

26th Working Party on Tropical Tunas, IOTC, 28 October to 2 November 2024

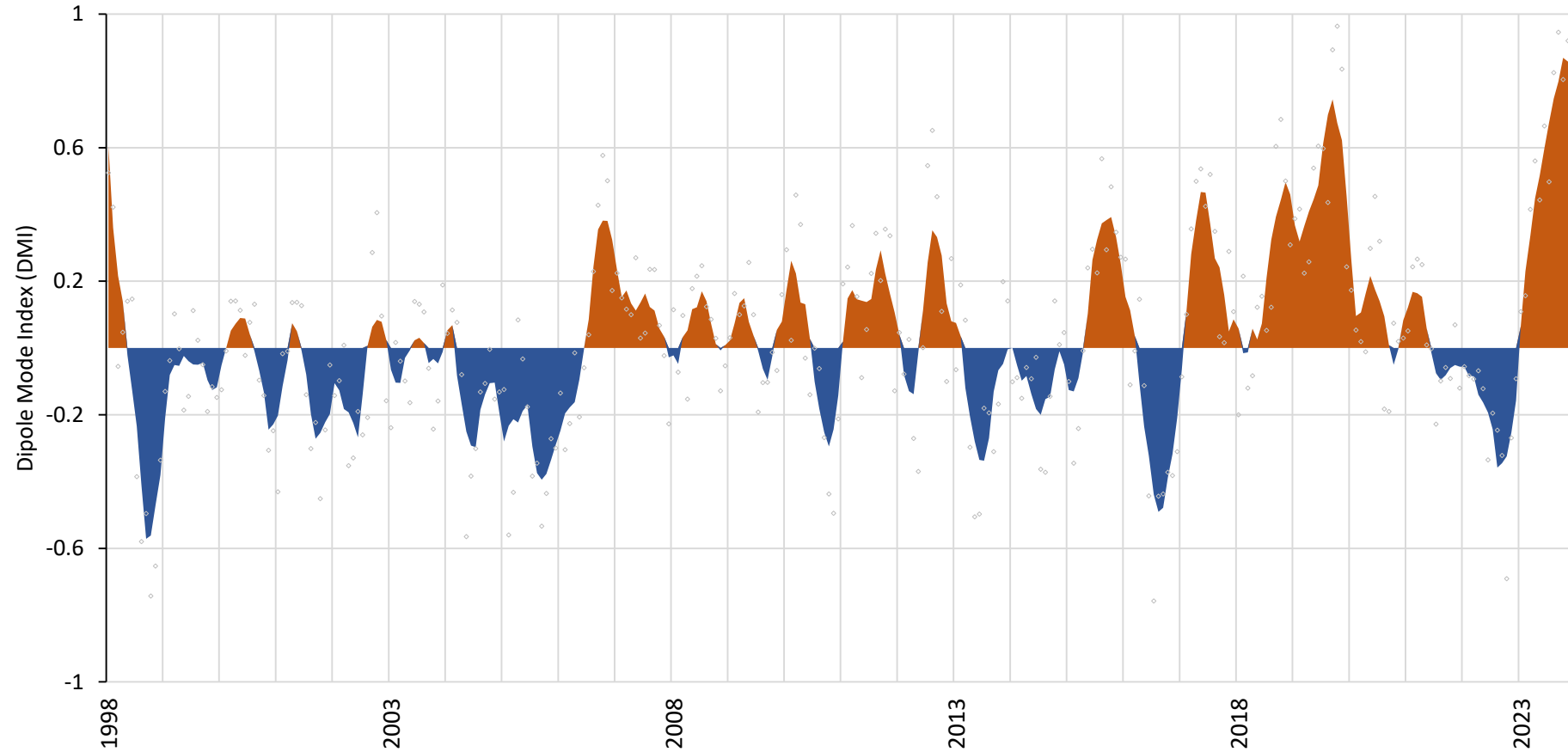
# Environmental indicators to inform ocean trends and state

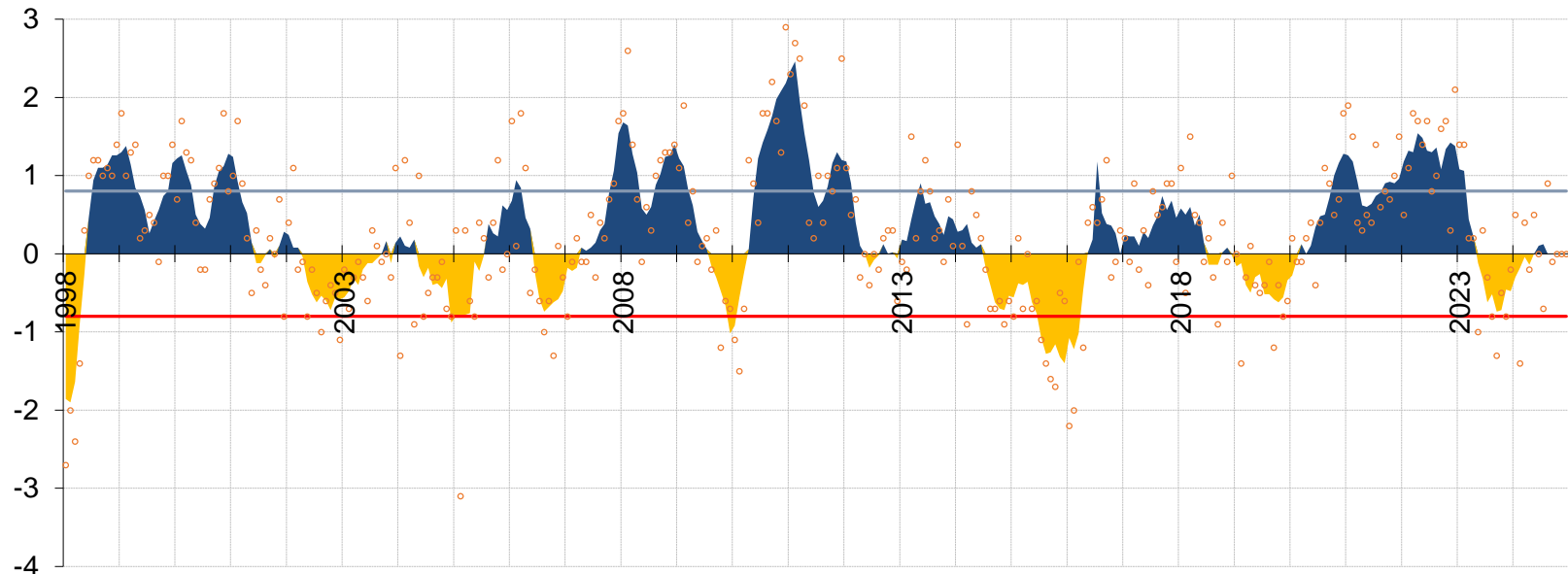
Food for thoughts !

# Data sources

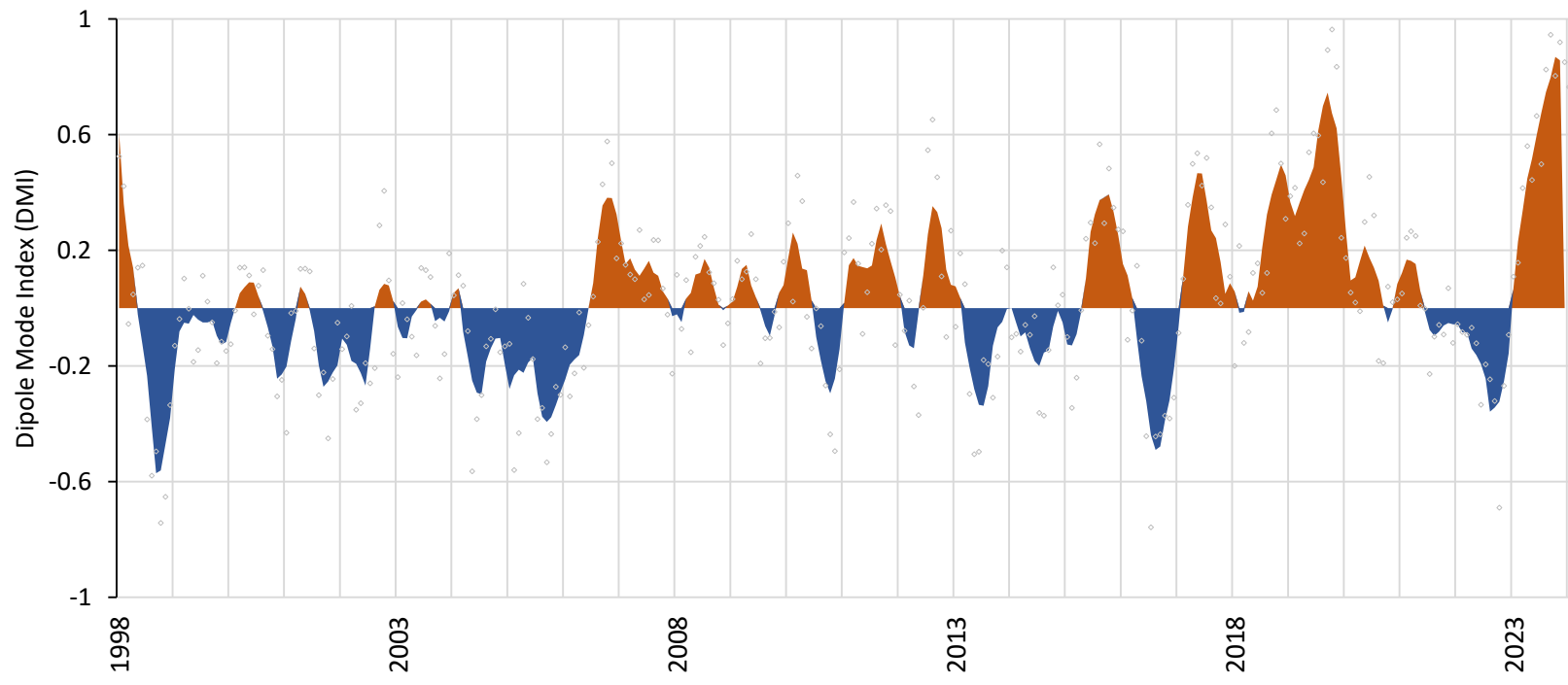
Variable	Provider	Characteristics	Resolution
Indian Ocean Dipole	Australian Bureau of Meteorology	Difference in Tano between West and East Indian Ocean	Basin-wide
Temperature	Copernicus Marine Environmental Service	Global ocean model (NEMO) Data-assimilated	8 km, monthly
Dissolved oxygen			25 km, monthly
Sea surface chlorophyll content		Satellite observations Multi-sensors OCEANCOLOUR_GLO_BGC_L4_MY_009_104	4 km, monthly

# Indian Ocean Dipole (past 25 years)





Blue : Nina  
**SOI**  
Yellow : Nino



**IOD**

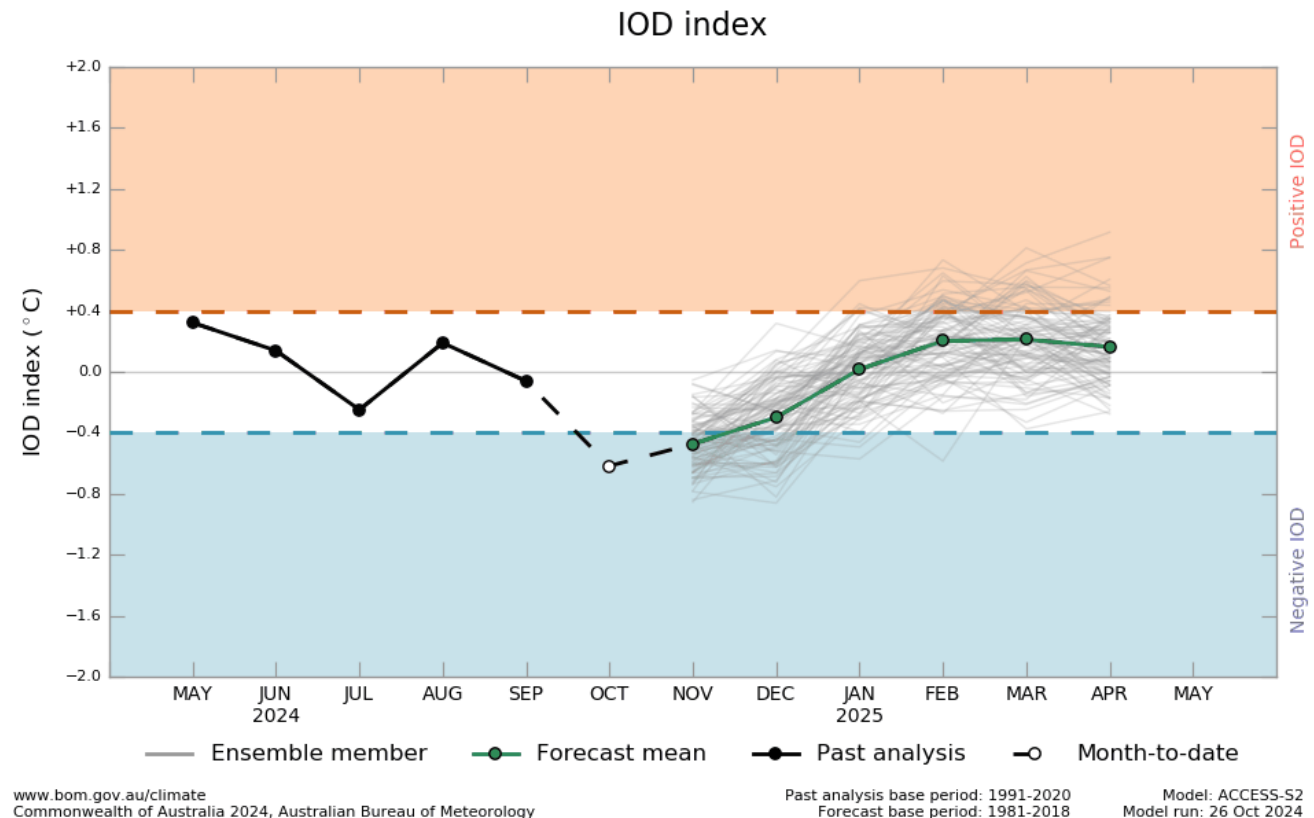
# IOD status by BoM

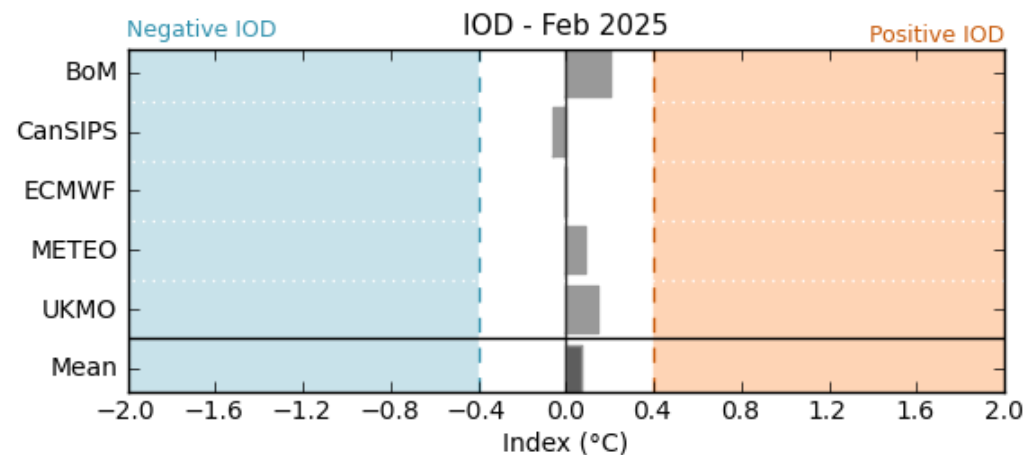
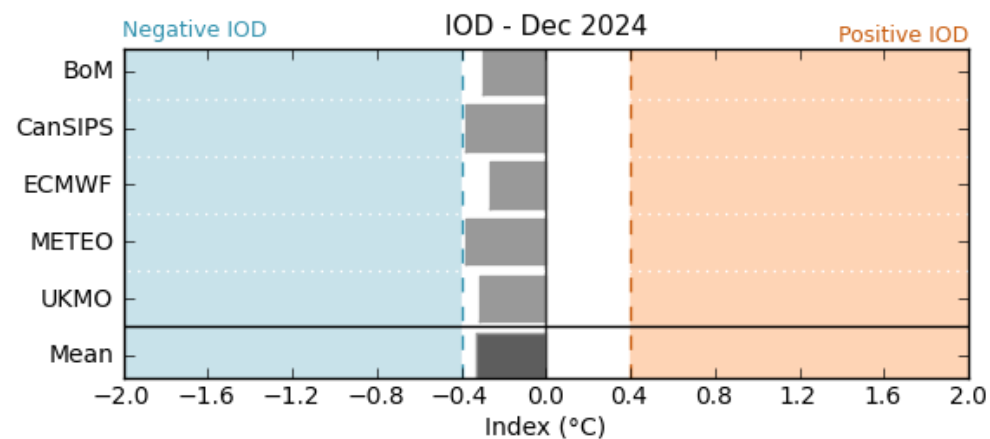
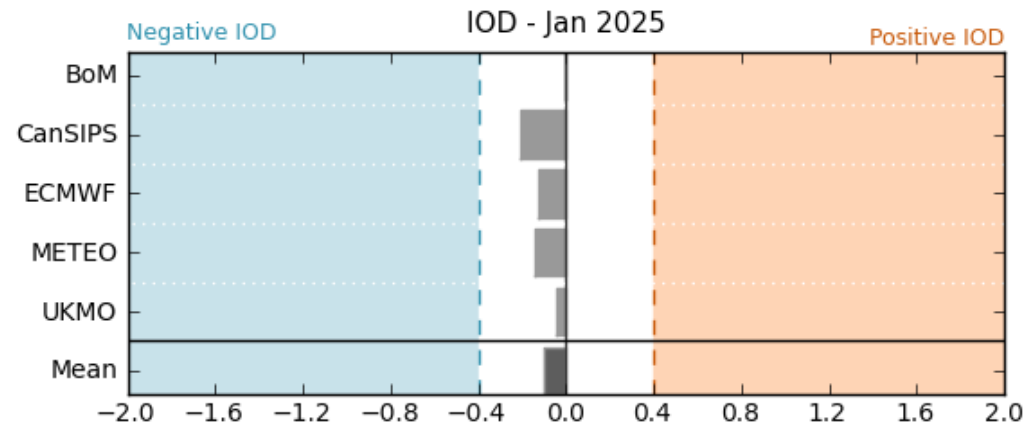
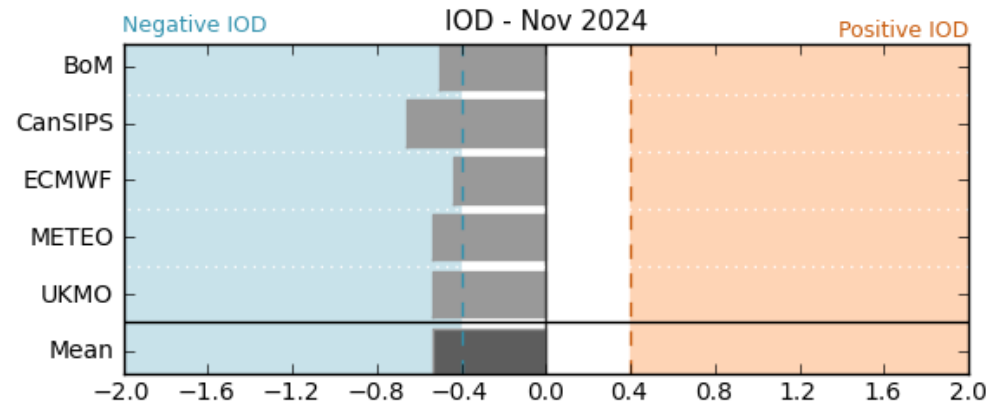
## Current state

- Neutral IOD (in September 2024)
- The IOD index for the week ending 27 October was  $-0.94\text{ }^{\circ}\text{C}$ , making it the 5th consecutive week close to or below the negative IOD threshold ( $-0.4\text{ }^{\circ}\text{C}$ ).

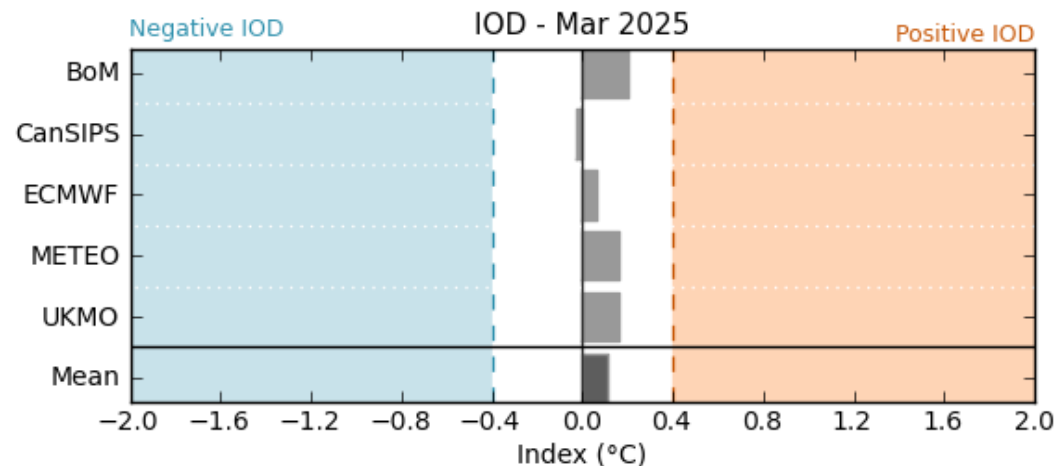
## Forecast

- The IOD index will meet or exceed negative IOD thresholds in November, before returning to neutral values during December.
- To be classified as a negative IOD event, the index would need to show sustained values below the negative IOD threshold, for at least 6 to 8 weeks





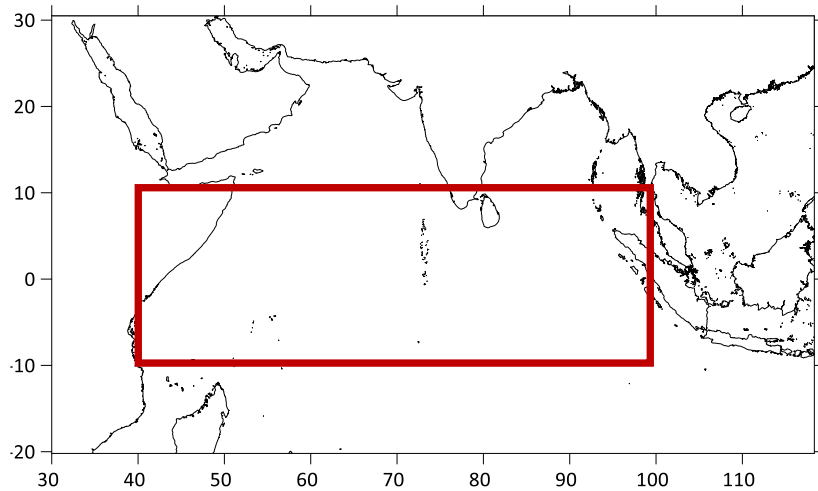
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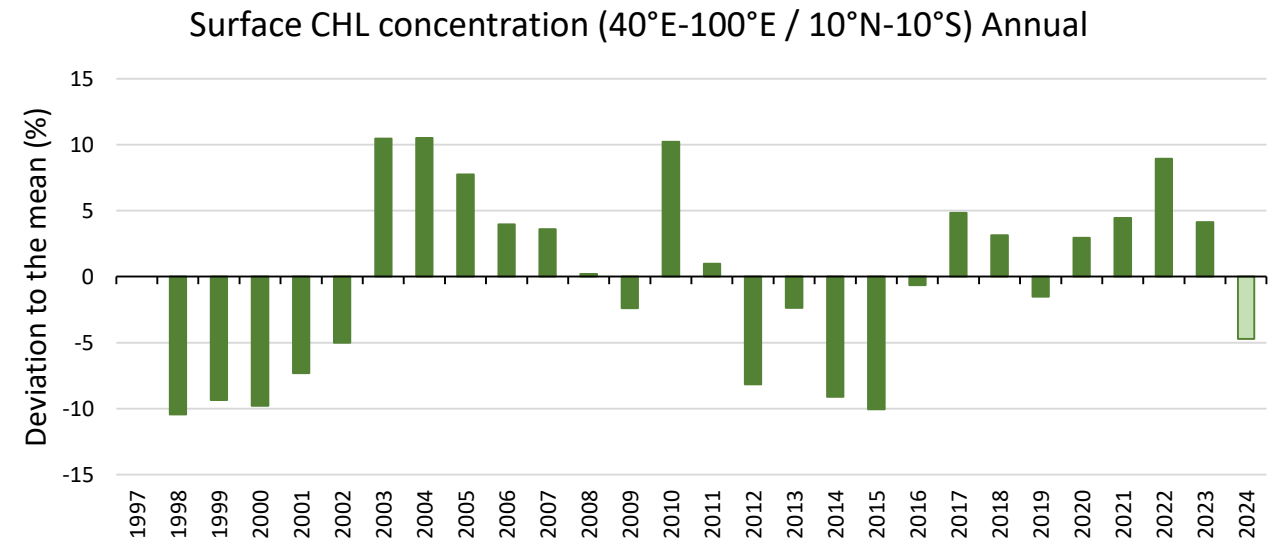
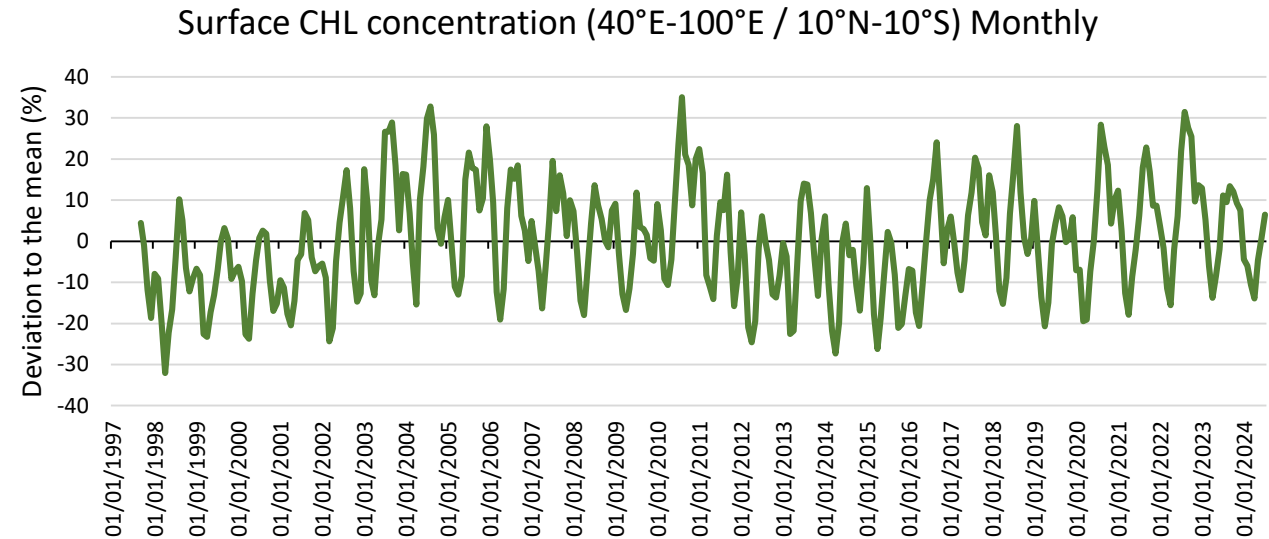
**IOD forecasts detailed  
by climate model**

# Ocean productivity (chlorophyll content)

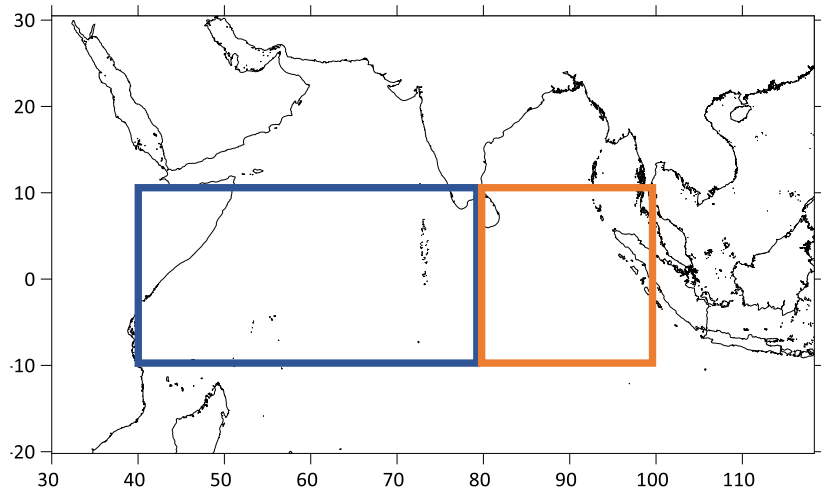


**Decline in chlorophyll content  
since 2022**

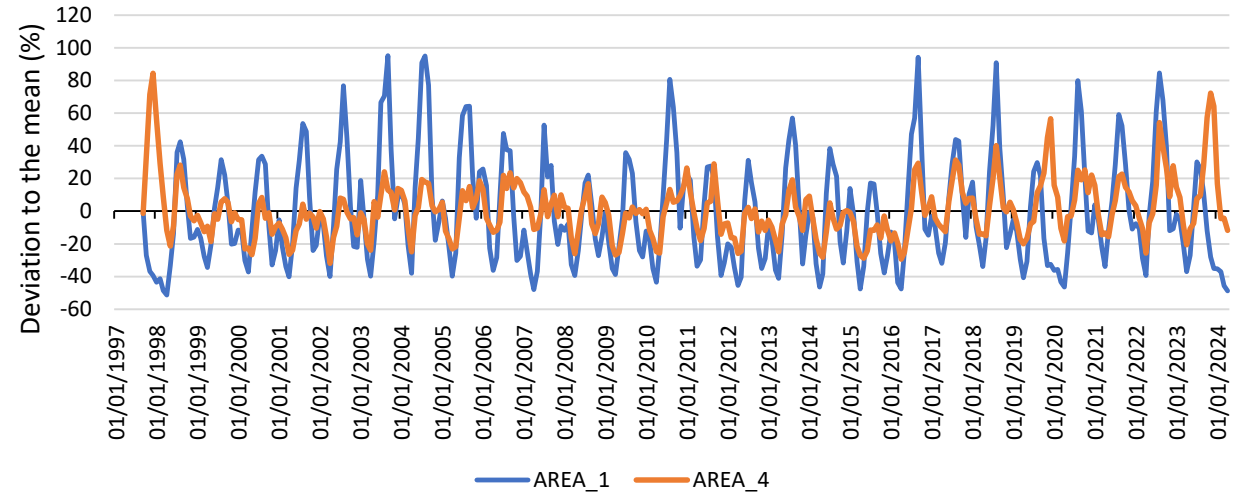
- **2022** : Negative dipole, increased Chl
- **2023** : Positive dipole, decreased Chl



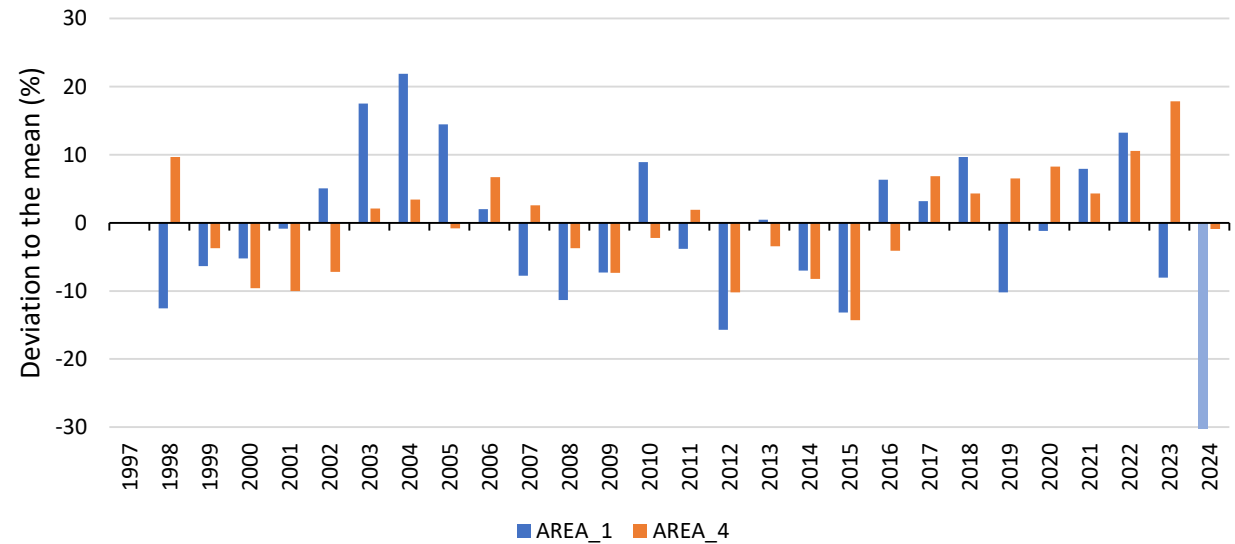
# Ocean productivity (chlorophyll content)



### Surface CHL concentration, monthly

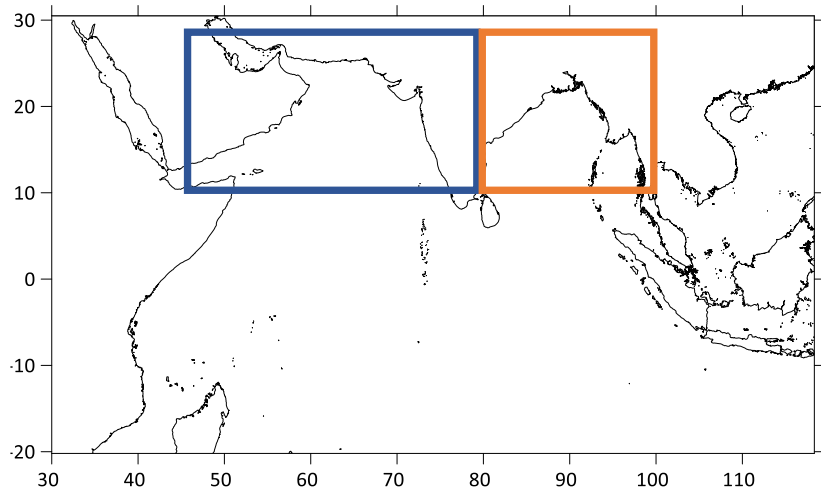


### Surface CHL concentration, Annual

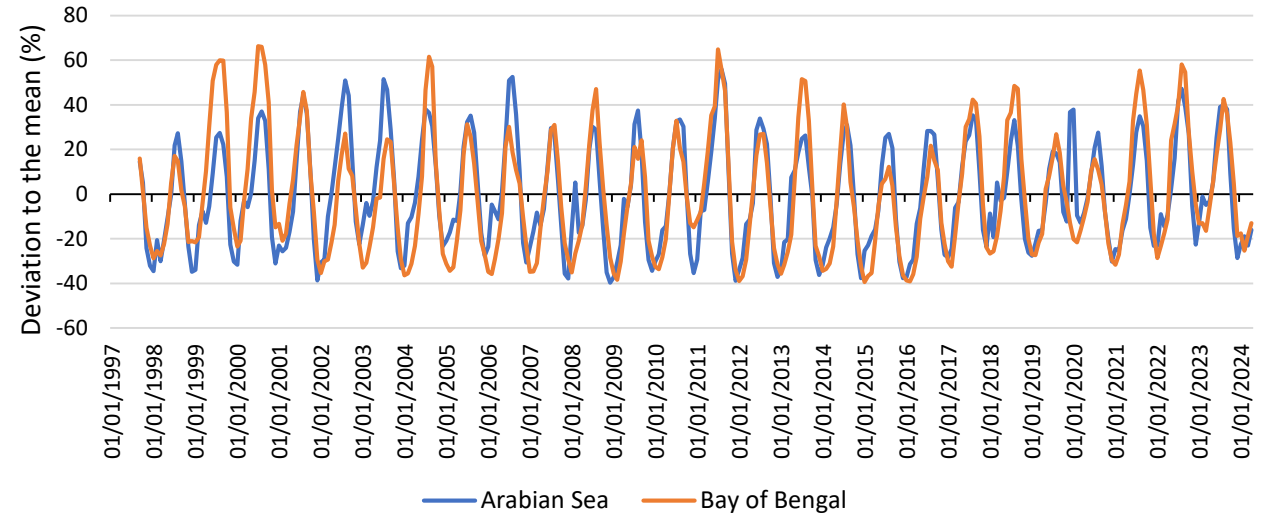




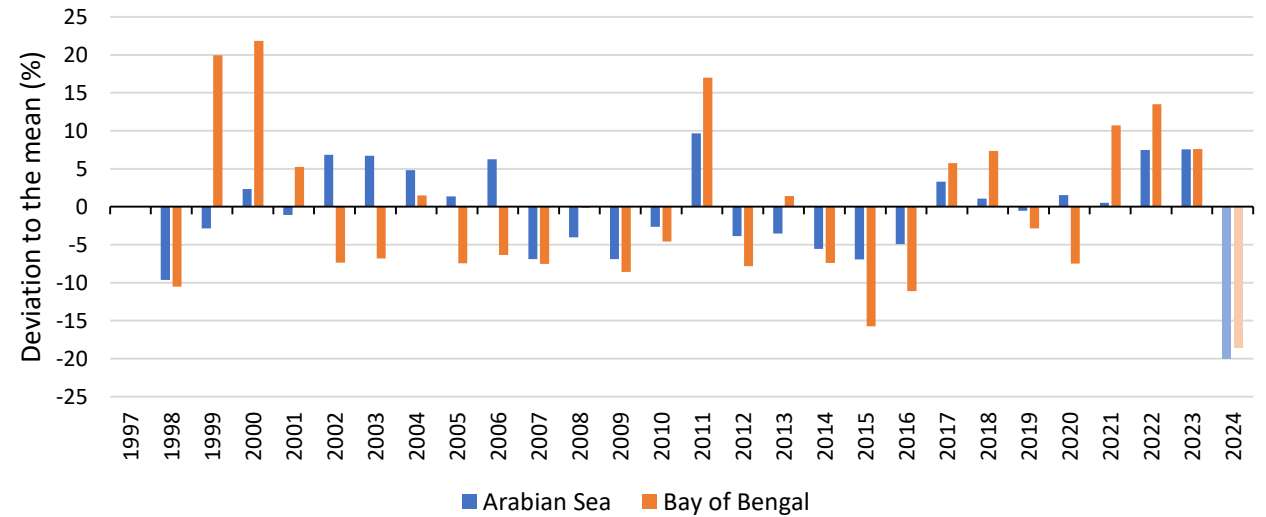
# Ocean productivity (chlorophyll content)



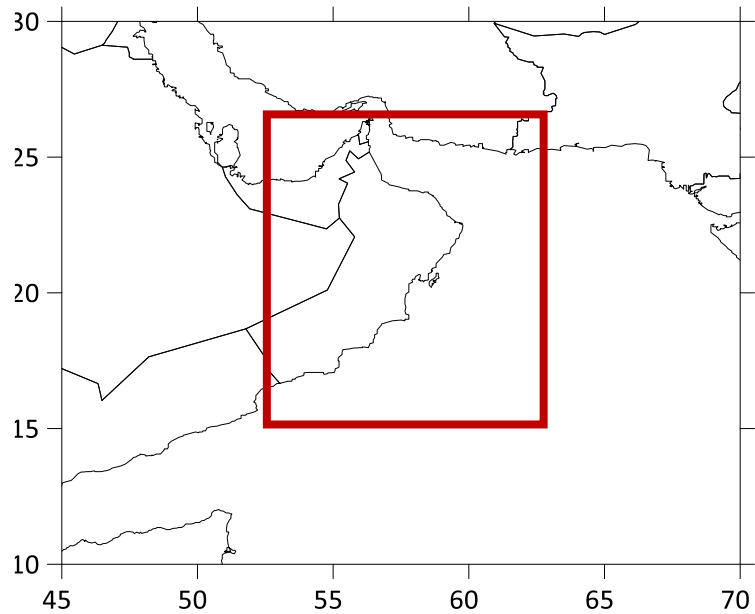
## Surface CHL concentration, Monthly



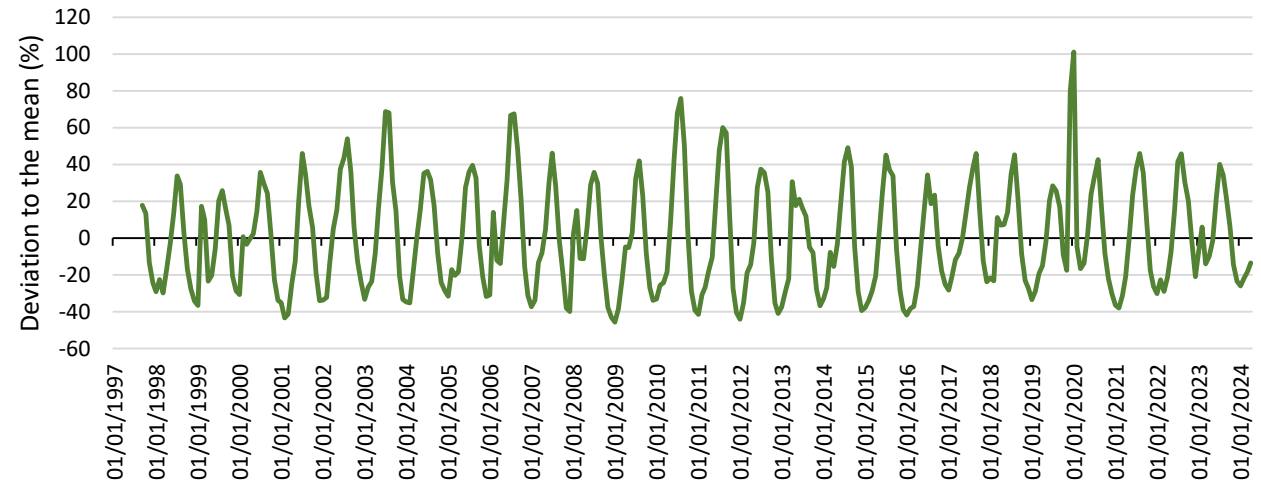
## Surface CHL concentration, Annual



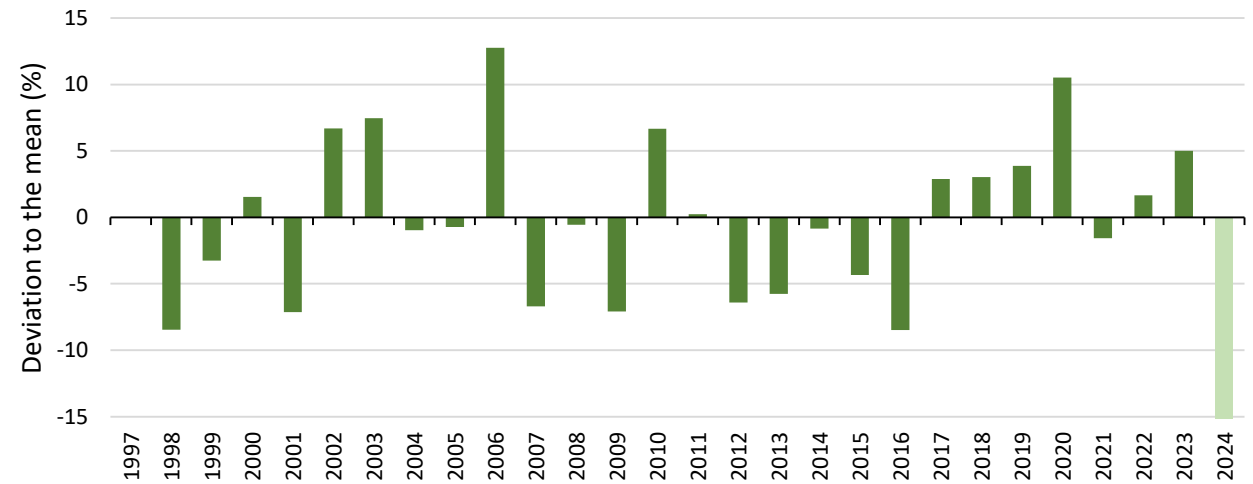
# Ocean productivity (chlorophyll content)



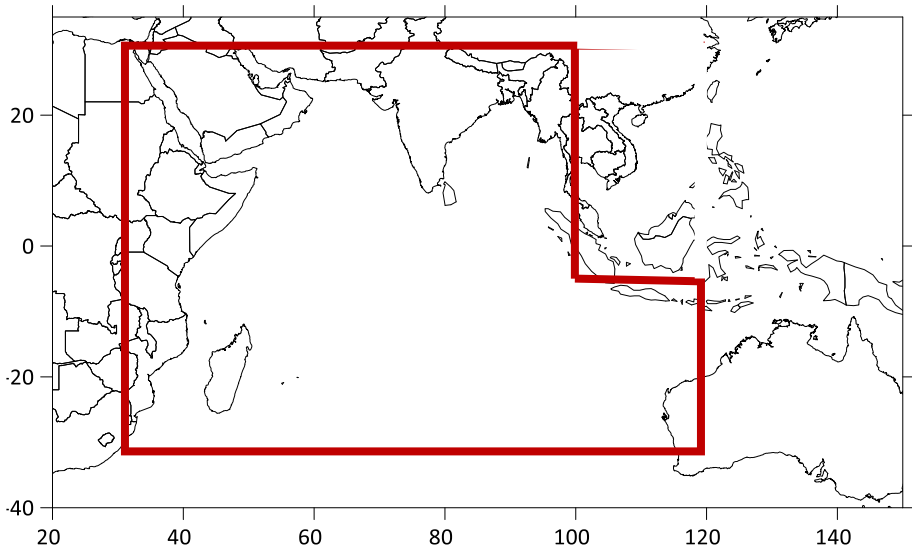
Surface CHL concentration, Oman, Monthly



Surface CHL concentration, Oman, Annual

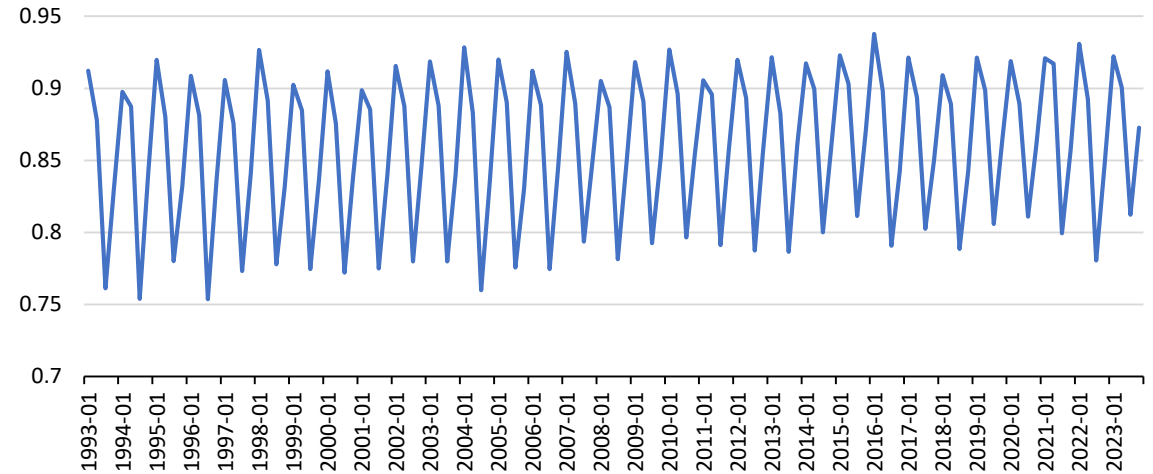


# Proportion of IO area occupied by temp > 25°C (Depth : 25 m)

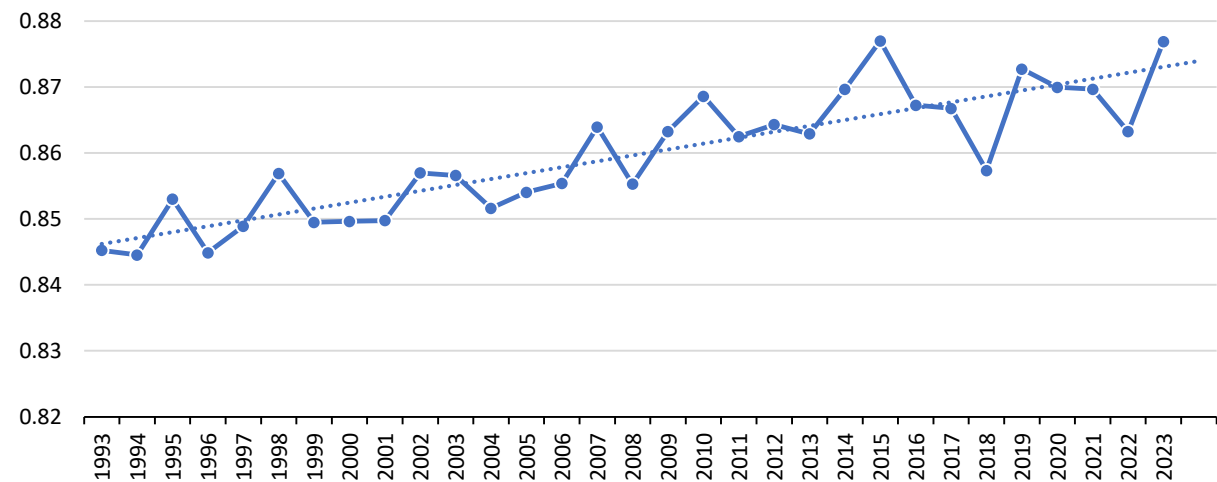


- Increase of 3% over the past 30 years (1993-2023)
- This is an indication that the optimal spawning habitat is expanding (mostly southwards)

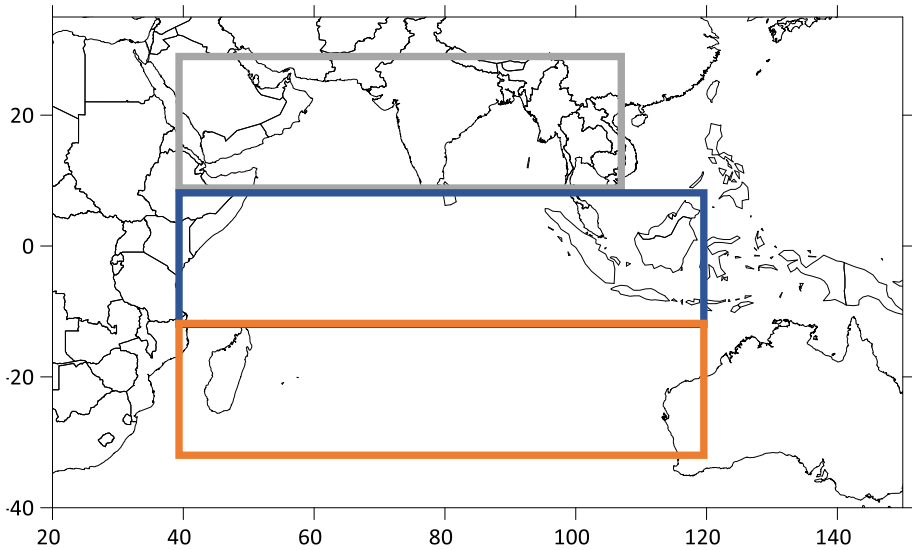
Prop. space T>25 by quarter (IO, 30°N to 30°S)



Prop. space T>25 by year (IO, 30°N to 30°S)



# Dissolved oxygen (Depth : 100 m)



- **2.5 ml l<sup>-1</sup> is a threshold in hypoxia stress for tropical tunas**
- **Depletion in dissolved oxygen below 100 m can increase the catchability of tuna in the upper layer**

