

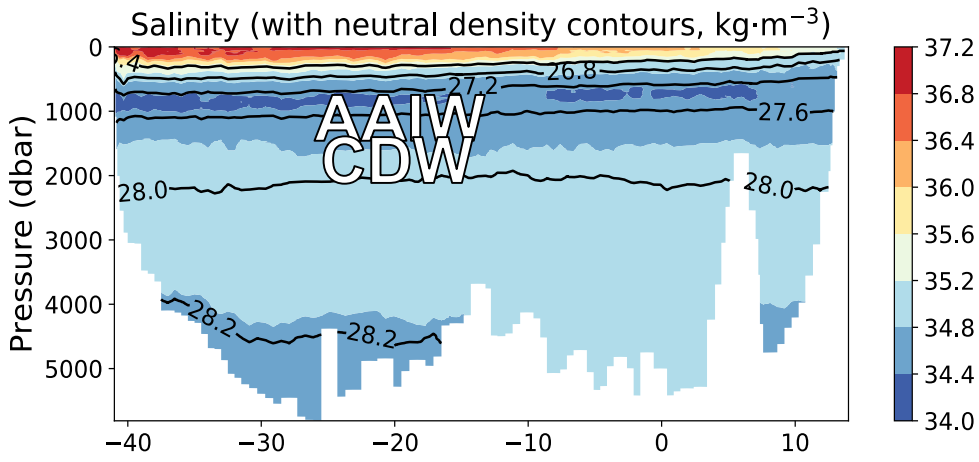
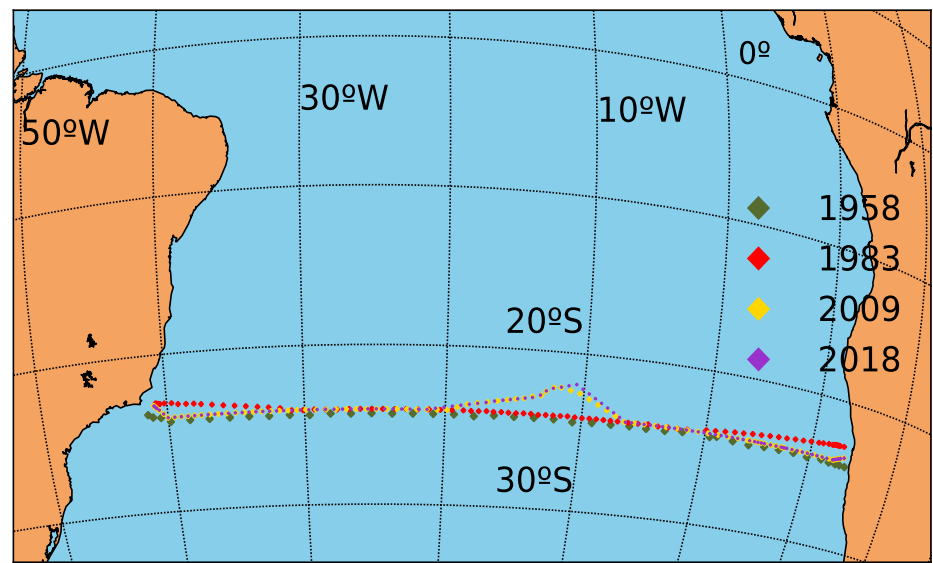
Salinity - Oxygen Indices for Climate variability in the South Atlantic

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LOUIS CLEMENT¹, GERARD MCCARTHY³, MARIA PAZ CHIDICHIMO⁴,
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- (1) NOC
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- (3) Maynooth University
- (4) CONICET
- (5) LMD
- (6) GEOMAR

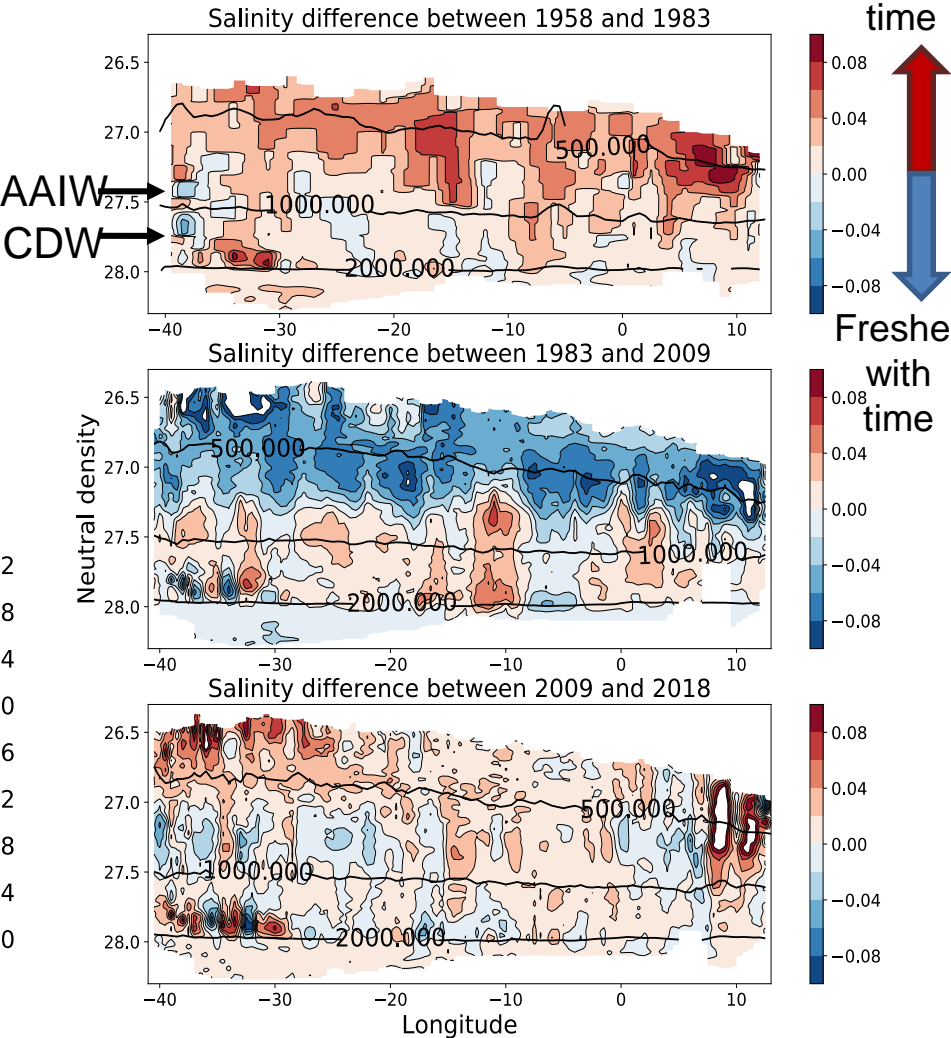


Repeated hydrographic cruises at 24°S over 60 years

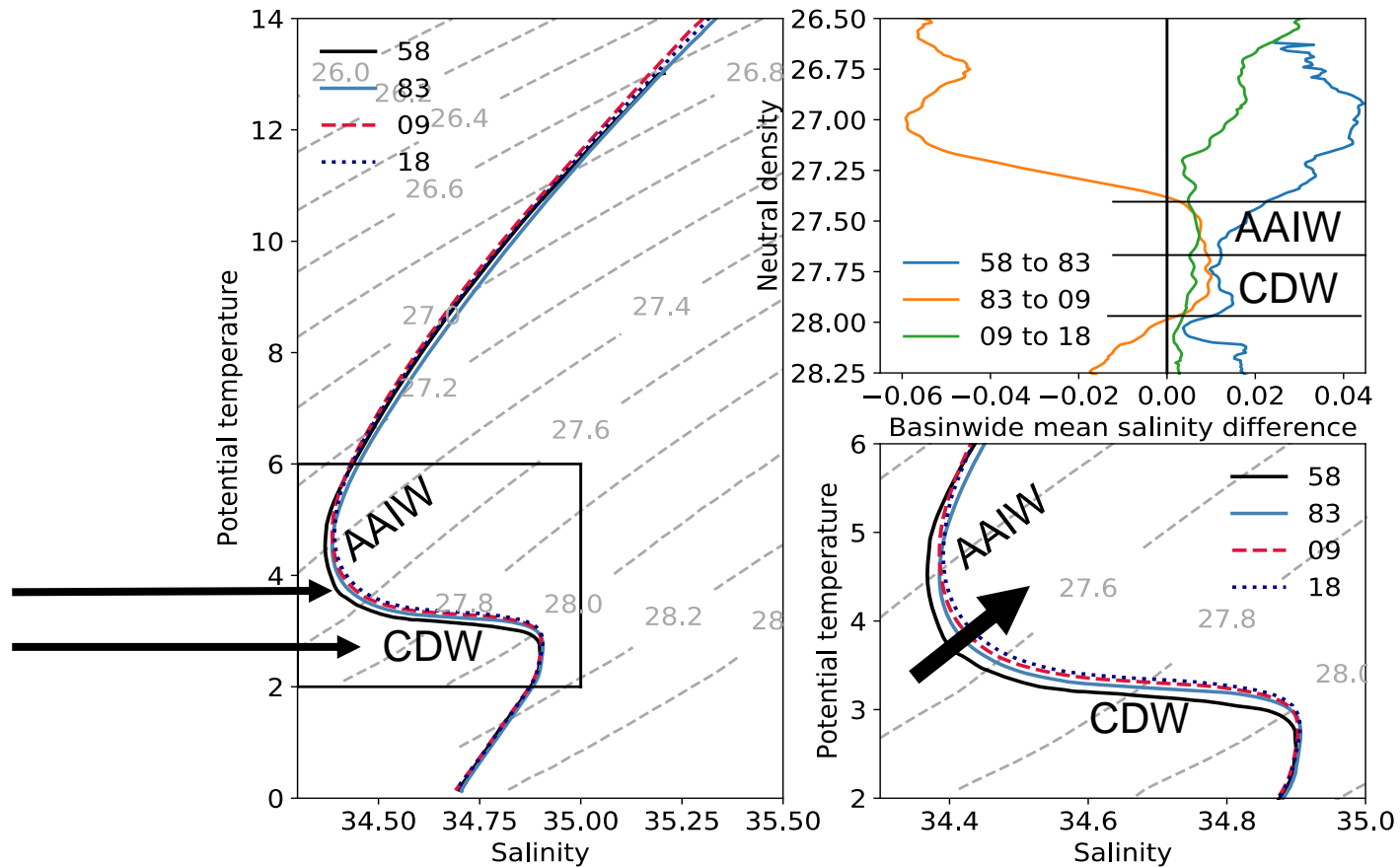


AAIW: Antarctic Intermediate Water
CDW: Circumpolar Deep Water

Decadal Salinity Changes on neutral density surfaces



AAIW and CDW getting warmer and saltier with time



AAIW and CDW getting warmer and saltier with time

The relationship between Apparent Oxygen Utilisation and salinity at the AAIW

Apparent Oxygen Utilisation (AOU) = Oxygen saturation – Observed Oxygen

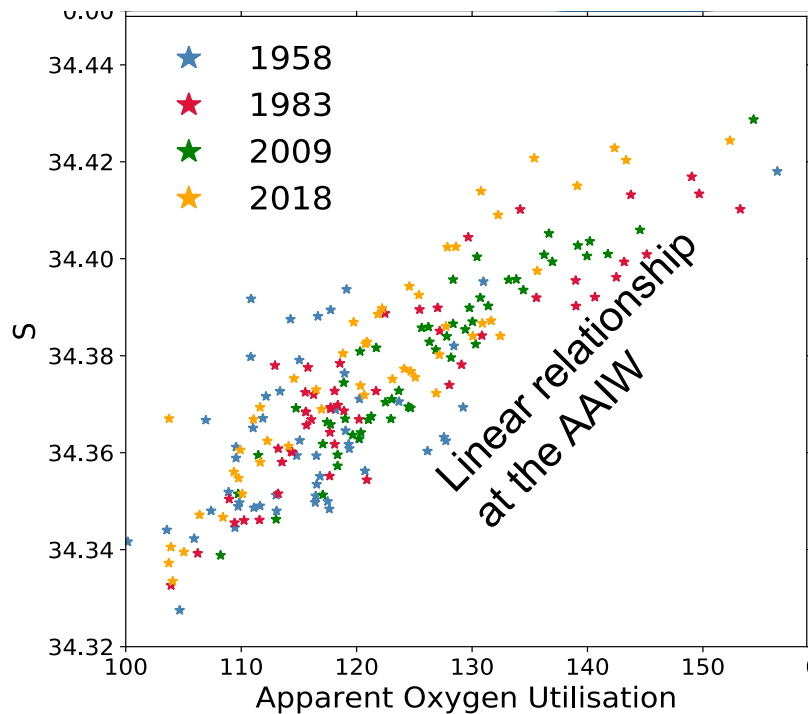
- AOU → indicator of age (older water = higher AOU)



The relationship between Apparent Oxygen Utilisation and salinity at the AAIW

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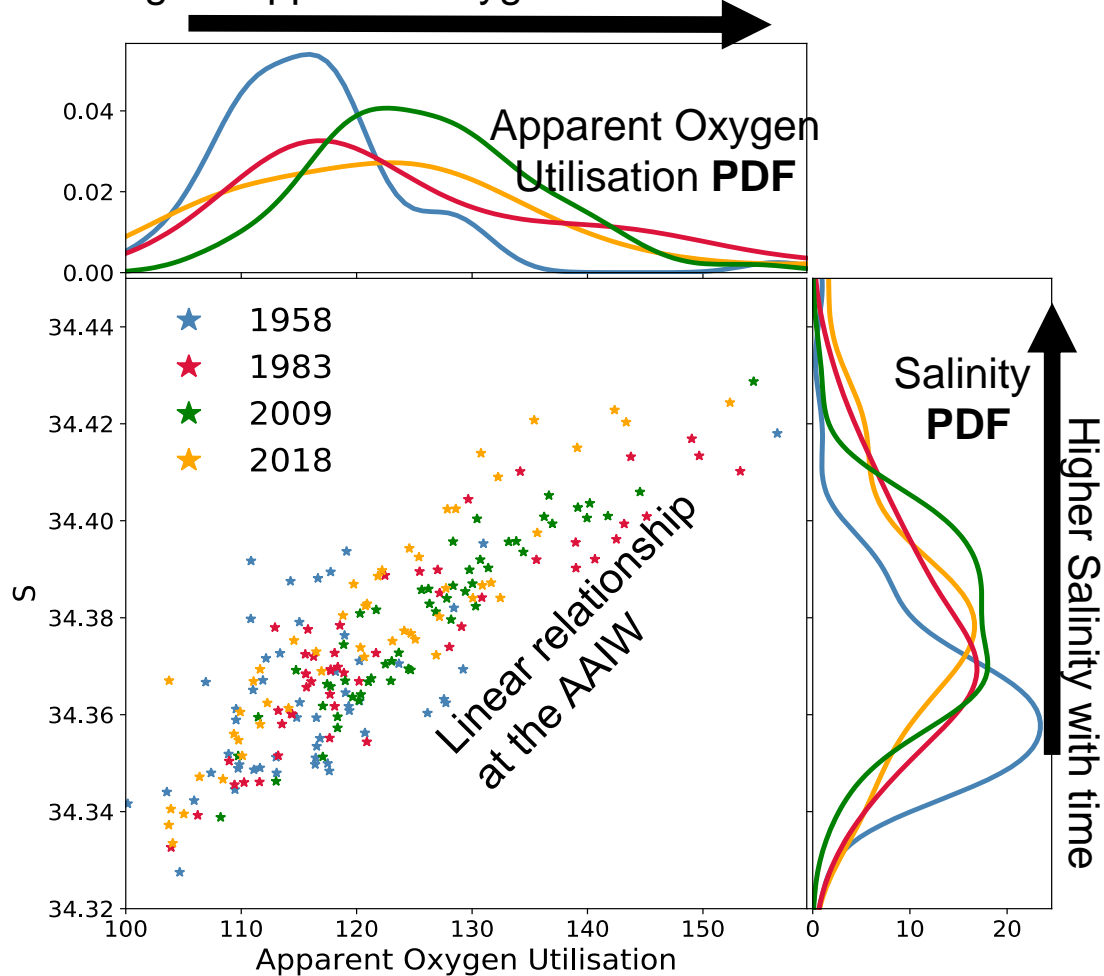


The relationship between Apparent Oxygen Utilisation and salinity at the AAIW

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Higher Apparent Oxygen Utilisation with time



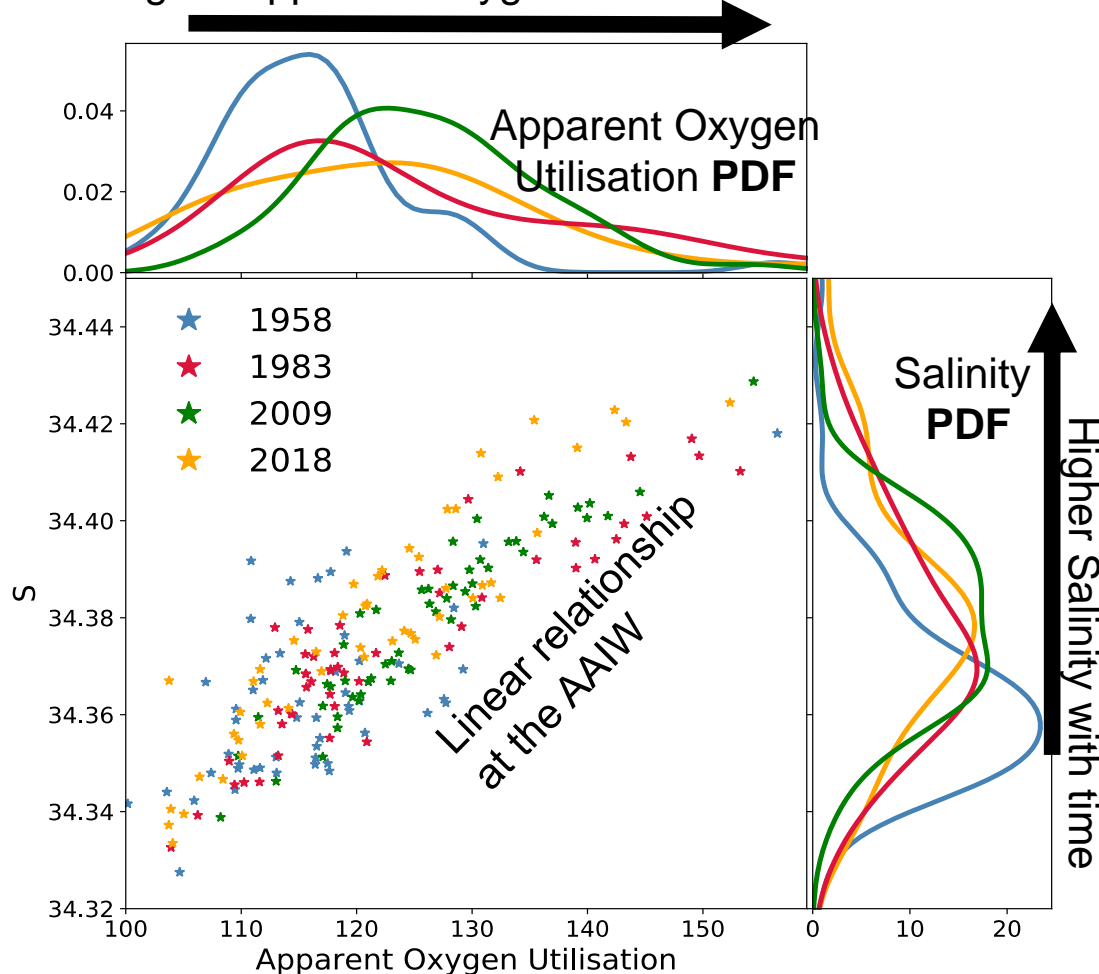
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Higher Apparent Oxygen Utilisation with time

➔ *An Index for climate variability*



AAIW:
Salinity correlated
with AOU

↓

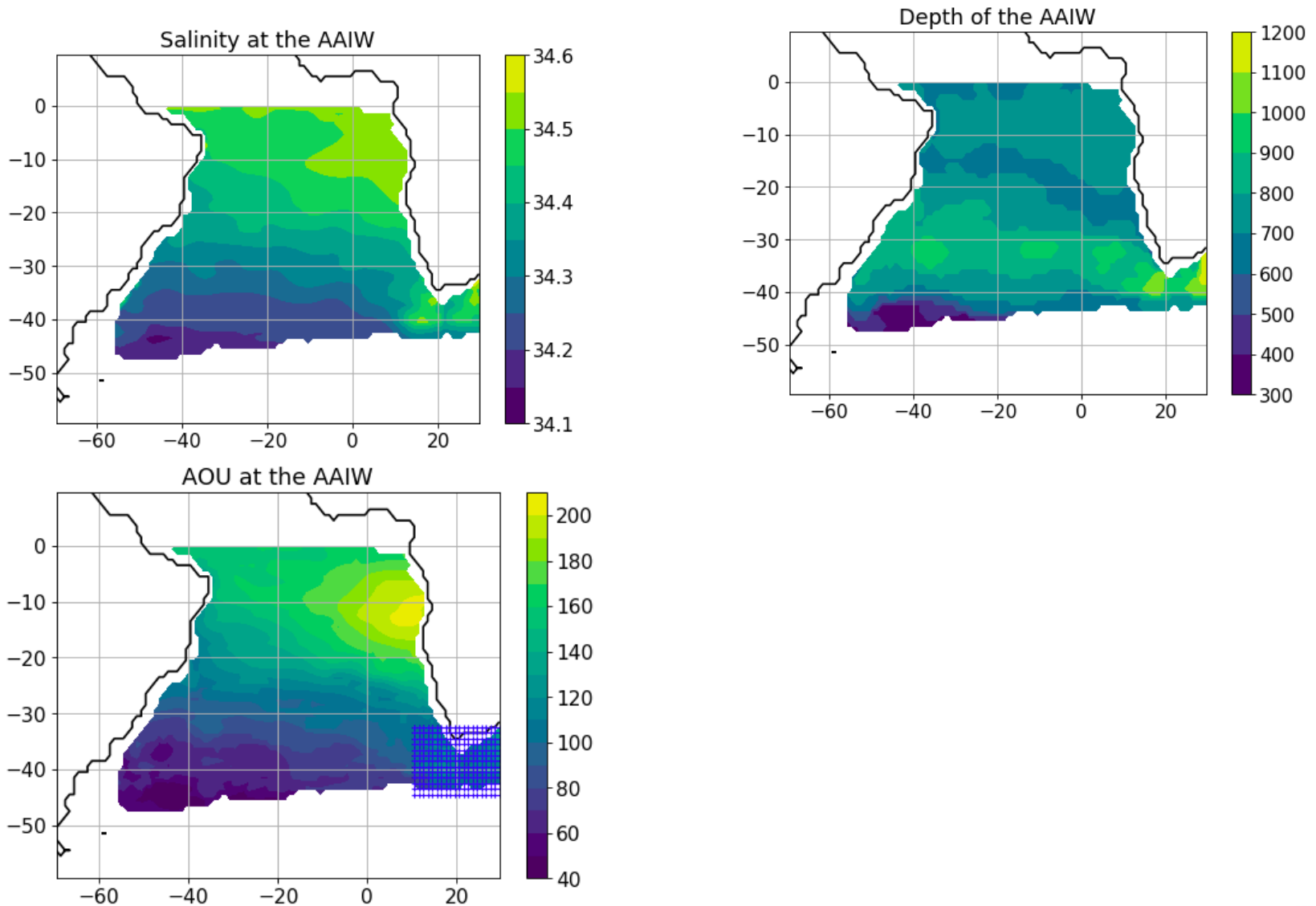
Index of Indian Ocean Influence

Increased salinity & AOU
over time since 1958

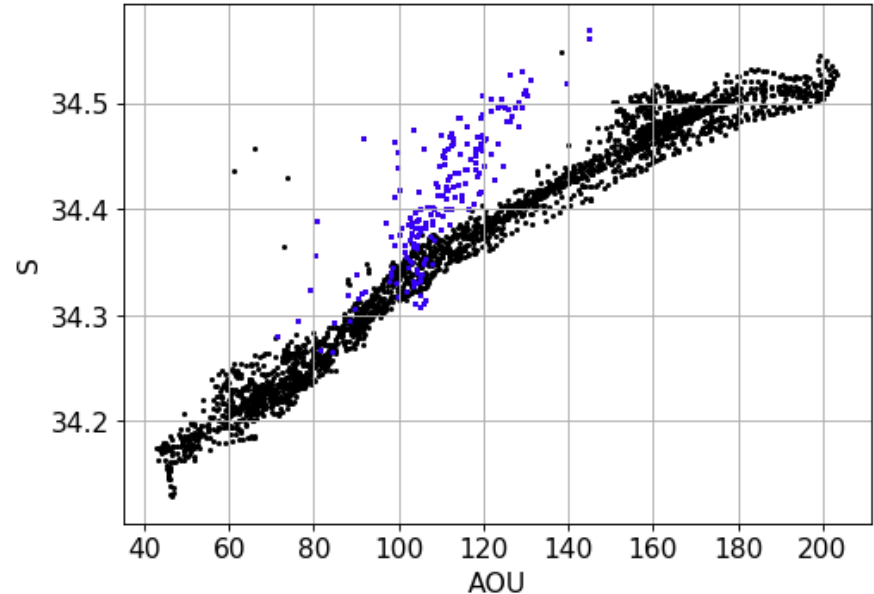
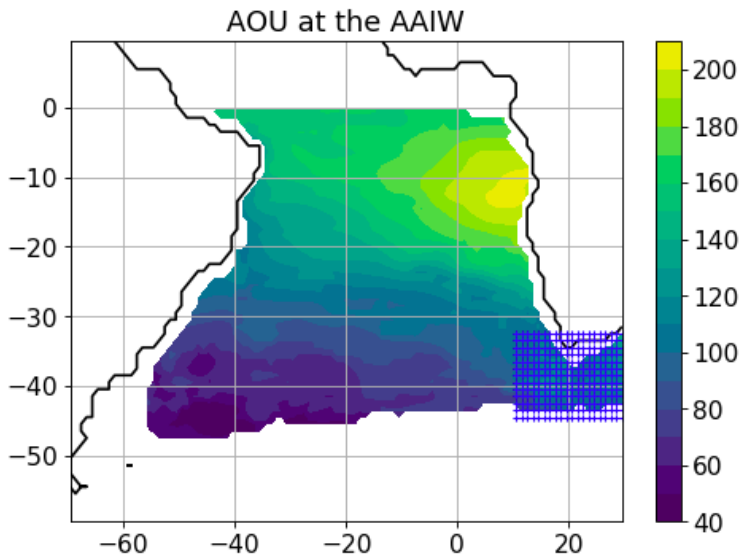
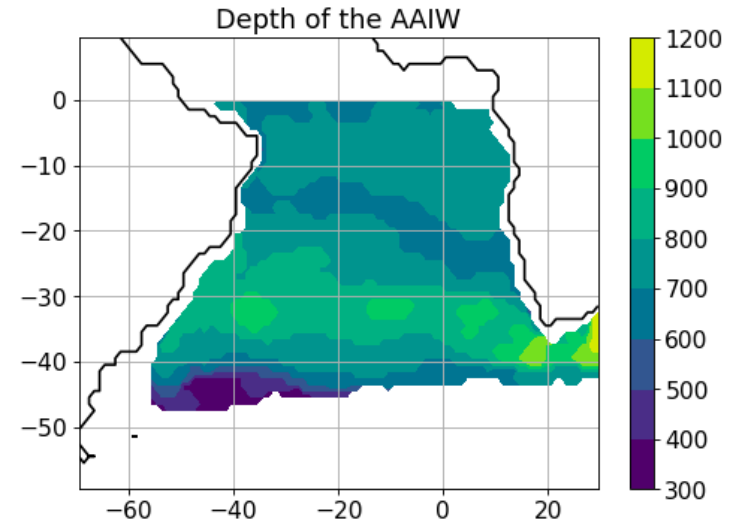
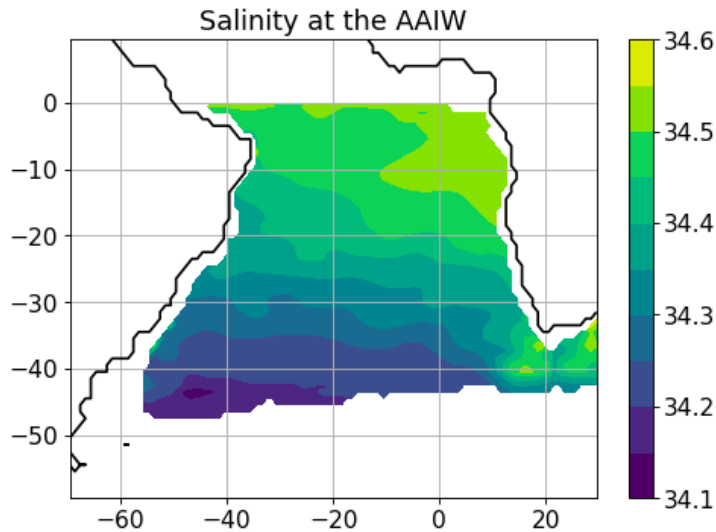
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- **Circulation Change**
- **Increased Indian Ocean Influence**

AOU – S climatology (GLODAPv2)



AOU – S climatology (GLODAPv2)



A new South Atlantic network of oxygen-sensor floats



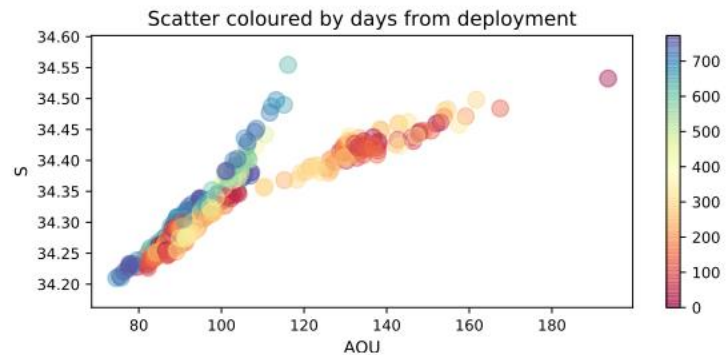
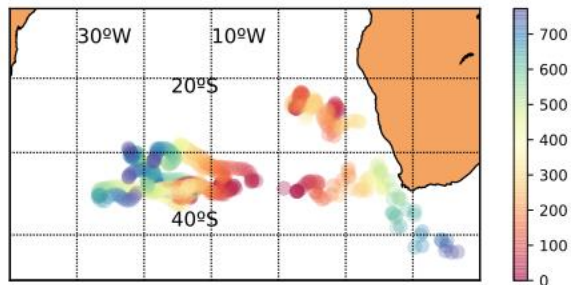
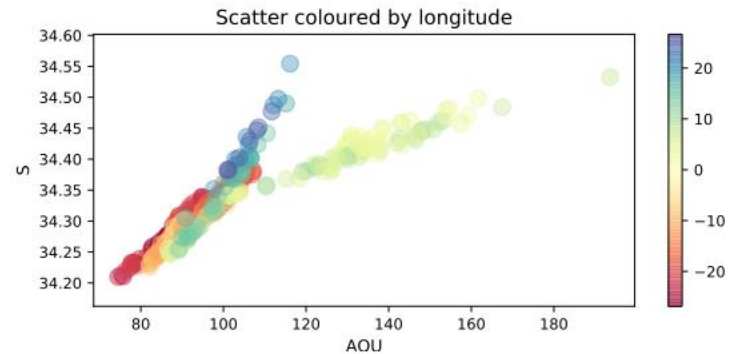
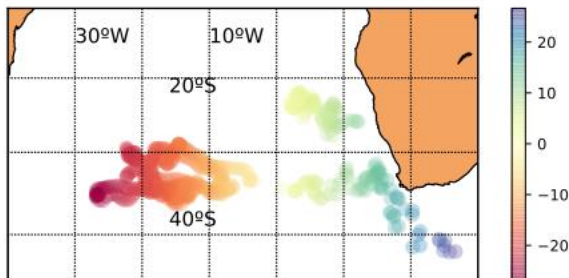
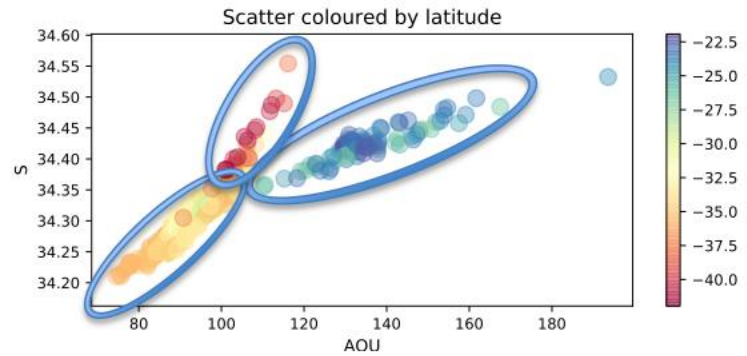
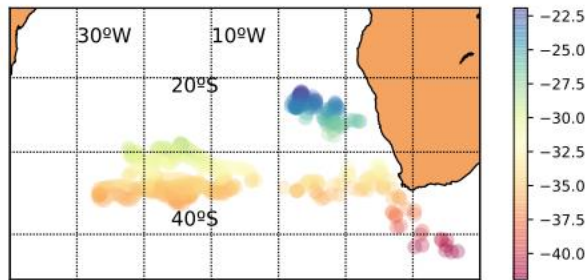
➔ ***Increasing space & time resolution of index***

6 NAVIS/oxygen floats deployed Jan 2017
from AtlantOS cruise MSM 060 at 35°S
2 NAVIS/oxygen and 2 APEX/oxygen floats
deployed Mar/Apr 2018 from JC159

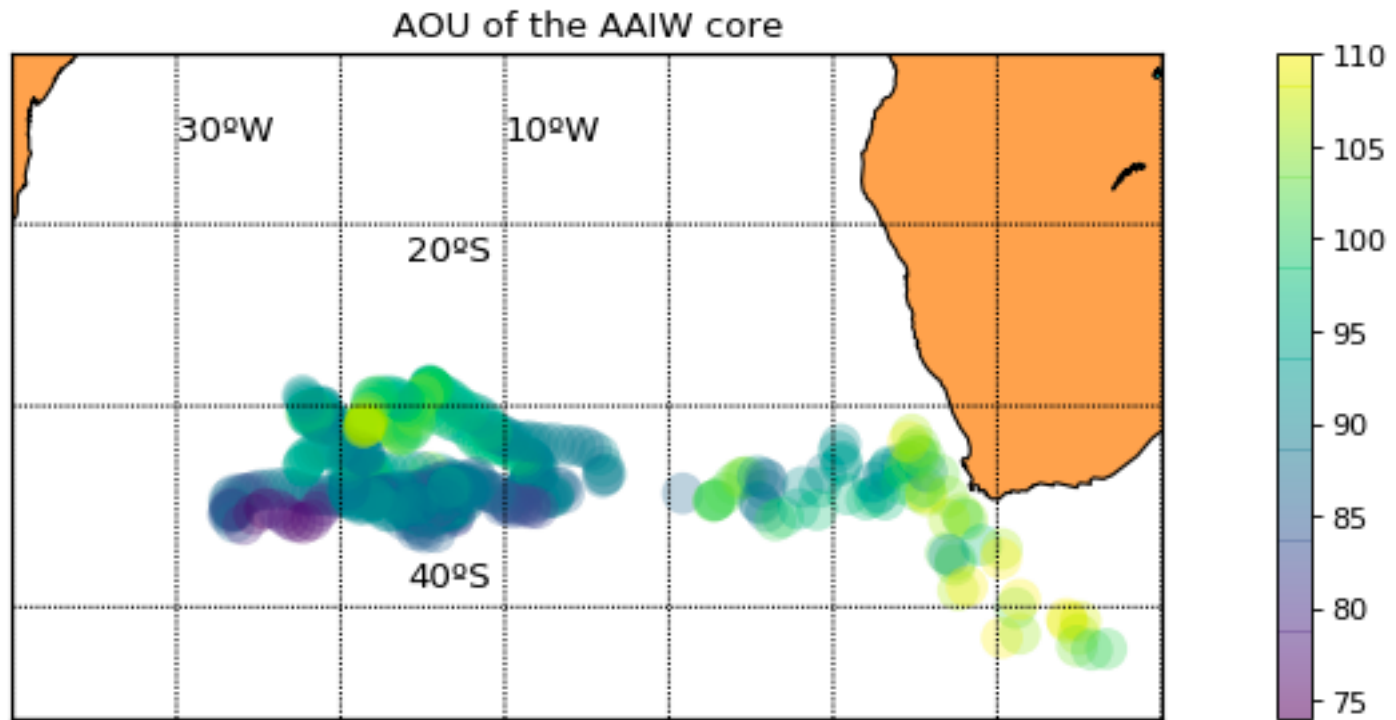
**Informing understanding of
salinity – AOU relationship**
Seasonal to interannual timescales
Spatial variability of the relationship



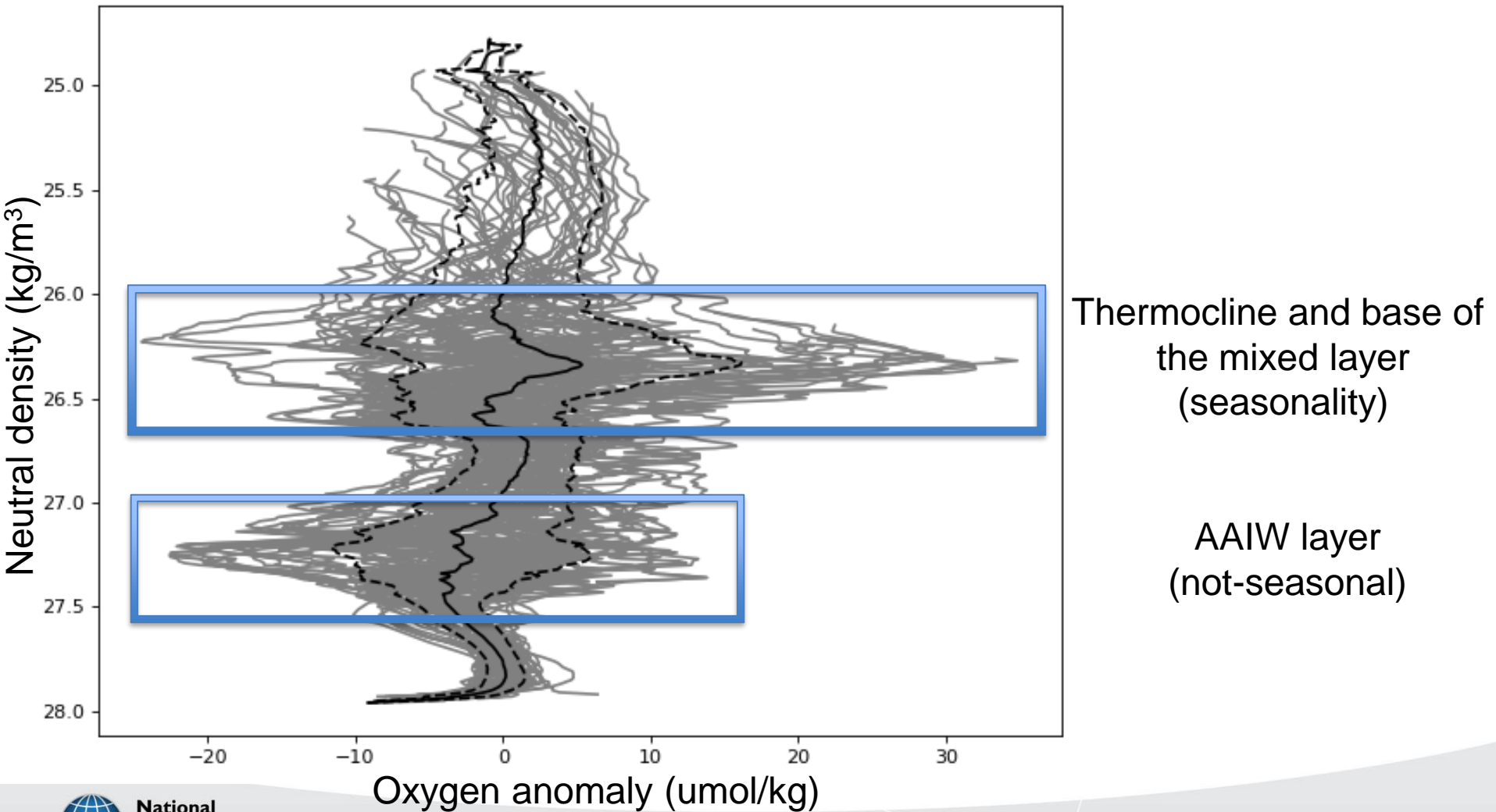
AOU – S index from the floats



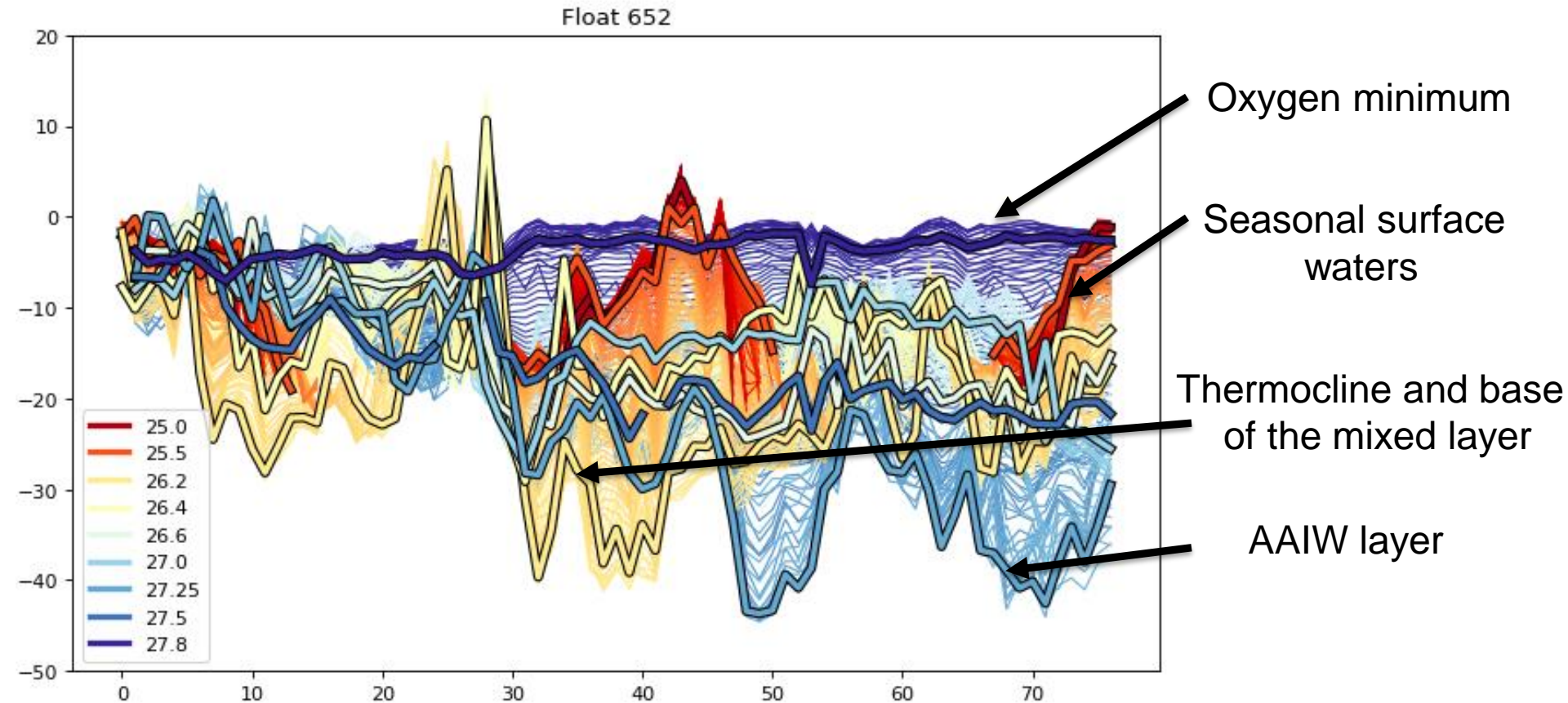
Indications of time-dependent variability



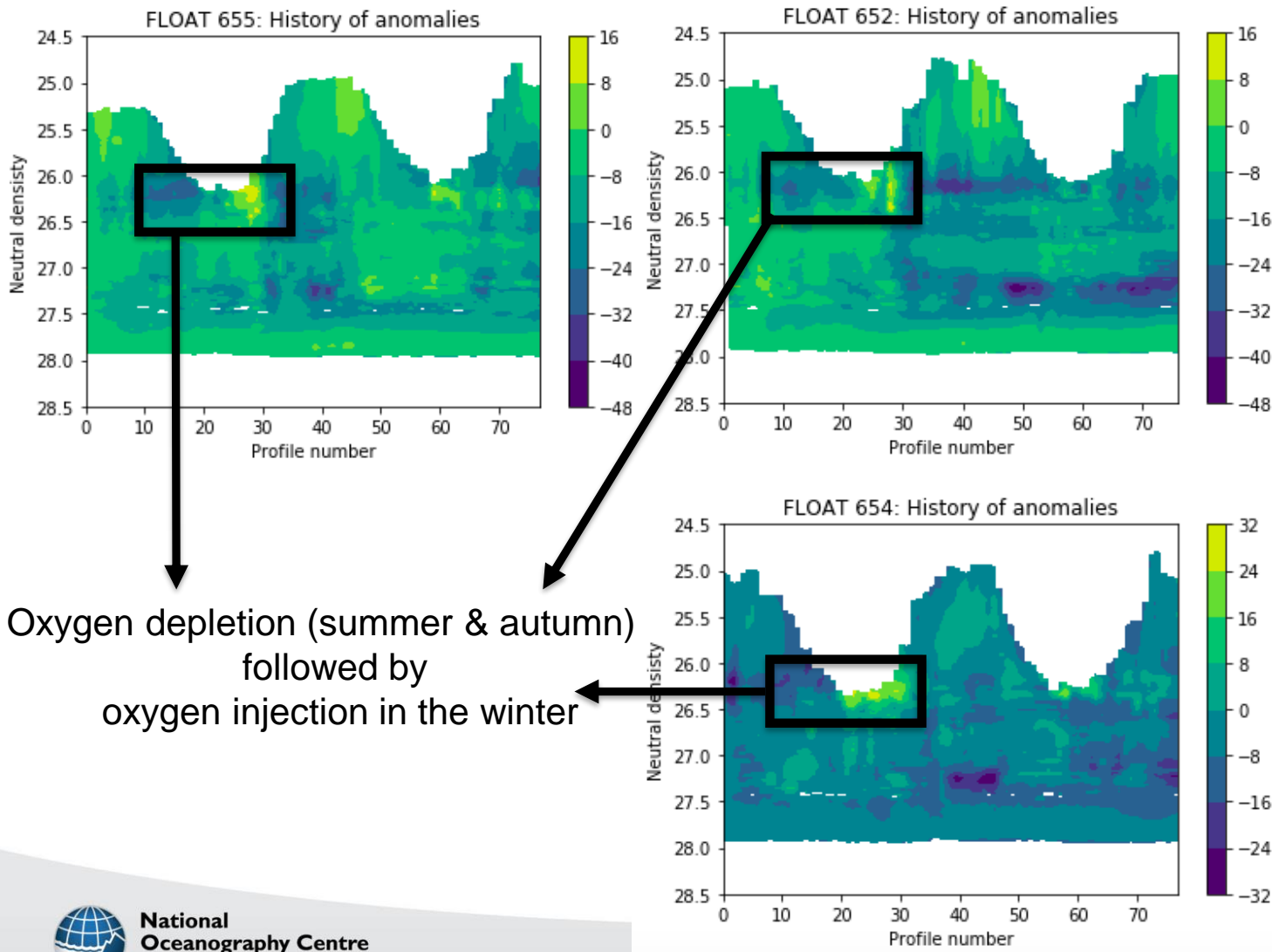
Oxygen anomalies from float – CTD profiles



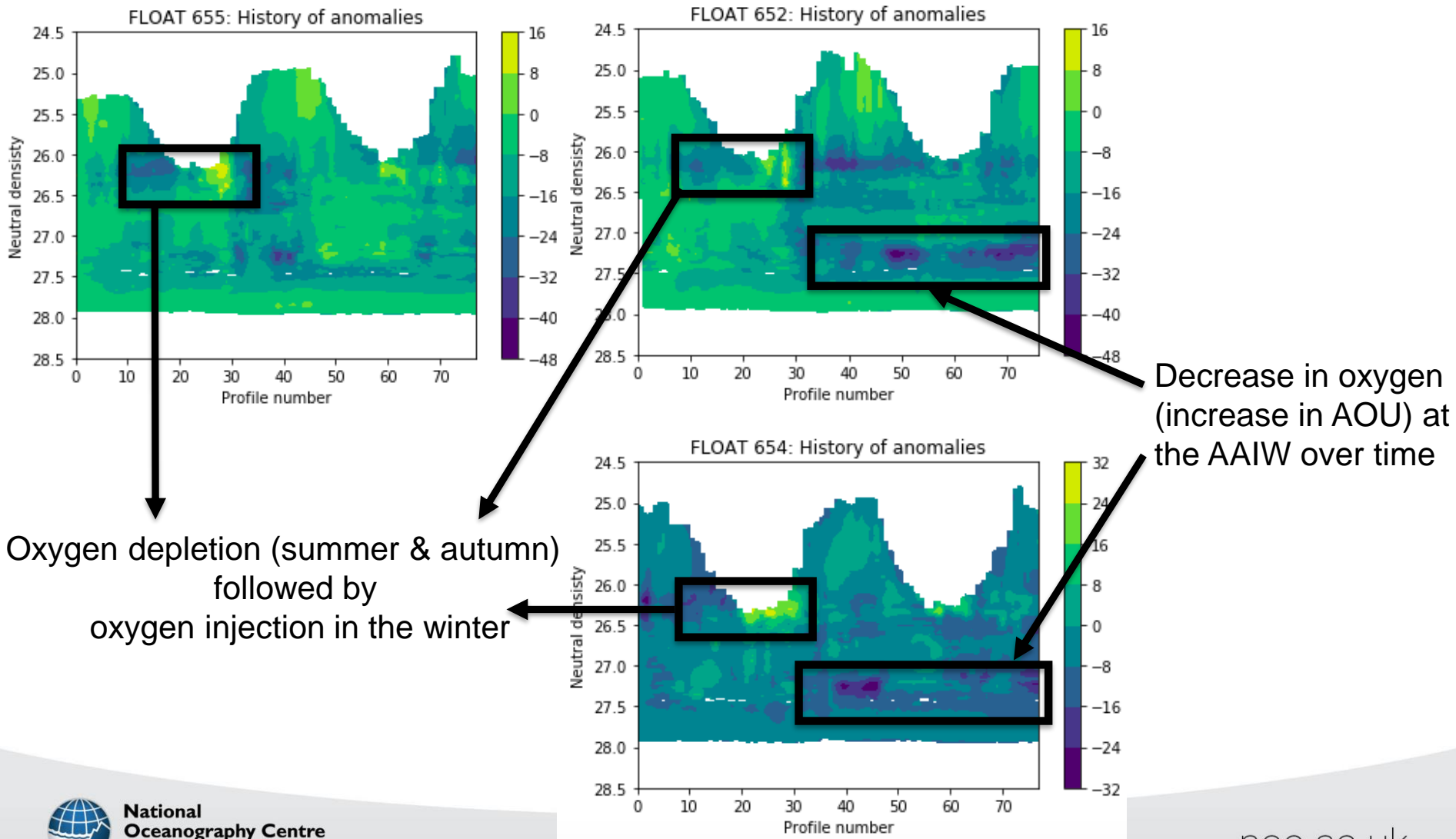
Evolution of the oxygen changes at different density levels



Evolution of the oxygen differences in the full water column



Evolution of the oxygen differences in the full water column



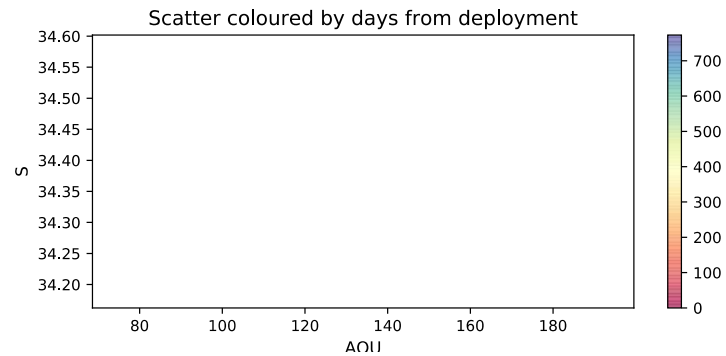
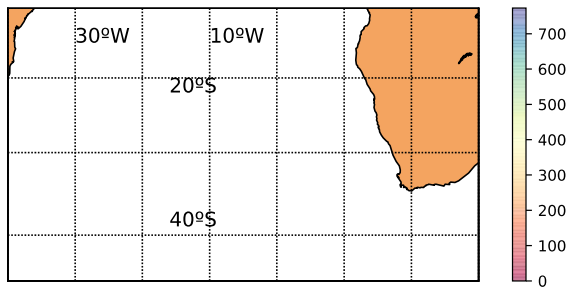
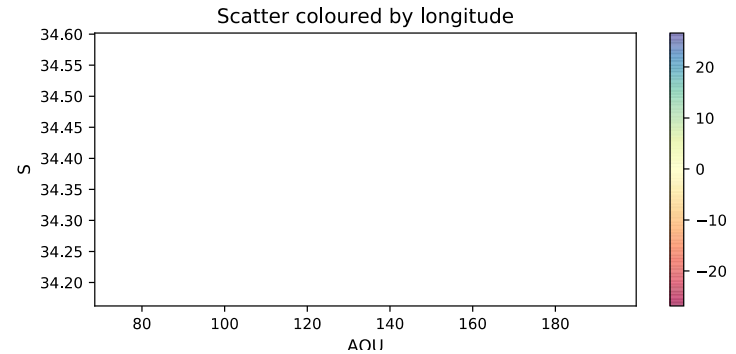
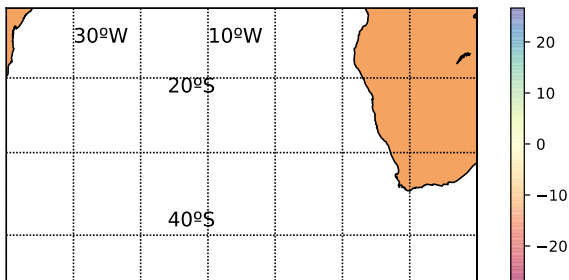
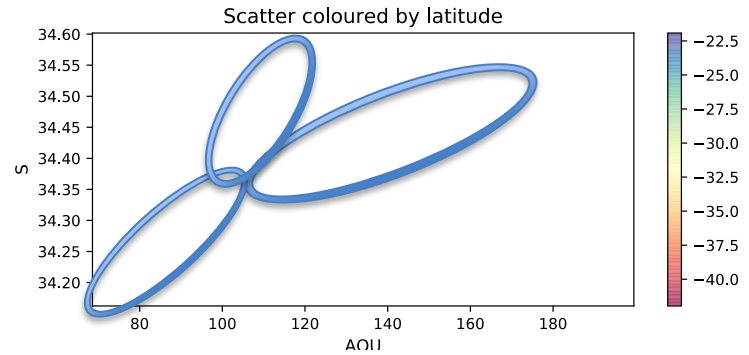
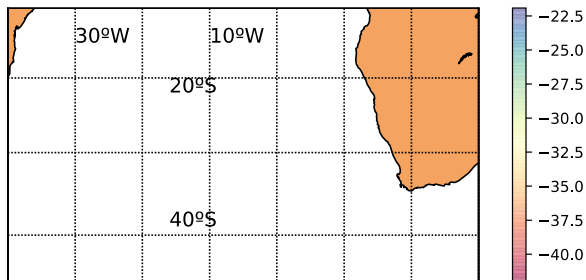
Next...

- Early analysis shows that the changes in the AAIW are significant (larger than spatial variability)
- We will use the climatology to account for space-induced variability and account for time related change only
- We will quantify this change and further investigate seasonal variability and spatial differences between the floats



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AOU – S index from the floats



AOU – S index from the floats

