Spatial Distributions of Ocean Salinity Along the Indian Coasts Using Satellite Data

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Introduction

The ocean's salinity is important to our ecosystem and has a significant impact on fishing, climate change, and ocean ecology, which influence other parameters. We have studied spatial and temporal variability in sea surface salinity (SSS) along the coasts of India. A comparison of salinity and temperature at the same latitude has been carried out at different longitudes covering the Arabian Sea and the Bay of Bengal. The effect of precipitation and surface runoff on SSS and temperature have been observed along the coasts of India.

Methodology

We used satellite data from 2011 to 2020. Data source, image processing, and earth viewing tools:

- NASA Giovanni
- Google Earth
- NOAA STAR SOCD Ocean Viewer (OV)
- Copernicus Marine Environment Monitoring Service (CMEMS)
- NASA Panoply

Satellite data collection was achieved through NASA Giovanni and CMEMS. NASA Panoply, OV, and Google Earth were used to visualize and format images. For some data conversion, we wrote a script in Python that collects the data using the NumPy and Pandas library.

Figure 1 – Salinity

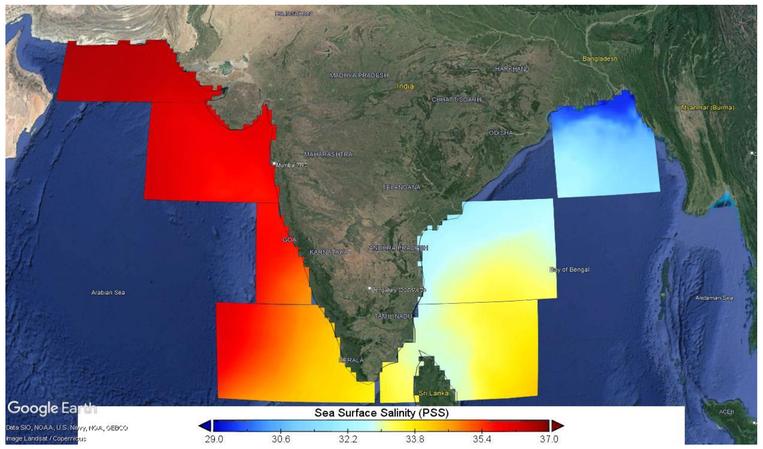


Figure 2 – Precipitation

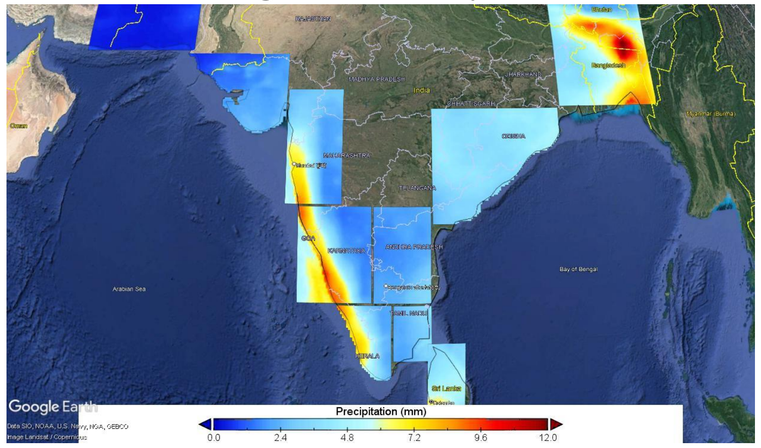
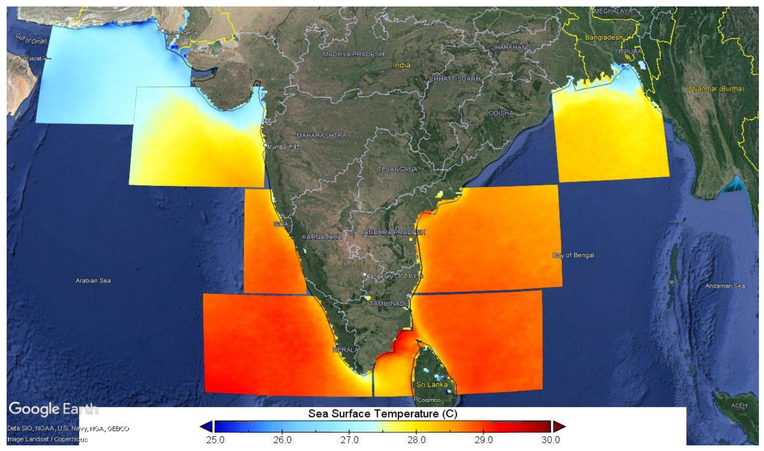
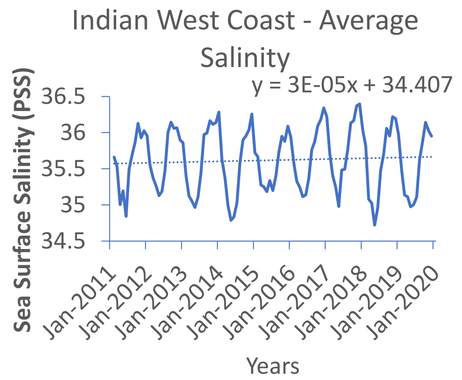
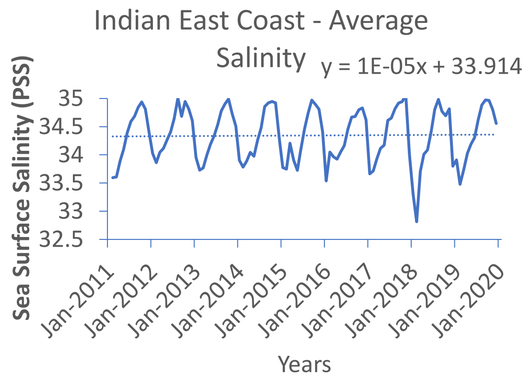
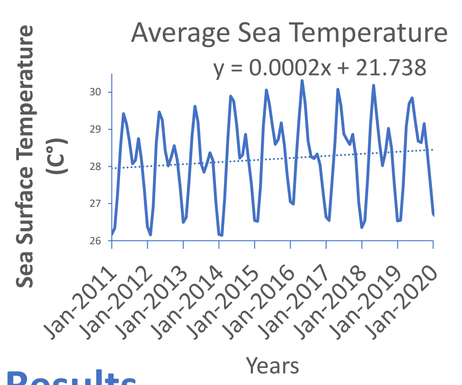


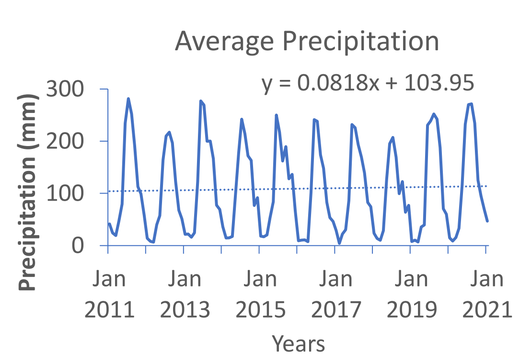
Figure 3 – Sea Temperature











Results

- Salinity over the Bay of Bengal and the Arabian sea shows strong spatial and temporal variations.
- The Bay of Bengal has low salinity Compared to the Arabian Sea.
- The surface runoff and precipitation affects salinity in these two regions
- Salinity greatly increases as we go from the east coast to west coast of India.
- These differences affect marine life, which may need to regulate its intake of saltwater and can largely affect their living conditions.

Sources

Sea Surface Salinity (MULTIOBS_GLO_PHY_S_SURFACE_MYNRT_015_013) (SMOS)
Daily Accumulated Precipitation (Combined Microwave-IR) (GPM_3IMERGDF v06)
Sea Surface Temperature at 11 microns (Night)
(MODISA_L3m_NSST_Monthly_9km Vr2019.0)

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