Long-term variation of the Sea Surface Temperature over 13 oceanic regions linked to Indian Summer Monsoon Rainfall

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Introduction

The prediction of Indian Summer Monsoon Rainfall (ISMR) has always been challenging due to its complexity and heterogenic nature. Traditionally predicated models were unable to identify the smaller irregularity and therefore the need of better predication model arises.

Objectives

The study aims to determine and evaluate presence of trend in SST(Sea Surface Temperature) of 13-oceanic regions linked with ISMR for time period (1901-2010; 110 years)

Methodology

Collection of data

- Monthly reconstructed global SST (ERSST) version 3b from National Oceanic and Atmospheric Administration (NOAA); National Centers for Environmental Information (NCEI)
- https://www1.ncdc.noaa.gov/pub/data/cmb/ersst/v3b/netcdf

Identification of zones

The 13 oceanic regions linked to ISMR are identified based on (Sahastrabuddhe & Ghosh, 2019)
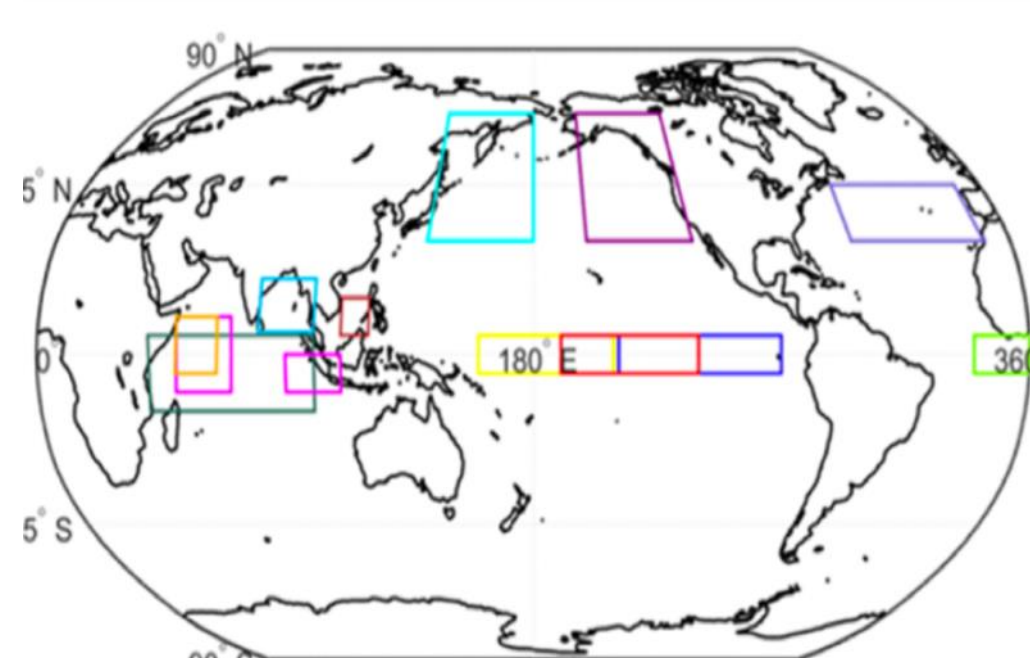
Data processing

Used Matlab application to process the data
Methods used :-
- Mann Kendall Rank Test
- Sen Slope estimator

Result

Sr no.	Name of sst region	Presence of trend	sen-slope value
1	Atlantic nino	1	0.268
2	Bay of Bengal	1	0.6244
3	Niño 3	1	0.1169
4	Niño 3.4	1	0.1717
5	Niño 4	1	0.3039
6	North Atlantic	1	0.1246
7	North Pacific	1	0.0999
8	North Pacific 2	1	0.1339
9	China sea	1	0.3639
10	Southern Indian ocean	1	0.4078
11	Western Indian ocean	1	0.3817
12	Zonal mode	1	0.2912
13	Indian ocean dipole	1	0.3846

- ❖ The results reveal a positive trend indicating warming for all oceanic regions except for North Pacific 2 which shows a negative trend.
- ❖ The Sen-slope values are recorded highest for North Atlantic region; while, lowest for North Pacific region.
- ❖ The three regions around Indian landmass namely Southern Indian Ocean, Western Indian Ocean and Bay of Bengal which shows statistically significant positive trend with estimated Sen-slope values nearly 0.0285, 0.0292 and 0.0243 respectively.
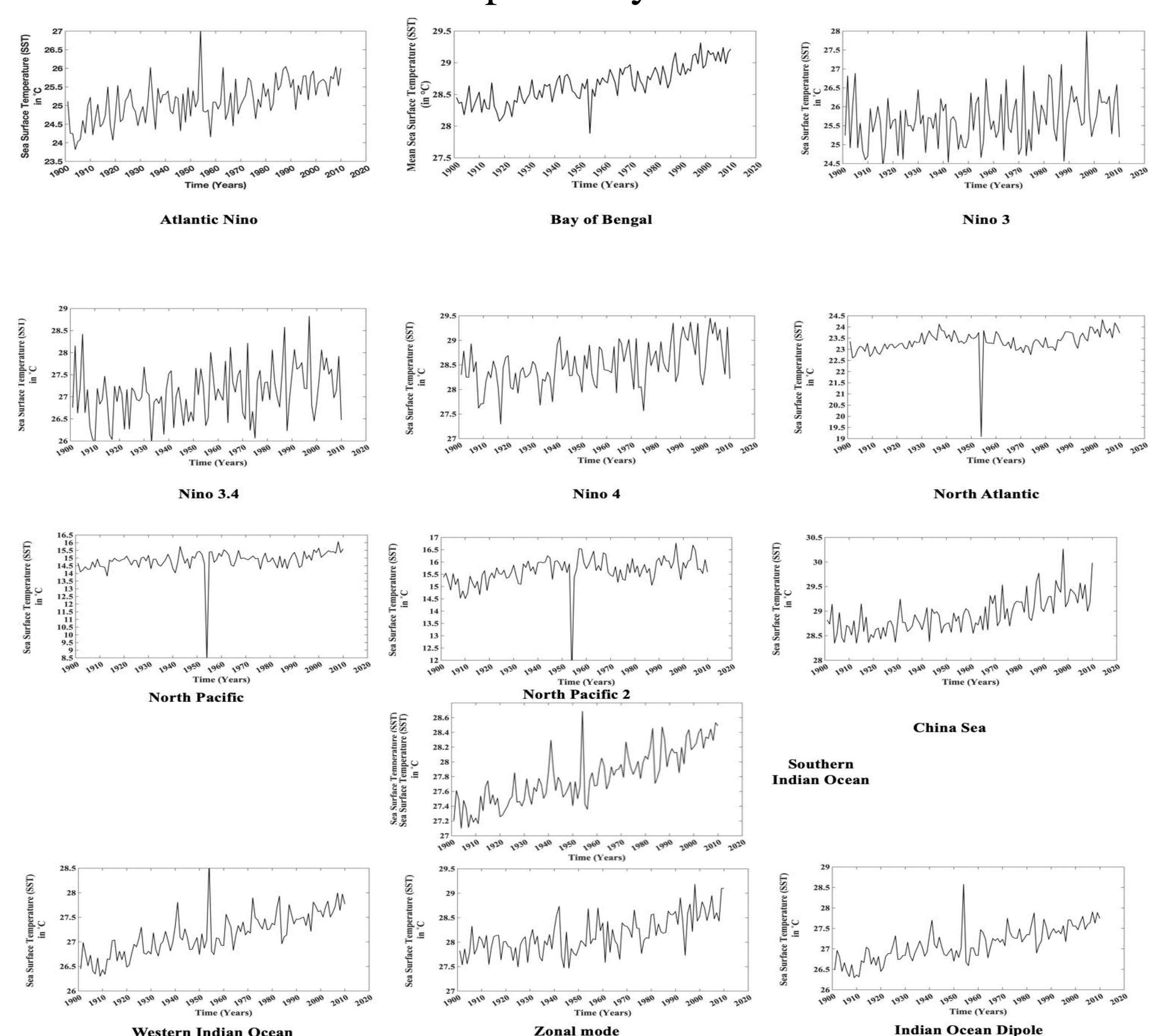
Observed Monthly SST over different oceanic region

References

- ➢ Socioeconomic impacts (Wang., 2015)
- ➢ Comprehensive Ocean Atmosphere Data Set (COADS) (Smith TM, 2008)
- ➢ Spatial patterns of rainfall anomalies (Sahastrabuddhe and Ghosh, 2019)