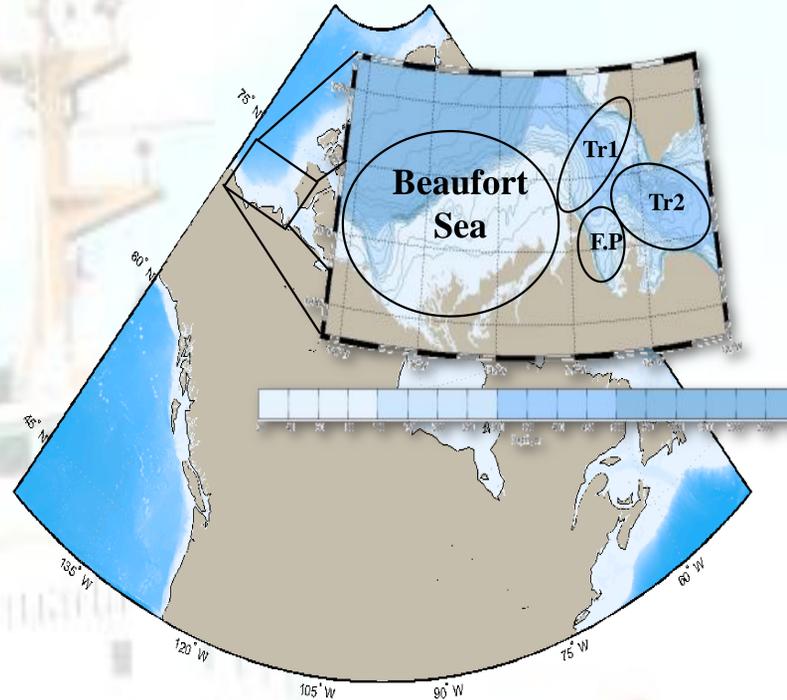


Evolution of the mixed layer in the Amundsen Gulf and Beaufort Sea

Introduction

The surface mixed layer which is in the upper region of the ocean has almost uniform density. Turbulent mixing, driven by the wind and convective buoyancy flux affect the mixed layer depth (MLD). The mixed layer directly affects the heat, momentum and gases exchange between air and sea. And moreover, turbulent processes in the mixed layer affect biological productivities.

In the present study MLD in the different regions of Amundsen gulf and Beaufort sea has been estimated and its spatial and temporal evolution has been studied. The region is divided into four different sub-regions, i.e. Tr1, Tr2, Beaufort Sea and fixed point (F.P).



Results

In 2004, although the mean value of MLD in Tr1 and Tr2 are almost the same, PDFs of MLD show that in Tr2 the most frequent values of MLD are around the median value while in Tr1 we are witnessing that the most frequent values of MLD is at the minimum and also at the maximum MLD. Around the fixed station the mean value and the most frequent MLDs are higher than two other regions. In 2008, the lowest values of MLD occur in Beaufort Sea while both mean and the most frequent values are the highest in Tr2 and also the range of variation of MLD is the largest i.e. between 15-80m. Near the fixed station both mean of MLD and the most frequent values are higher than Beaufort Sea.

Available data

○ CASES

(Canadian Arctic Shelf Exchange Study)

2002 (Fall)
 2003
 2004 } Full Year

○ CFL

(Circum polar Flaw Lead)

2007
 2008 } Full Year

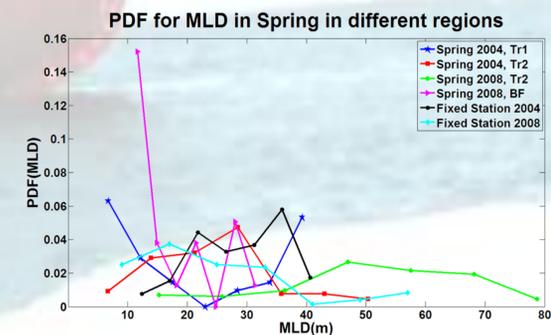
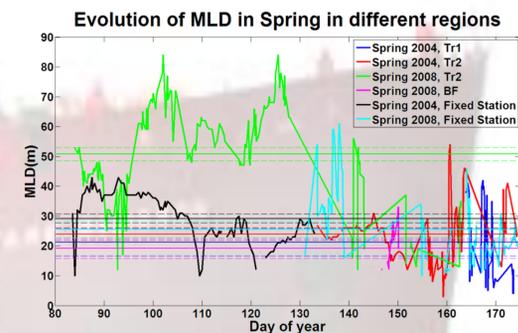
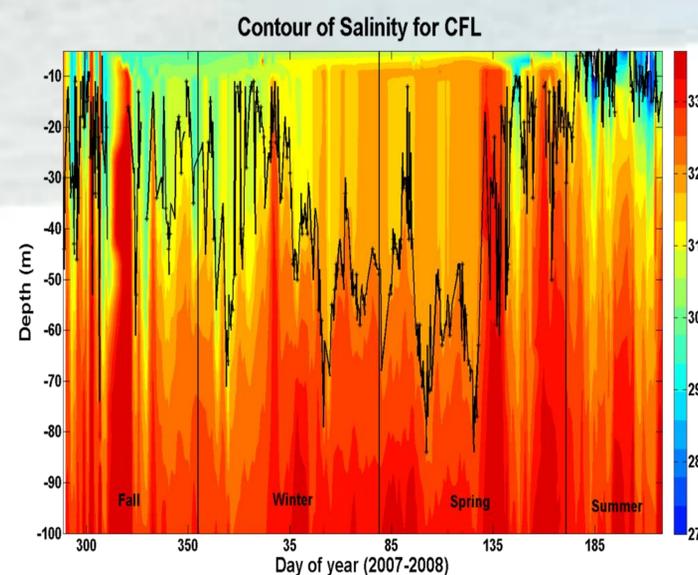
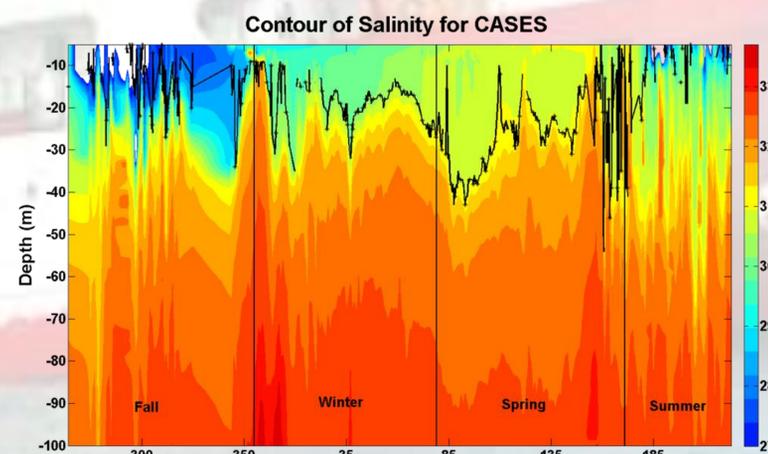
○ ArcticNet

2005 (Summer)
 2006 (Fall)

○ Malina 2009 (Summer)

Objective

- Annual variation between CASES and CFL
- Seasonal variation between different regions
- Spatial evolution
- Reasons?



Conclusion

- MLD is the lowest in Summer and the deepest in Winter and Spring
- MLD varies spatially too, the shallowest around fixed station in fall and winter
- MLD and its range value abruptly increase during CFL program in 2007-2008 compared to other years because of upwelling in the Amundsen Gulf
- Set of events like wind, solar radiation and ice formation or melting play important role in determining the MLD