AS205:Ocean Dynamics(Assignment 5)

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Introduction

We describe the seasonal mean stratification in the Bay of Bengal and Arabian sea.

Datasets

The datasets used in this analysis is as follows:

- **Density** : World Ocean Atlas(WOA18)

Methodology

The datasets are choosen for the domain of $40°E$ to $100°E$ and $0°N$ to $25°N$. This covers the North Indian ocean. We then calculate the seasonal mean with the following seasons:

The density data was chosen for the transect at $70°E$ for the Arabian sea and $88°E$ for the Bay of Bengal. Both the transect extend from $10°N$ to $20°N$ .We choose seasonal means were as follows

- **Summer Monsoon** : June, July, August, September(JJAS)
- **Winter Monsoon** : December, January, February(DJF)

The stratification is measured by the Brunt-Vaisale frequency calculated as:

$$N^2 = -\frac{g}{\rho_0}\frac{\partial \rho}{\partial z}$$

where,
ρ_0 is the reference density.
ρ is the density of the water at different levels.

Bay of Bengal

- The seasonal mean stratification for the Bay of Bengal is plotted in Figure 1(Summer) and Figure 2(Winter).
- We observe the pycnocline is deeper in the post-monsoon DJF period(around 100m) as compared to the pre-monsoon period(around 30m).
- Overall the stratification is higher in the post-monsoon period in the bay.

Arabian Sea

- The seasonal mean stratification for the Arabian sea is plotted in Figure 3(Summer) and Figure 2(Winter).
- The stratification is nearly constant in both the periods.
- The pycnocline in both the periods is around 100m.

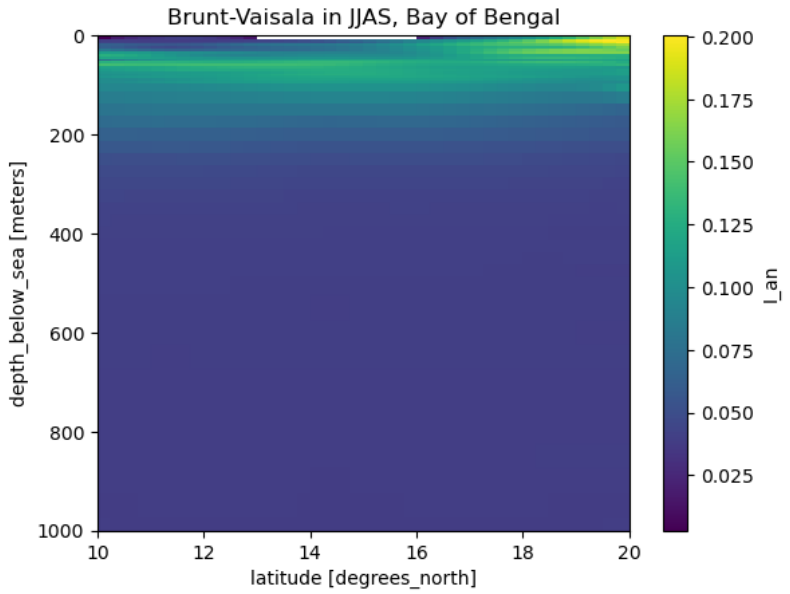

Figure 1: stratification of Bay of Bengal in summer (s^{-1})

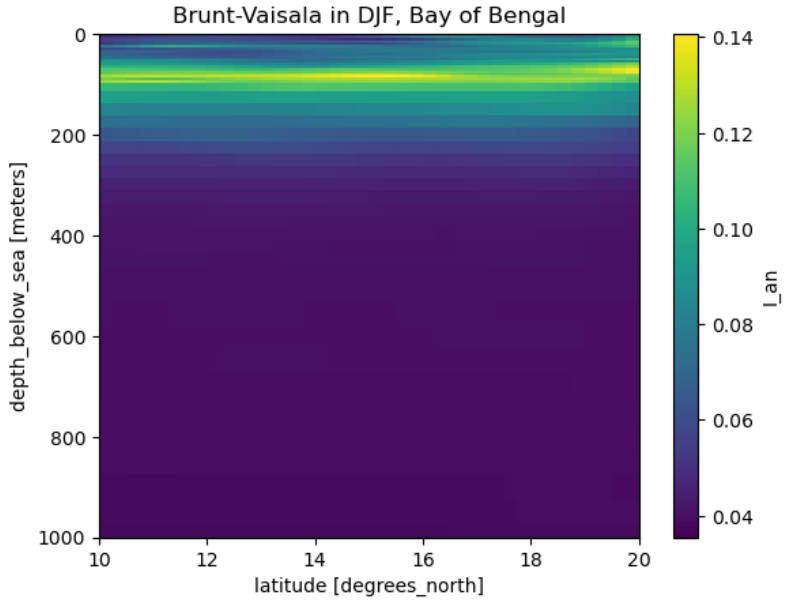

Figure 2: stratification of Bay of Bengal in winter (s^{-1})

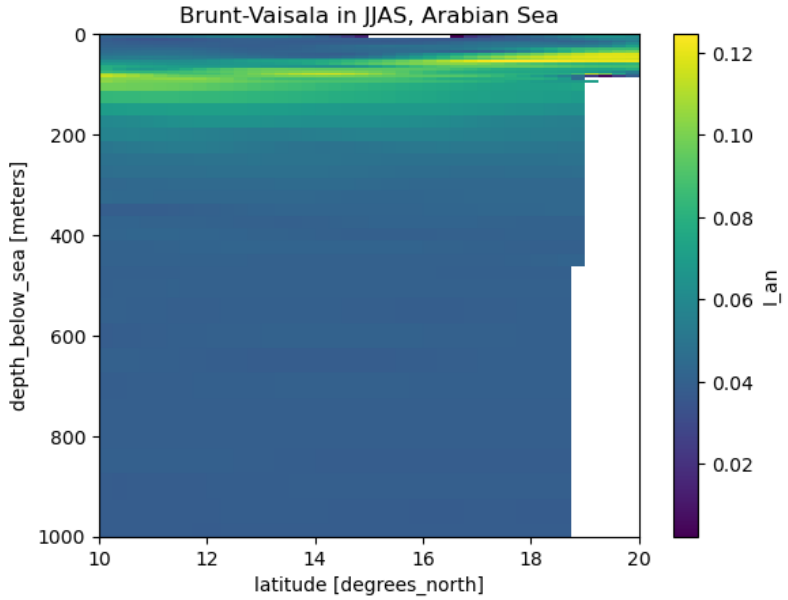

Figure 3: stratification of Arabian sea in summer (s^{-1})

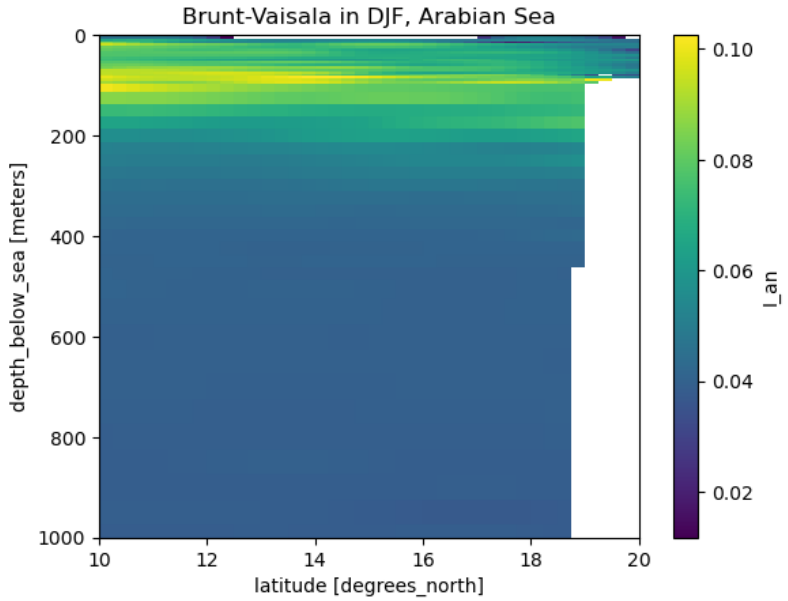

Figure 4: stratification of Arabian sea in winter (s^{-1})