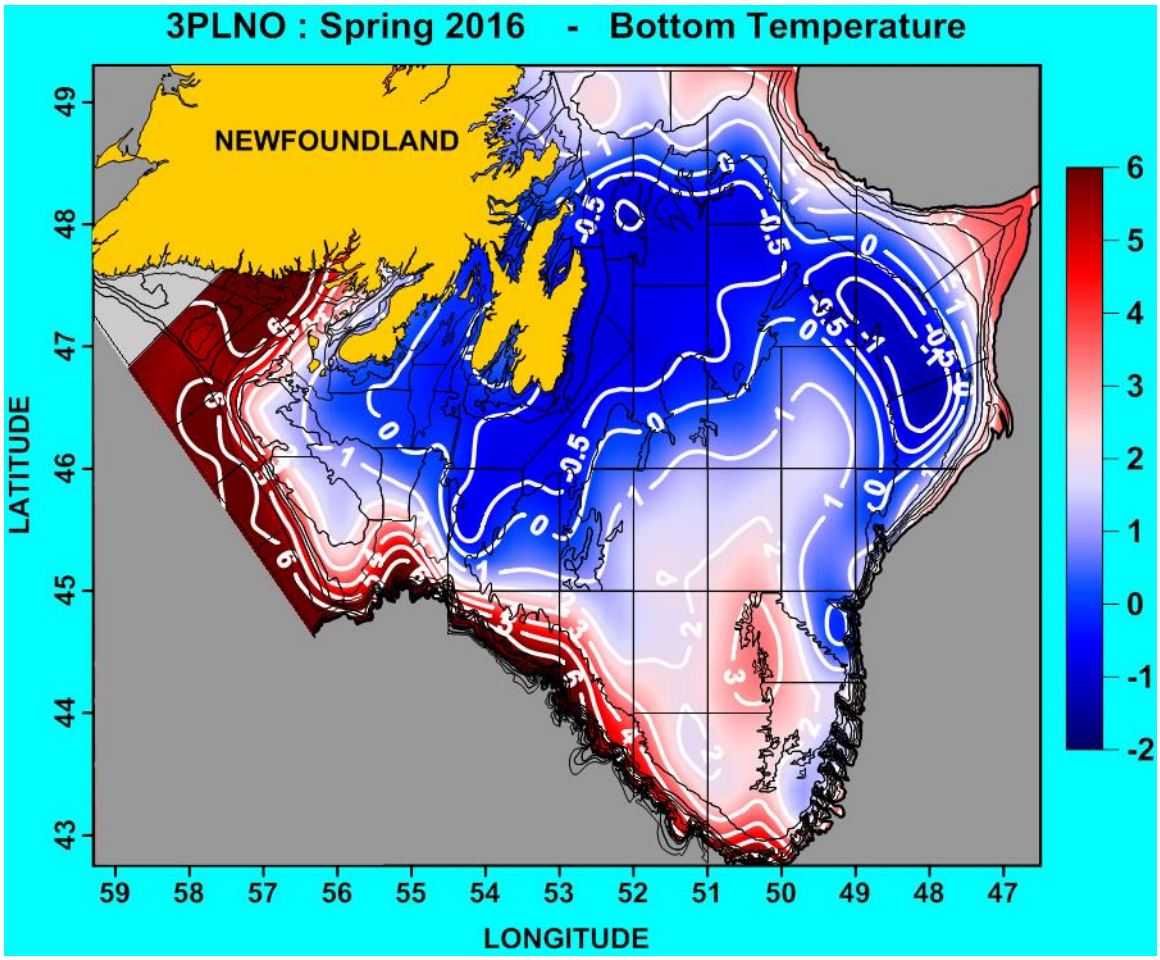
A vertical cross-section of the Temperature across the Grand Banks and Flemish Cap during the summer of 2016 showing the extent of cold water overlying the Grand Bank and to some extent the Flemish Cap.



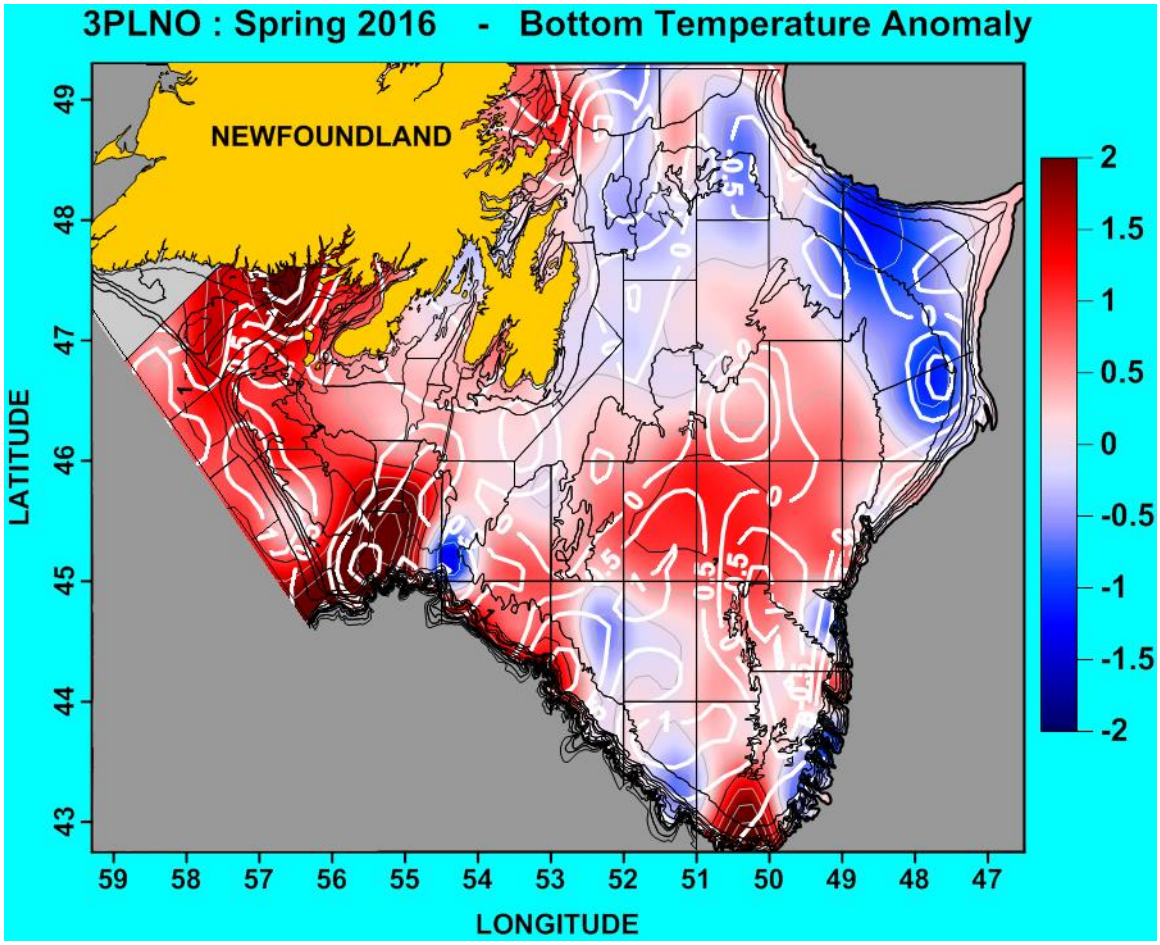
A vertical cross-section of Temperature Anomalies across the Grand Banks and Flemish Cap during the summer of 2016 showing colder than normal conditions in the offshore areas and warmer than normal intermediate water over the Grand Bank. Upper-layer temperatures over and east of the Cap remained below normal.



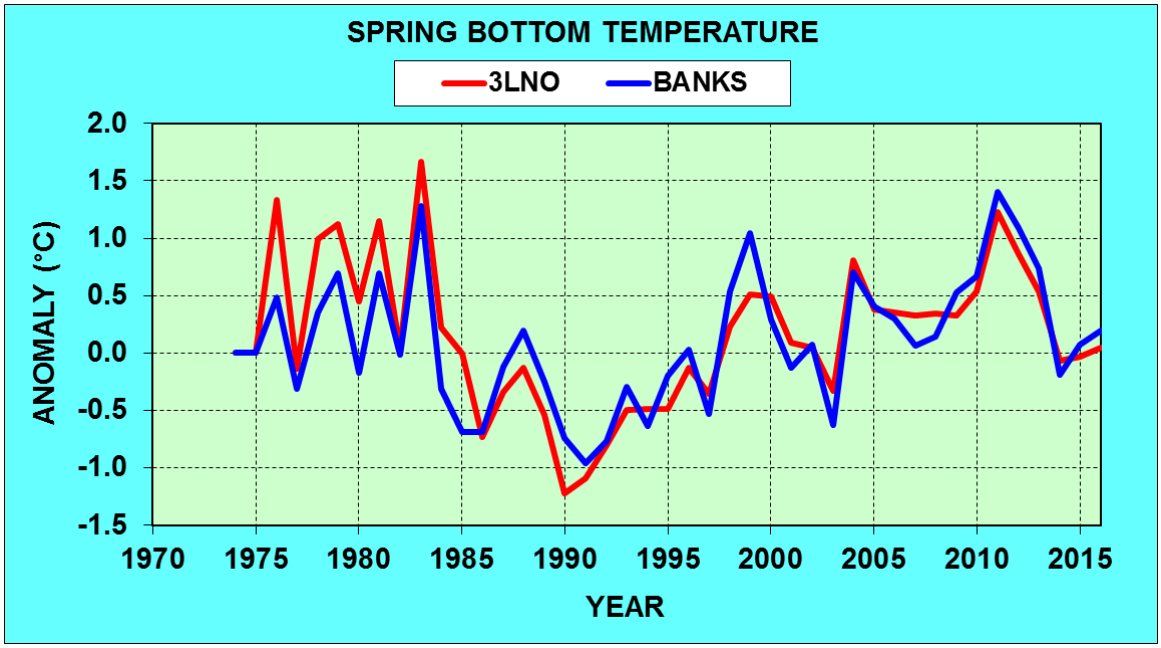
Bottom temperature (in °C) during the spring of 2016 in NAFO Divs. 3PLNO showing a large area of cold CIL water covering the bottom over the Northern Grand Banks.



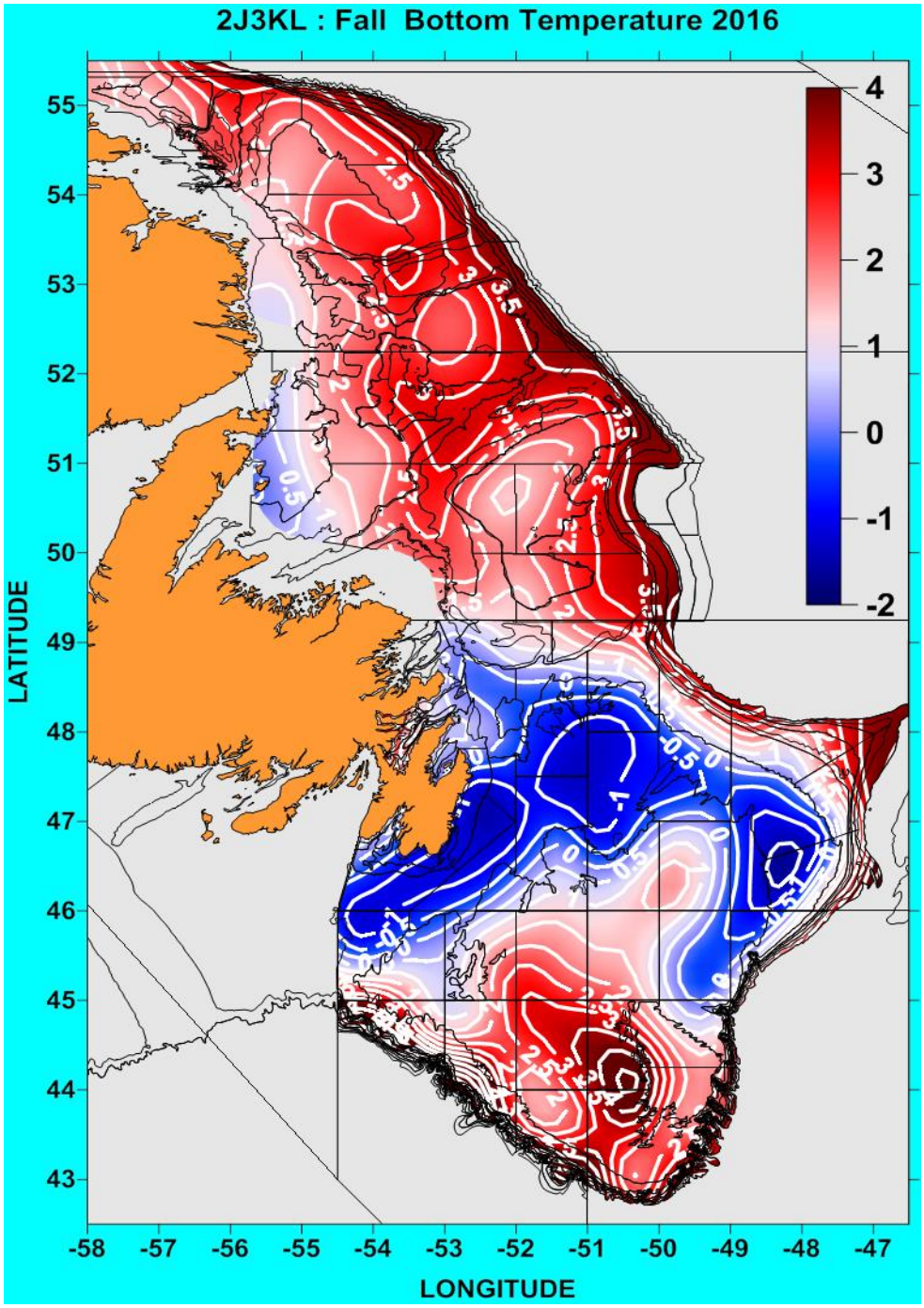
Bottom temperature anomalies (in °C) during the spring of 2016 in NAFO Divs. 3PLNO showing below normal conditions in northern areas, while most of the southern areas including the 3Ps region bottom temperatures were above normal.



Time series of the spatially averaged spring Bottom Temperatures in NAFO Divs. 3LNO showing the record high values in 2011 and the significant decrease since then with values near the long-term mean in 2014 to 2016.



Near bottom temperatures on the Newfoundland and Labrador Shelf during the fall of 2016, showing the colder waters normally found in Div. 3L compared to the deeper areas further north and the warmer shallower southern areas of Divs. 3NO.



Bottom temperature anomalies on the Newfoundland and Labrador Shelf during the fall of 2016 were mostly above normal in the inshore regions of 3K and the southern part of the Grand Bank and mostly below normal elsewhere.