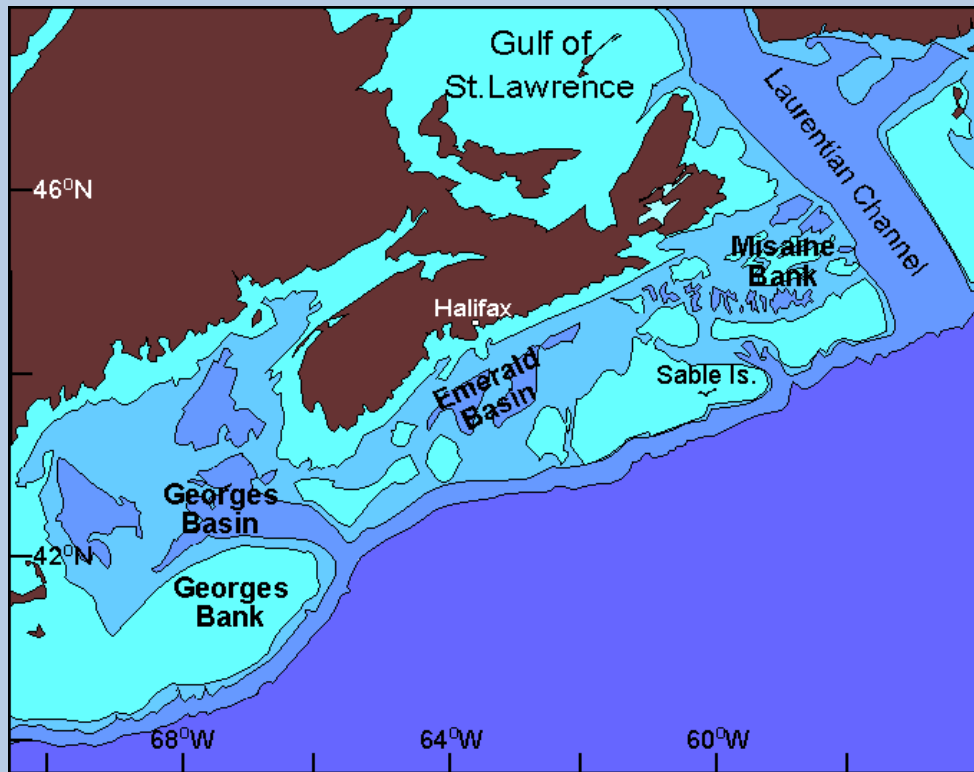


The 2017 Ocean Climate Status Summary for NAFO S. A. 4.

The Scotian Shelf and Eastern Gulf of Maine

Ocean climate conditions on the Scotian Shelf vary spatially due to complex bottom topography, transport from upstream sources, melting of sea-ice in spring, atmospheric heat fluxes and exchange with the adjacent offshore slope waters.

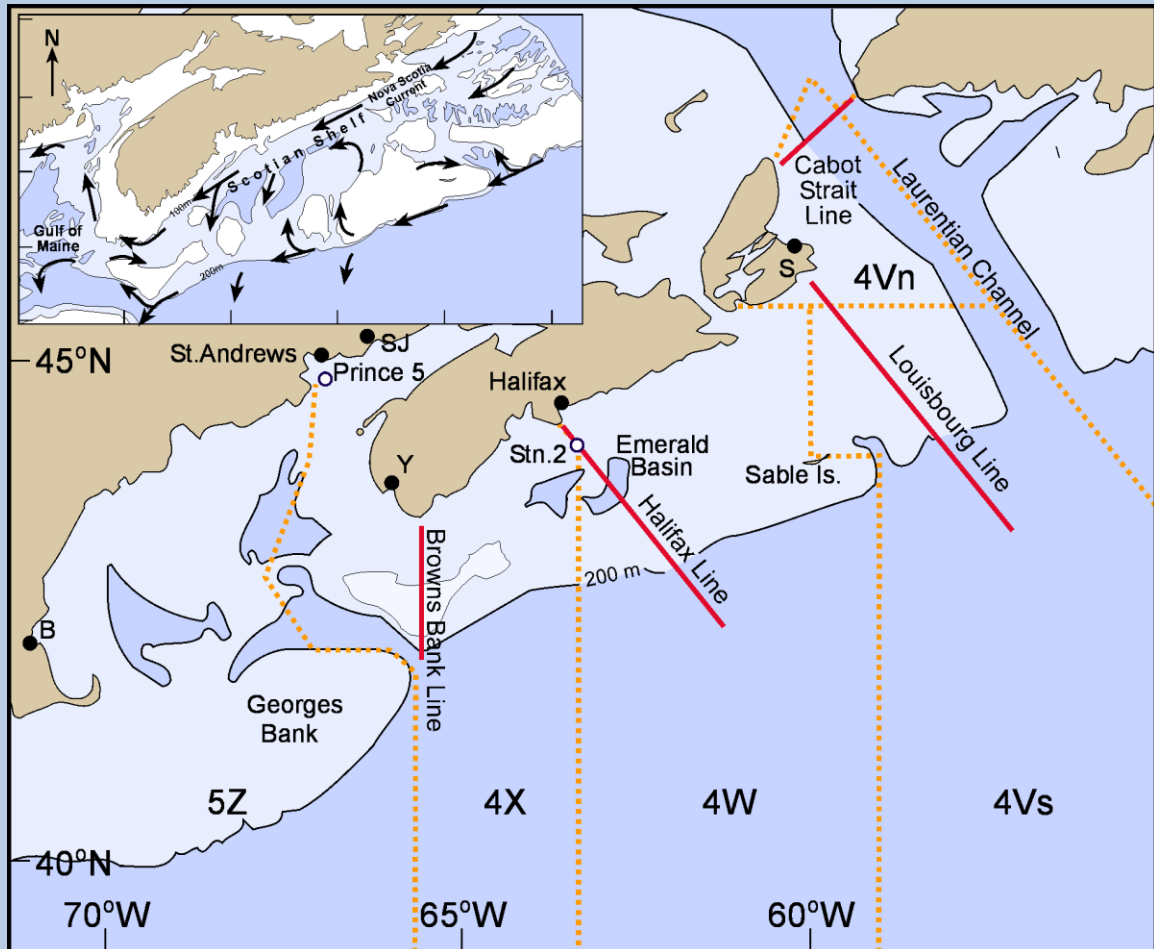
Map of the Scotian Shelf Region Showing the Location of major Banks and Basins in the area.



Scotian Shelf Temperatures during 2017 were the 3rd highest in 48 years with 2016 the 2nd highest and 2012 the warmest on record.

The locations of standard sections (Red lines) and fixed monitoring sites (white circles) on the Scotian Shelf in Sub-area 4. The black dots are air temperature monitoring sites.

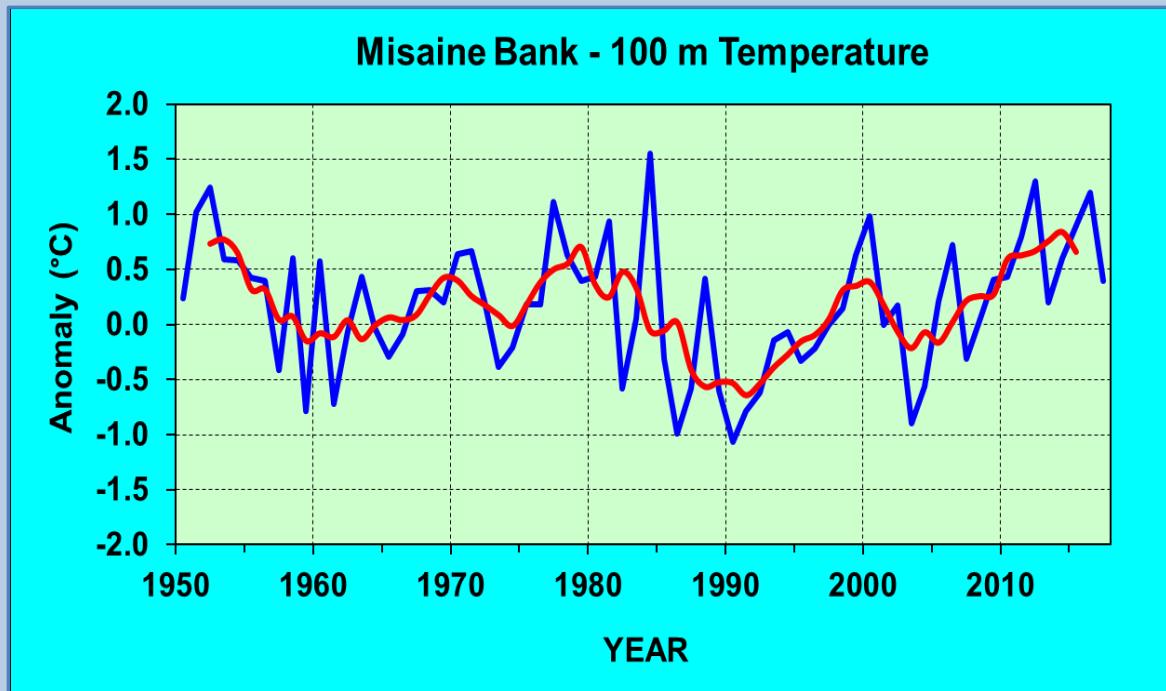
The inset shows the general circulation in the region.



LONG-TERM TEMPERATURE TRENDS

The cold waters on the northeastern Scotian Shelf at Misaine Bank during the 1990s gradually warmed to above normal temperatures by the end of the decade.

Temperatures returned to below normal values in 2003 but have been increasing in recent years, reaching the 2nd highest on record in 2012. In 2017, temperatures remained above the long term average by 0.4°C.



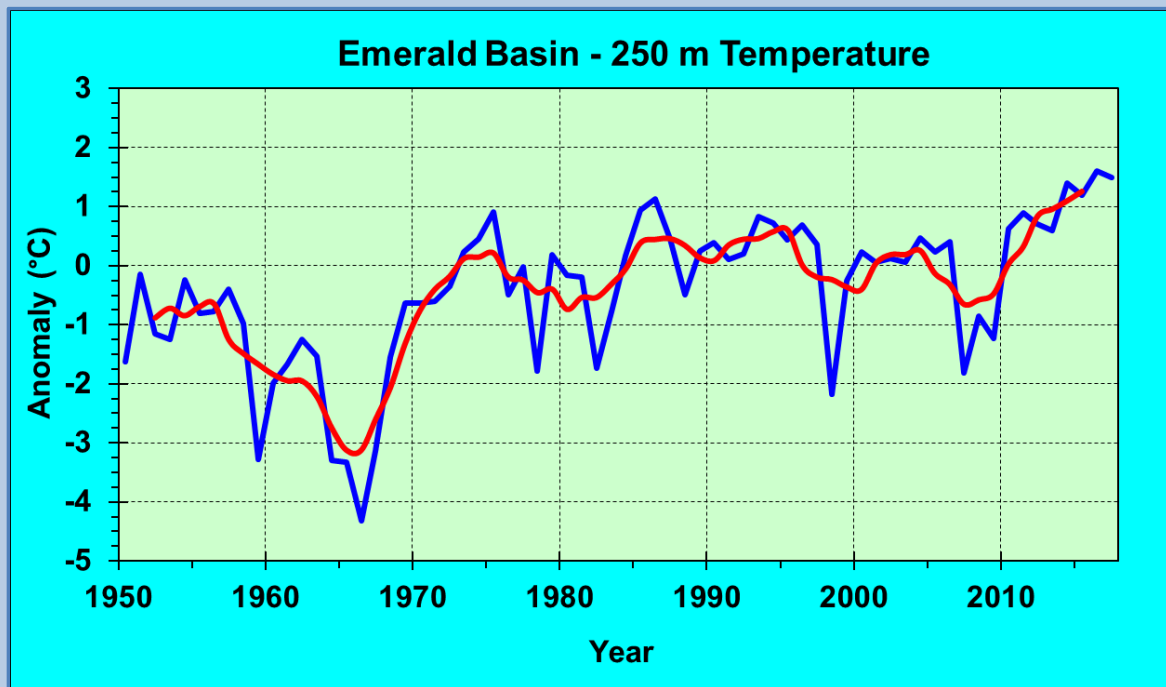
The **RED** line represents the 5-Year Trend.

LONG-TERM TEMPERATURE TRENDS

Temperatures in Emerald Basin are mainly influenced by offshore Slope Waters.

Conditions were slightly above normal from 2000-2006 after a cold anomaly in 1998 and 1999 but returned to below normal conditions during 2007-2009.

In recent years temperatures continued to increase reaching a record high in 2016 at 1.6°C above normal and remaining at +1.5°C above normal in 2017.

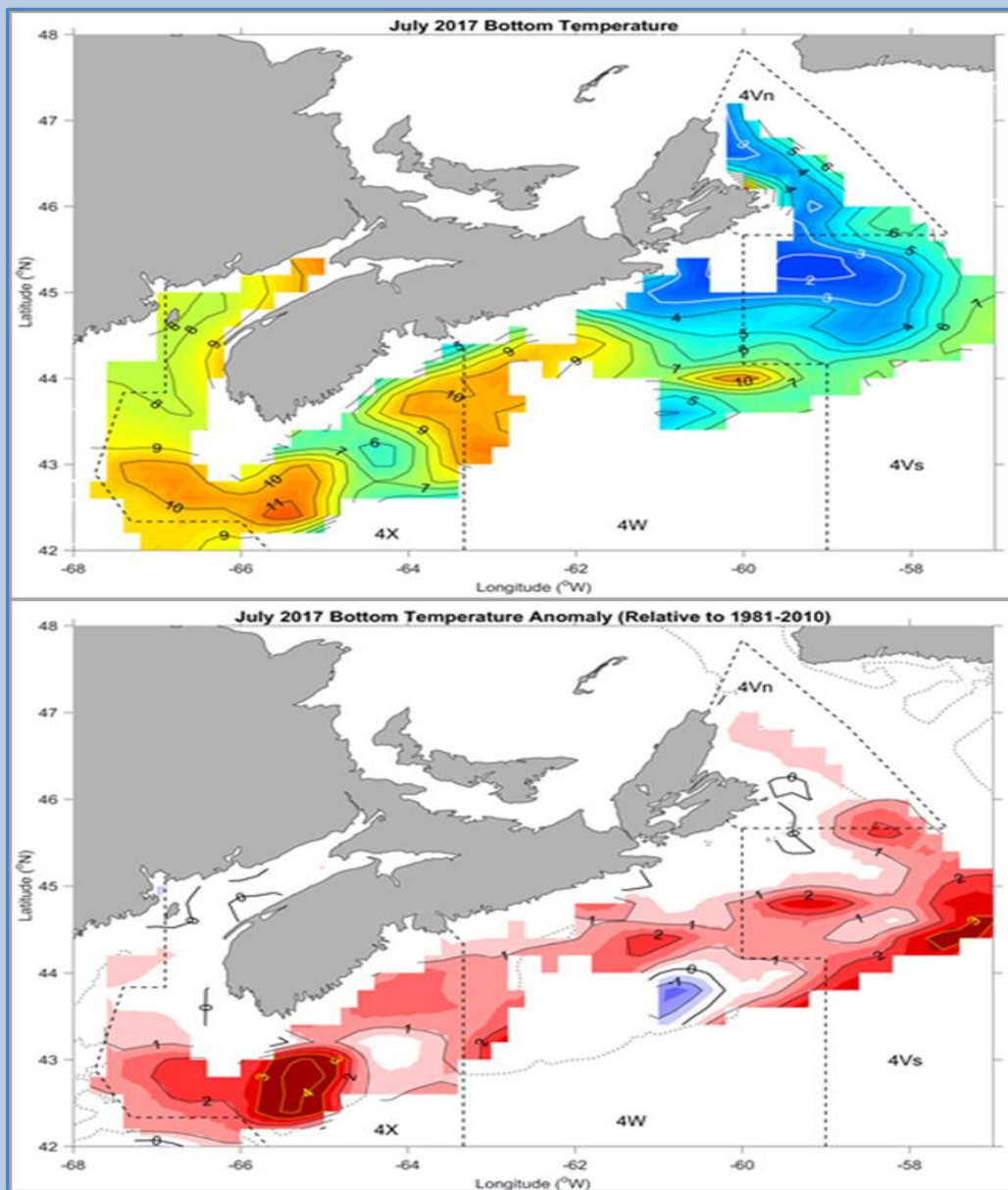


The RED line represents the 5-Year Trend.

The colder waters on the NE Scotian Shelf are due to outflow from the Gulf of St. Lawrence, while the warmer waters in Emerald Basin to the south are from the penetration of offshore slope waters.

Bottom temperatures ranged from an average of 4.6°C in NAFO Division 4Vs to 8.8°C in 4X during 2017.

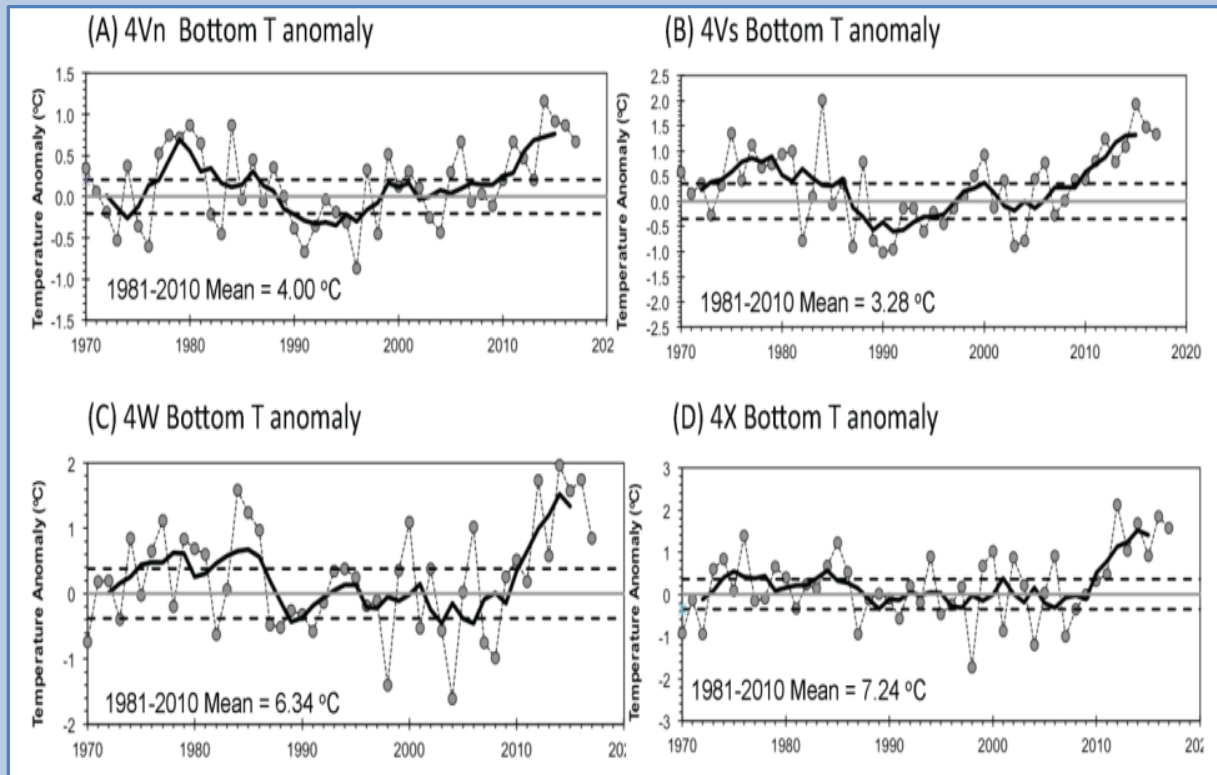
Anomalies were mostly above normal with values reaching 2°-3°C above normal in some areas, particularly in Div. 4X and offshore in 4Vs.



BOTTOM TEMPERATURE TRENDS

In 2017, summer bottom temperature anomalies for NAFO areas 4Vn, 4Vs, 4W and 4X were 0.7°C (+1.6 SD), 1.3°C (+1.9 SD), 0.8°C (+1.1 SD) and 1.6°C (+2.2 SD) above normal, respectively.

In 2017, 4Vn was the 4th warmest year, 4Vs was 5th warmest and 4X was the 4th warmest year.



Bottom temperatures in Subarea 4 are monitored during the DFO July multi-species survey on the Scotian Shelf.

Highlights for 2017

- **Annual SST anomalies on the Scotian Shelf during 2017 ranged from +0.7°C (+1.2 SD) in Cabot Strait to +1.9°C (+3 SD) in the Western Scotian Shelf area. All 8 sub-areas examined had SSTs above average with 4 of 8 areas reporting values ≥ 2 SD.**
- **In 2017, the July bottom temperature anomalies on the Scotian Shelf in NAFO Divisions 4Vn, 4Vs, 4W and 4X were 0.7°C (1.6 SD), 1.3°C (1.9 SD), 0.8°C (1.1 SD) and 1.6°C (2.2 SD) above normal, respectively.**
- **In 2017, the annual temperature anomalies representing different water masses were +1.1°C (+3.3 SD) for Cabot Strait 200-300 m (the 2nd highest), +0.4°C (+0.7 SD) for Misaine Bank at 100 m, +1.5°C (+1.8 SD) for Emerald Basin at 250 m (2nd highest) and +1.6°C (+3 SD) for Georges Basin at 200 m (a record high).**
- **The CIL ($T < 4^{\circ}\text{C}$) volume on the Scotian Shelf in 2017 was below normal by 0.8 SD, the 21st lowest in 44 years.**
- **The climate index, a composite of 20 selected, normalized temperature time series on the Scotian Shelf, averaged +1.7 SD, making 2017 the 3rd warmest year in the last 48 years. The warmest occurred in 2012 at +2.7 SD and the 2nd warmest was in 2016 at +2.1 SD.**

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Reference:

D. Hebert and R. G. Pettipas, 2018. Physical Oceanographic Conditions on the Scotian Shelf and in the eastern Gulf of Maine (NAFO Divisions 4V, W, X) during 2017. NAFO SCR. Doc. 2018/049. Serial No. N6844.



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