

BSB Oceanography

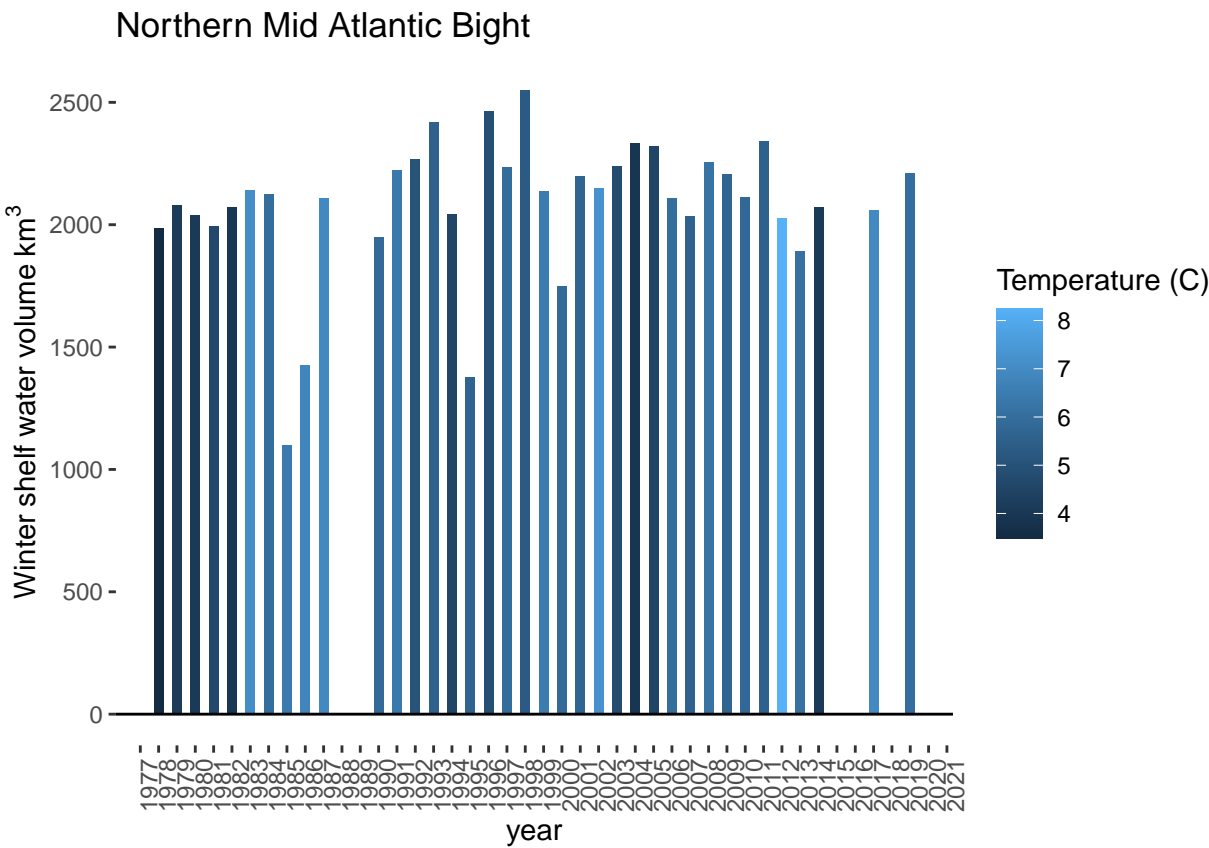
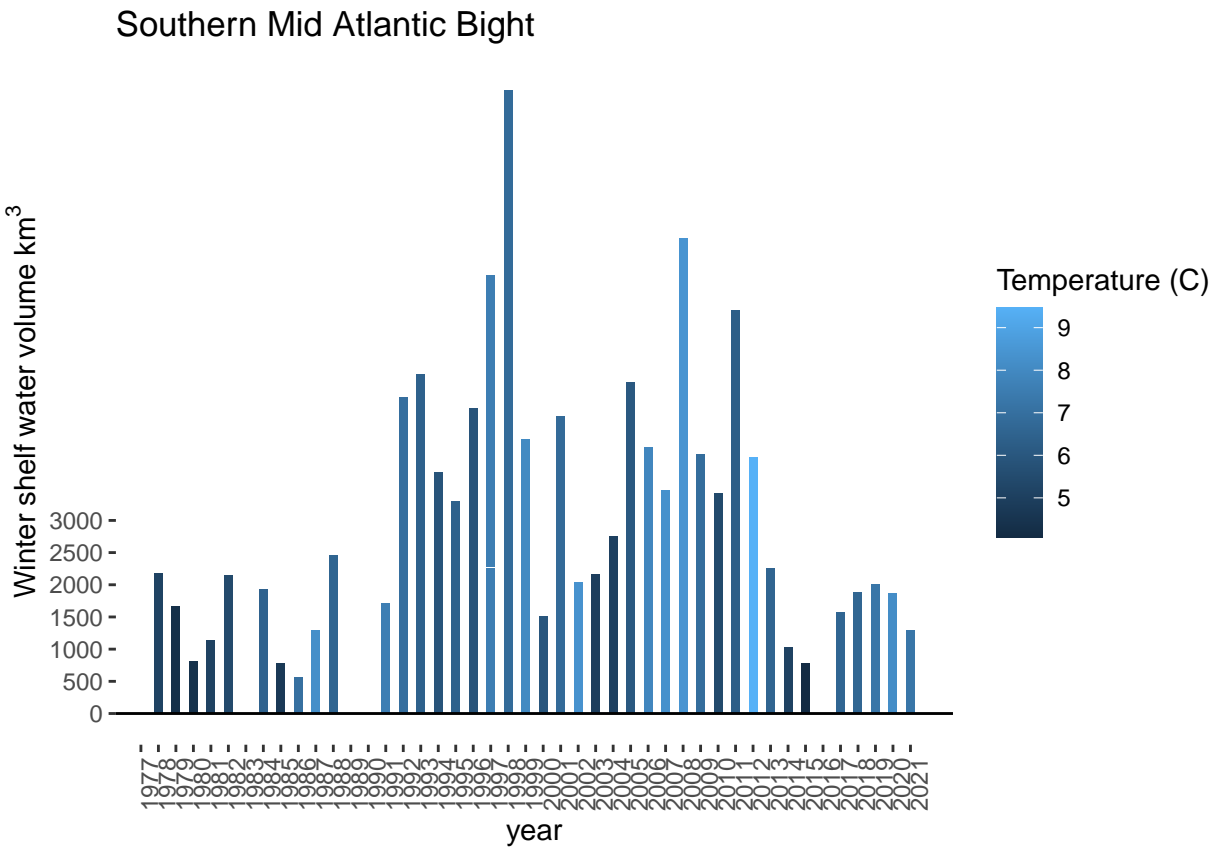
Ricky Tabandera

17 August, 2022

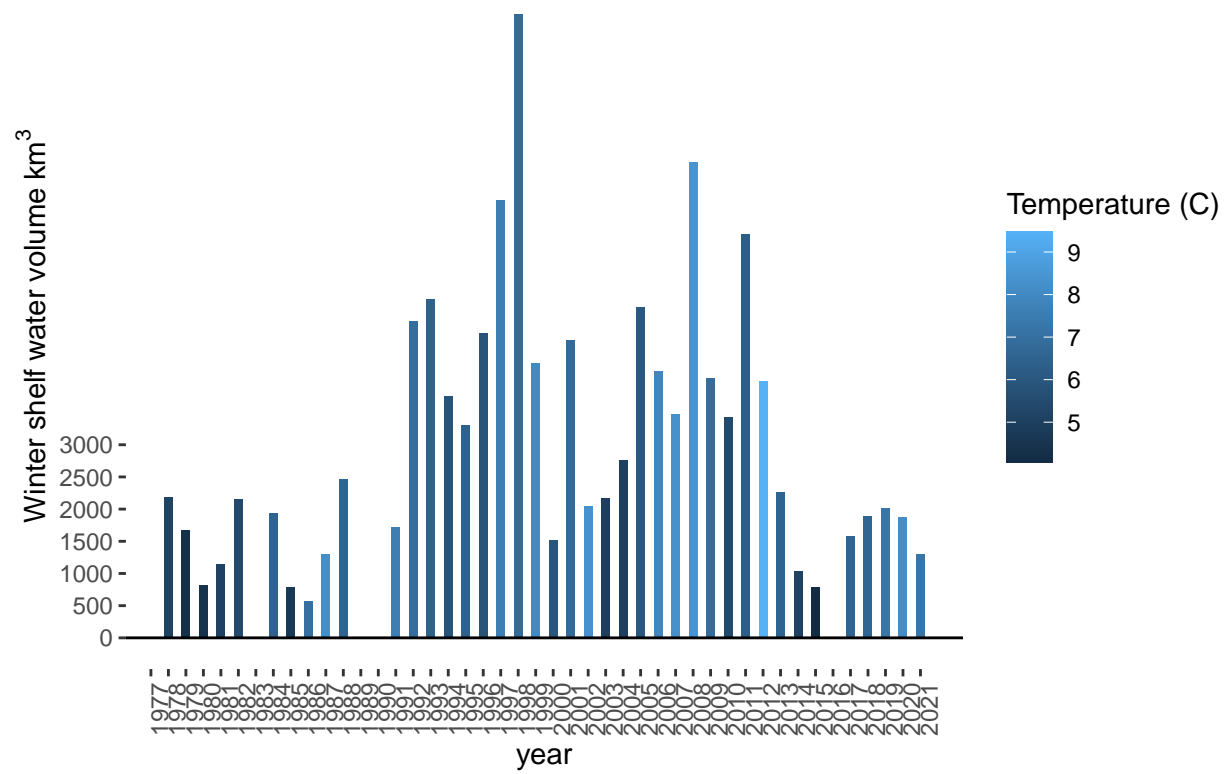
Shelf water volume

Shelf water volume which is a measure of the volume of water bounded inshore of a hydrodynamic feature called the shelf-slope front. In this analysis the shelf water is defined as all water having salinity <34 . It is hypothesized that fish are migrating from the shelf edge and using the shelf slope front as a way-point. The position of this front will vary inter-annually with the higher values indicating the front being pushed further towards the shelf break. As this front moves closer or further from the coast, the available susceptible habitat can expand or contract as black sea bass are known to concentrate slope ward of the front. Miller et al. 2016 Identified a negative impact on catches of both juveniles and adult black sea bass when shelf water volume exceeded 4000 km^3

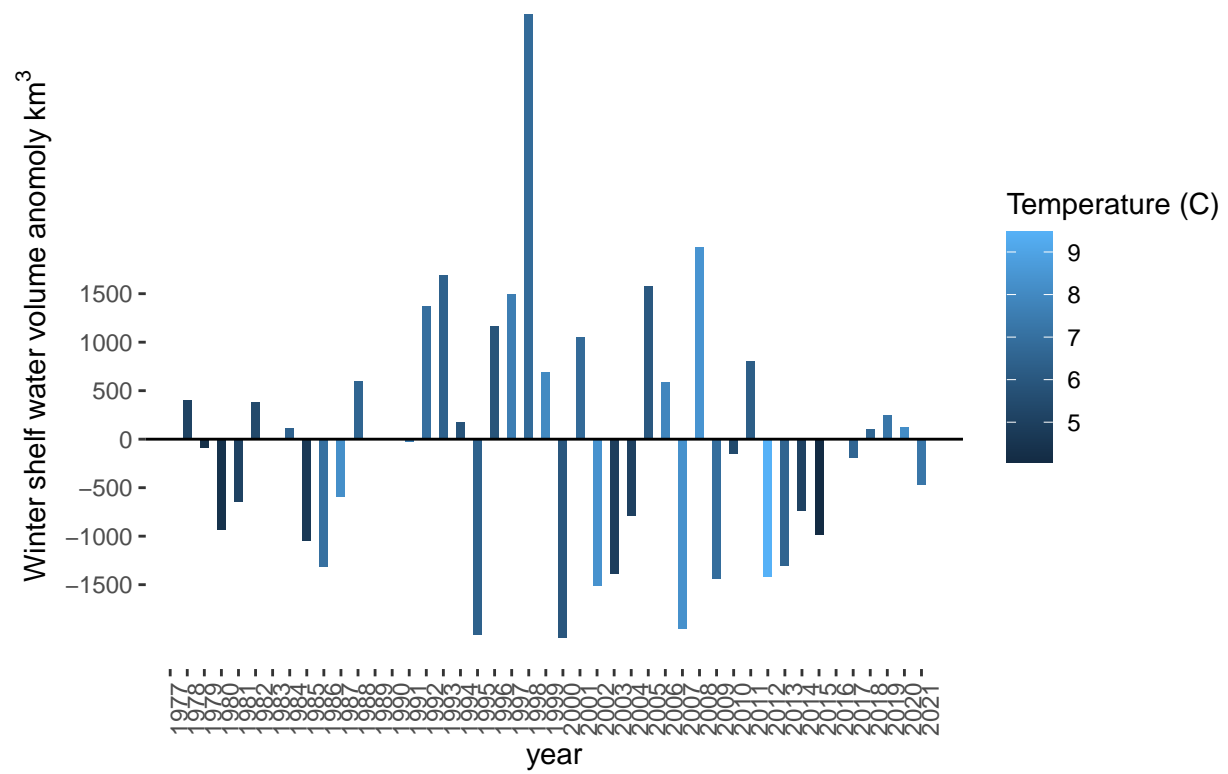
winter shelf water volume

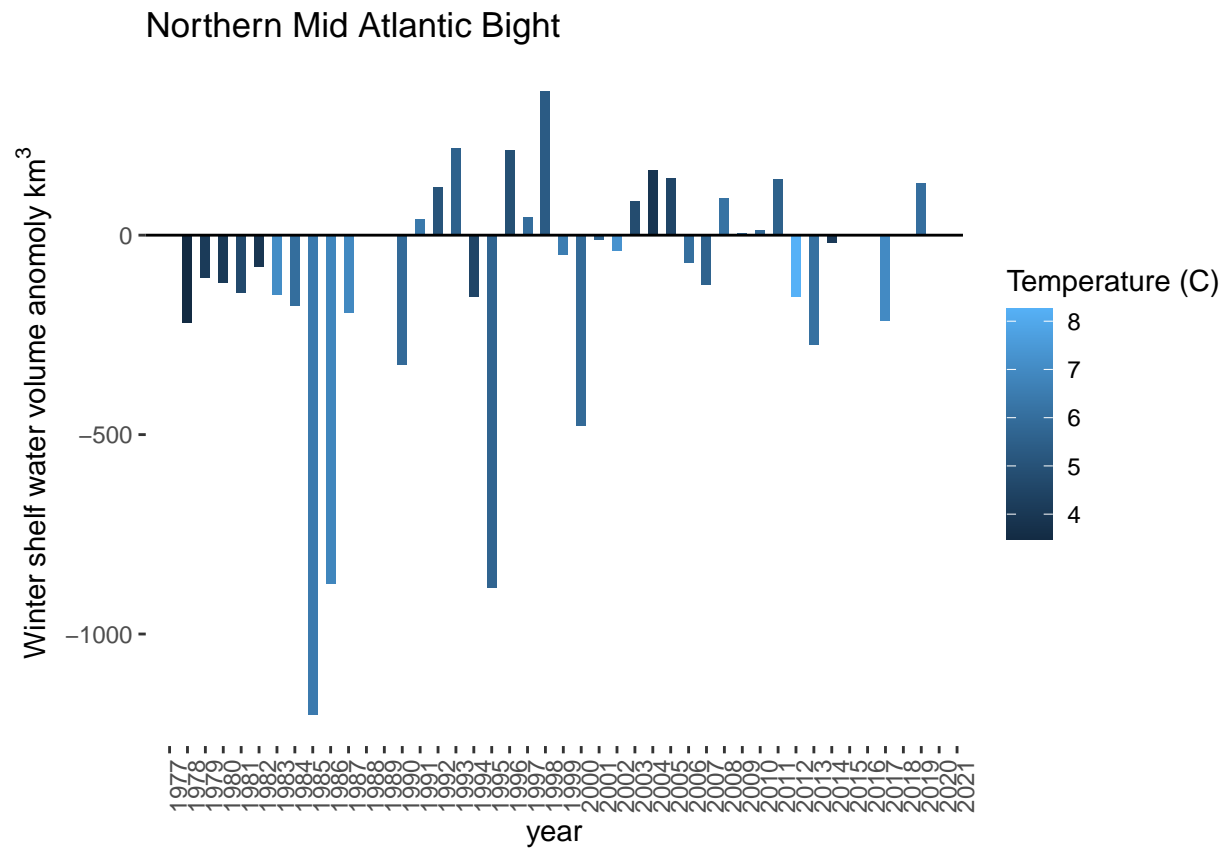


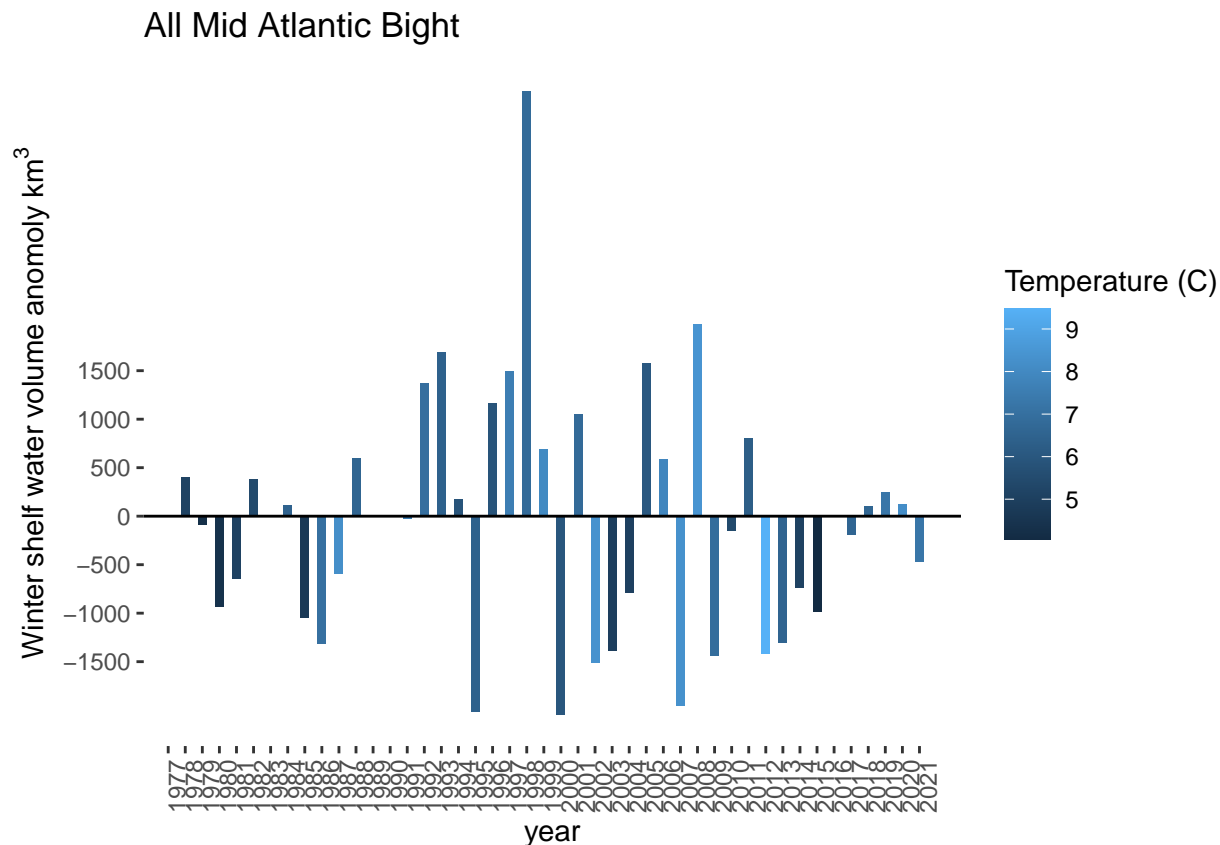
All Mid Atlantic Bight



Southern Mid Atlantic Bight





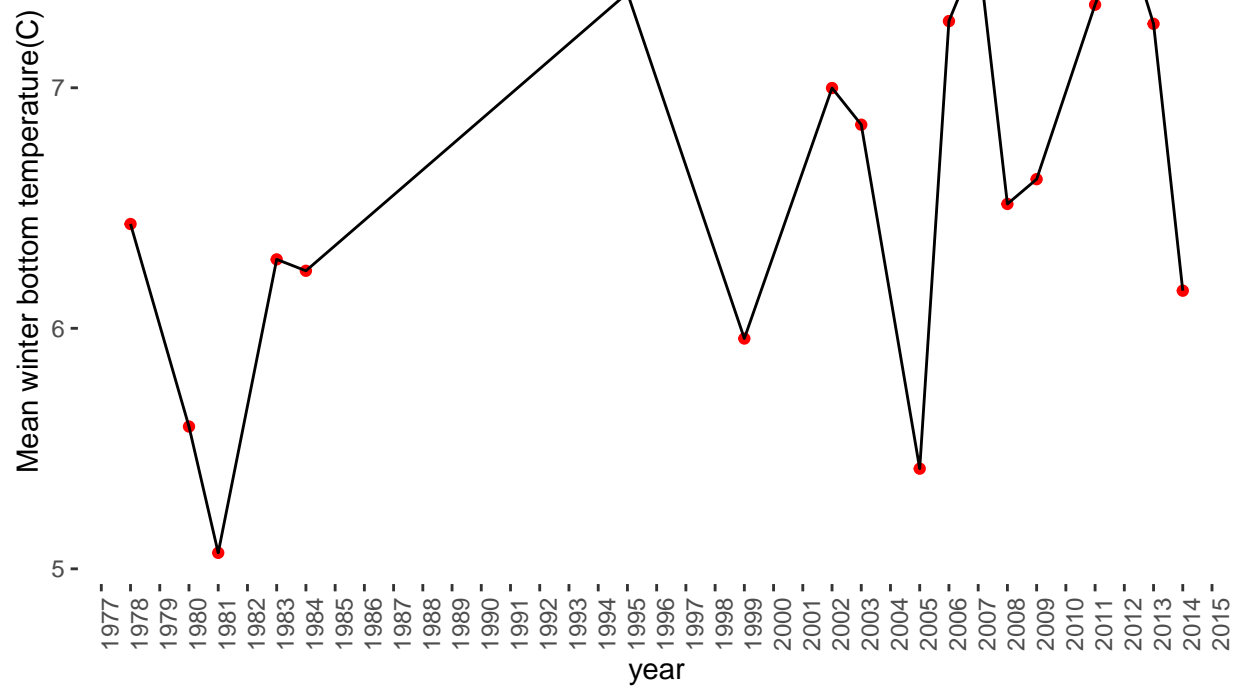


Regional in-situ winter bottom temperature and salinity with anomaly

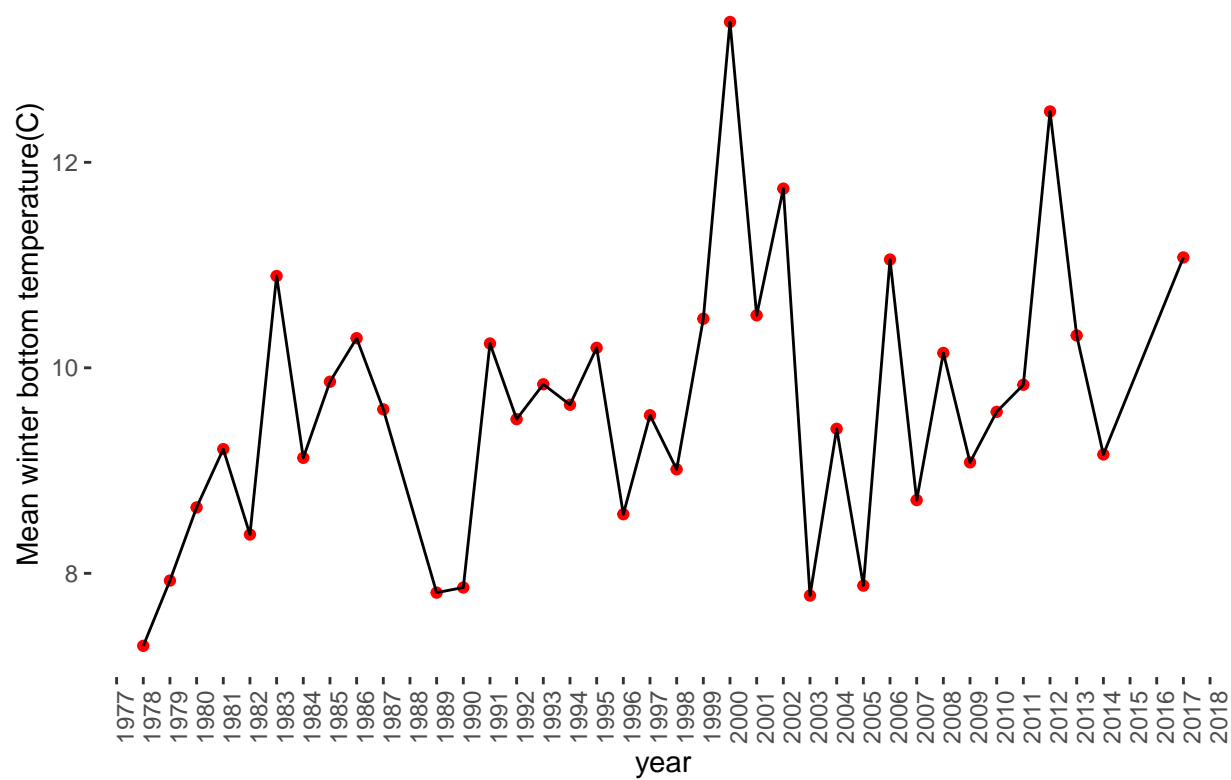
All available CTD data within 10m of the bottom between the northern and southern MAB region and as a whole. Regional time series were computed as follows: area-weighted regional mean values were computed for each survey in the OCDBS and a reference annual cycle was removed (fit to observations from 1981-2010) to get seasonal anomalies.

note: winter coverage is very sparse due to the winter ECOMON surveys ending. A better approach may be to use a two month span at the end of winter where coverage is better i.e. FEB-MAR rather than a whole winter.

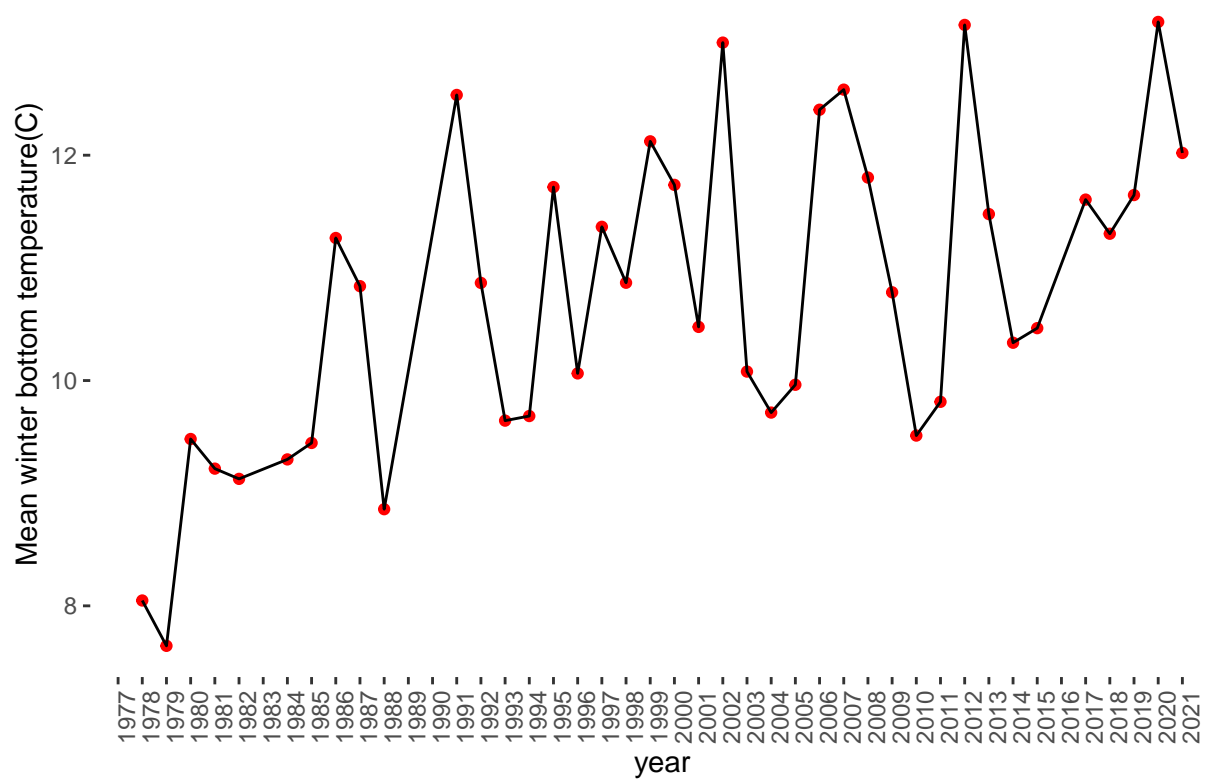
Western Gulf Of Maine



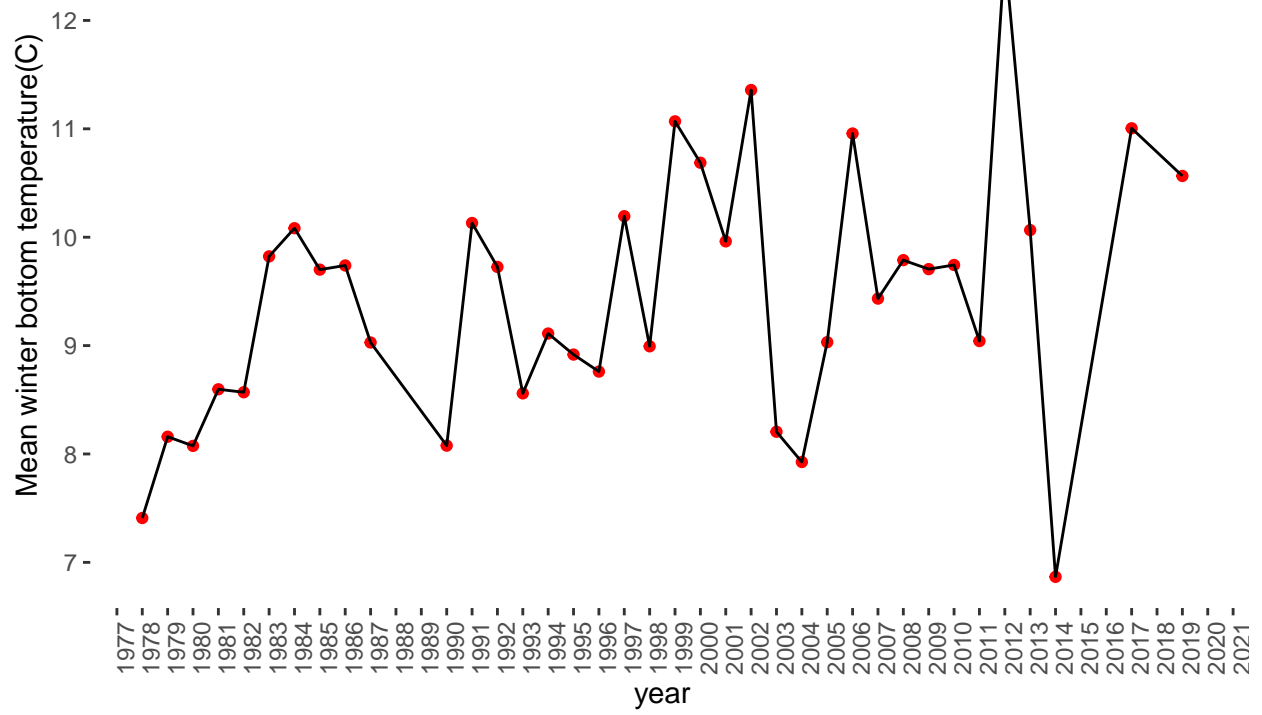
Western Georges bank

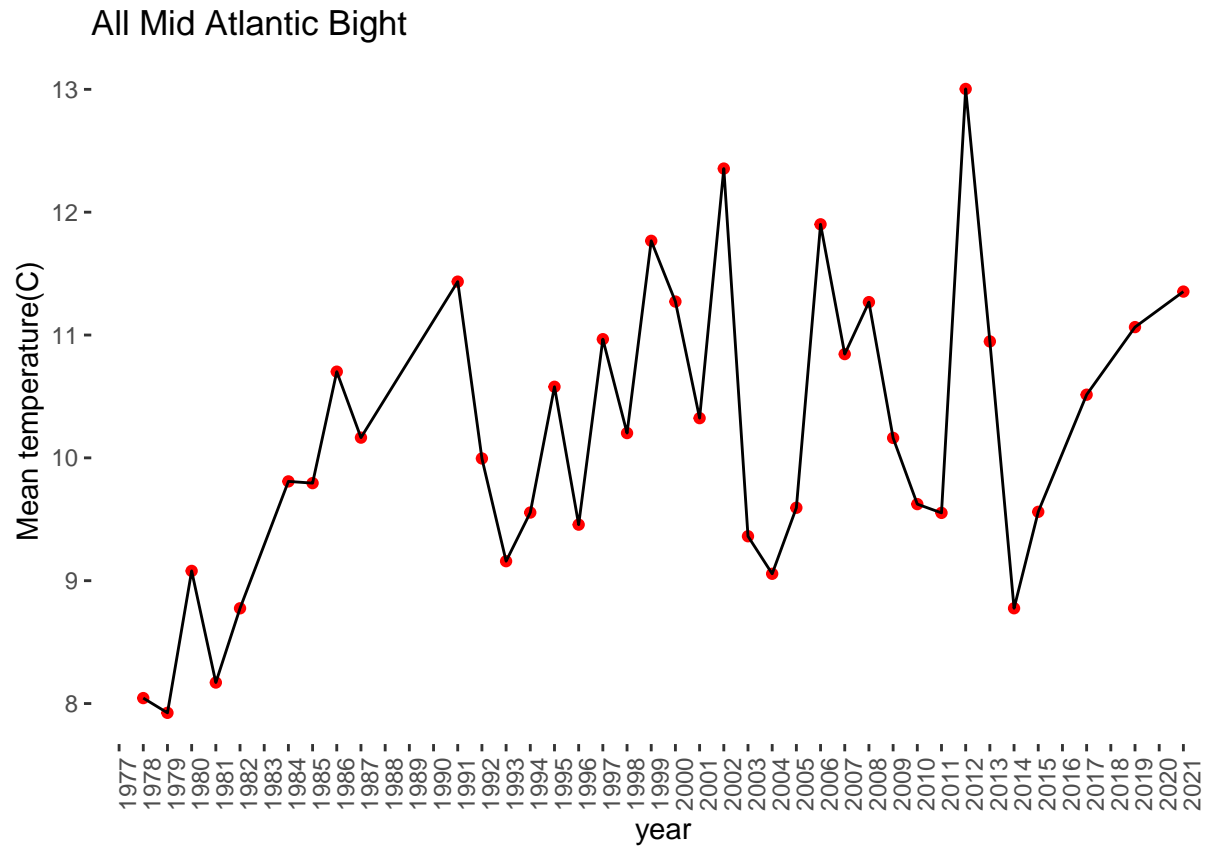


Southern Mid Atlantic Bight



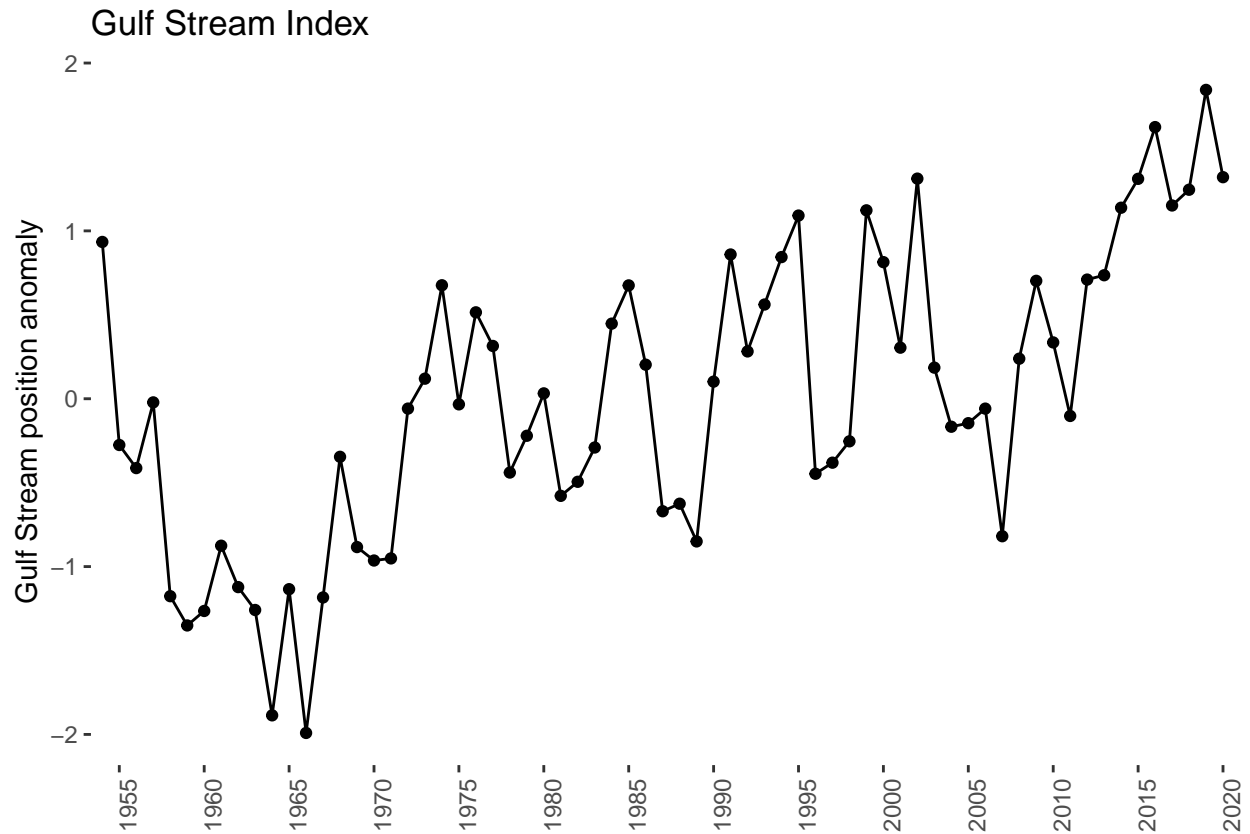
Northern Mid Atlantic Bight





Gulf Stream Index

The GSI is calculated based on the method presented by Pérez-Hernández and Joyce (2014). This gulf stream index is a position anomaly meaning the larger the value of the index the further north the northern wall of the Gulf Stream is for that year.



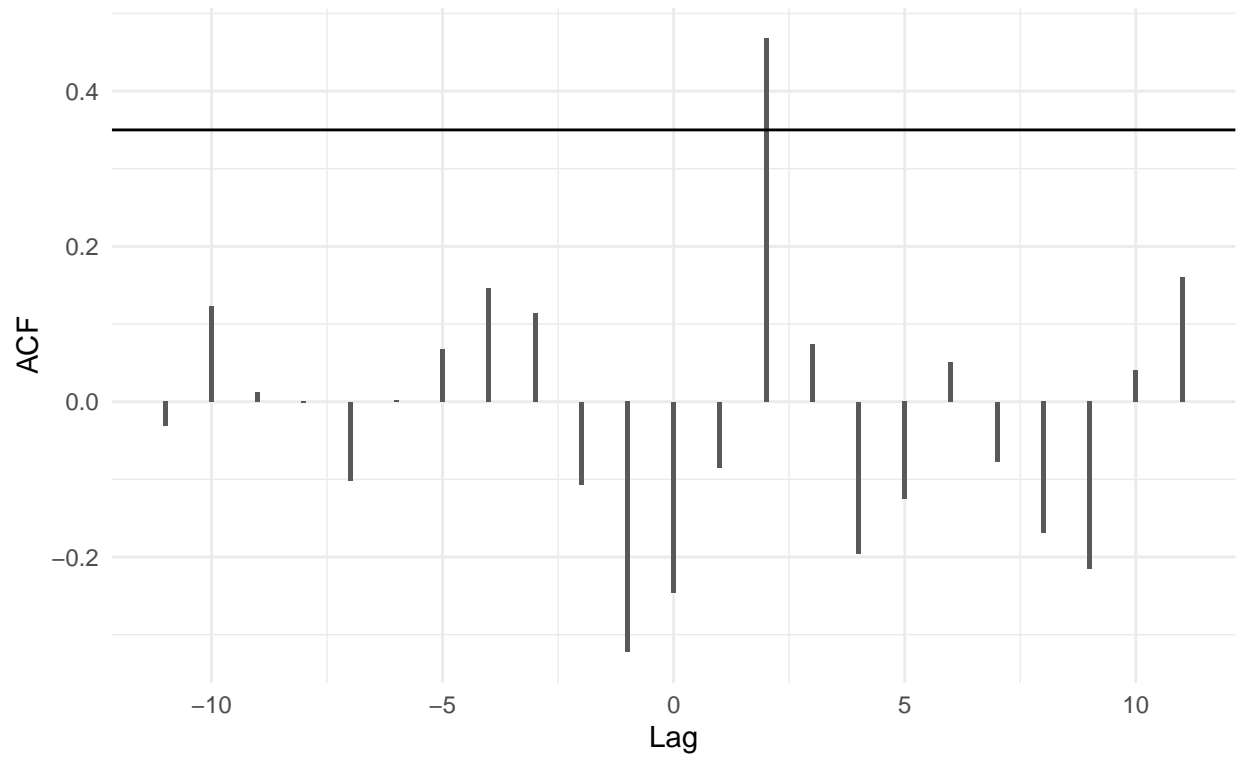
Cross correlation testing

Explorations into the association between bottom conditions and Black sea bass recruitment deviations. recruitment deviations from the 2021 operational assessment. This model output lacks 2020 data and thus 2019 is the terminal year. Bottom conditions are also limited to this time span. Temperature anomaly are used to avoid seasonal and annual patterns. The association is likely to occur with a time lag as current conditions would likely manifest in following years. Horizontal line indicates significant cross correlation

southern MAB ccf

Peak correlation occurs at a lag of 2 years. This could be and artifact due to how calendar year is in winter conditions

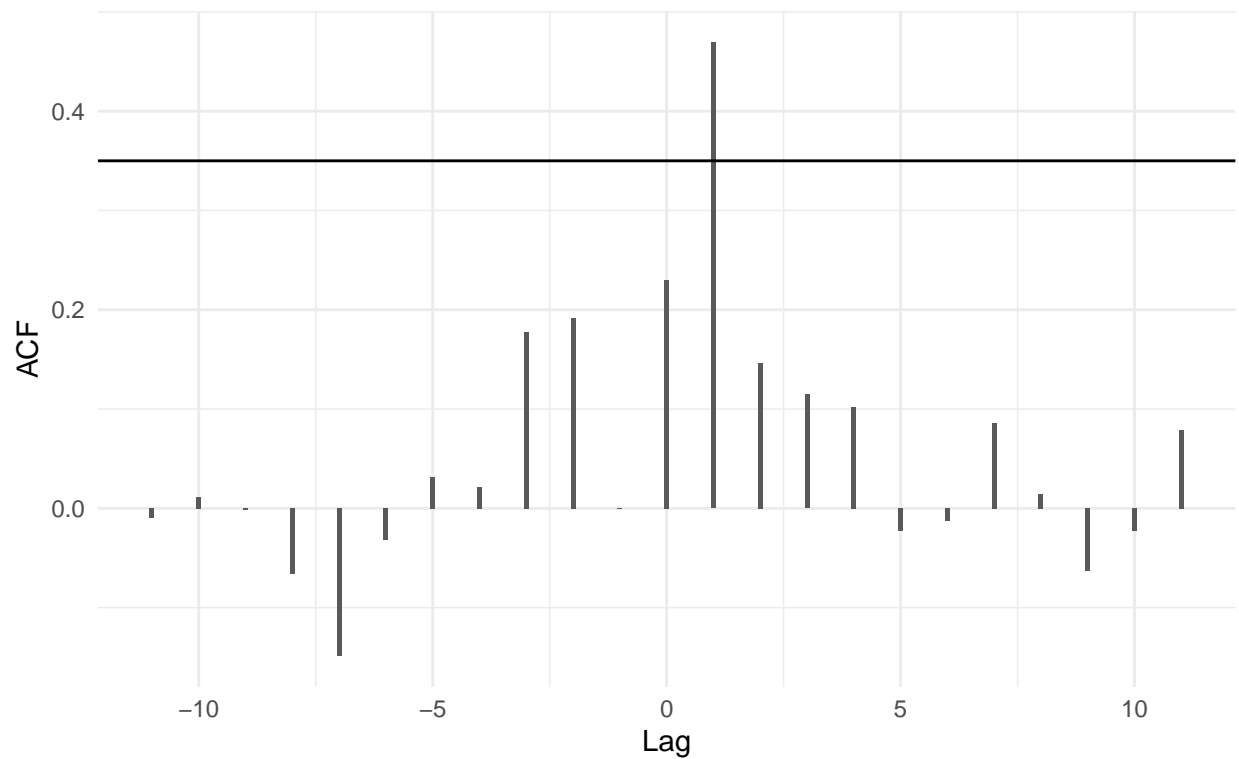
Log recruitment deviations & winter bottom temperature anomaly
Southern MAB



Northern MAB CCF

Peak correlation occurs with a 1 year lag.

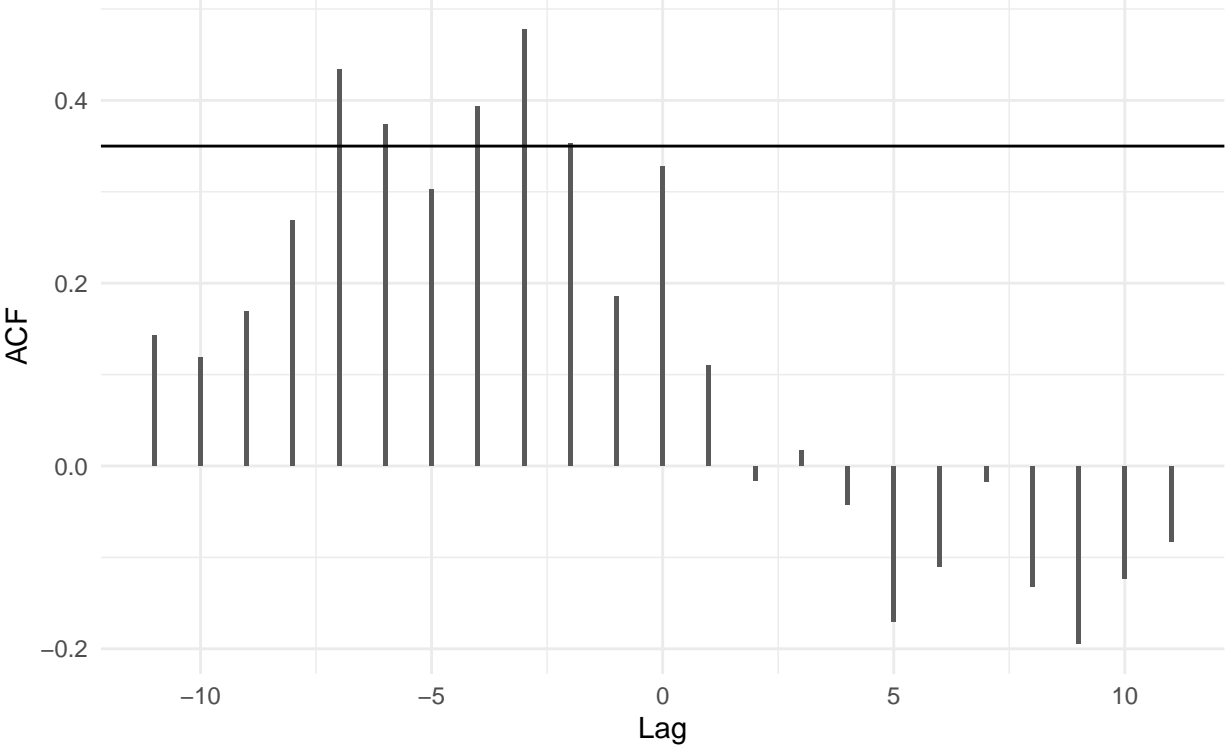
Log recruitment deviations & winter bottom temperature anomaly Northern MAB



Gulf stream wall index CCF

Differing patterns in association is observed across the north vs south. Northern MAB has -3 and -7 lags, while Southern MAB has no significant time lags that correlate with recruitment deviations.

Log recruitment deviations & Gulf stream wall index
Northern MAB



Log recruitment deviations & Gulf stream wall index
Southern MAB

