

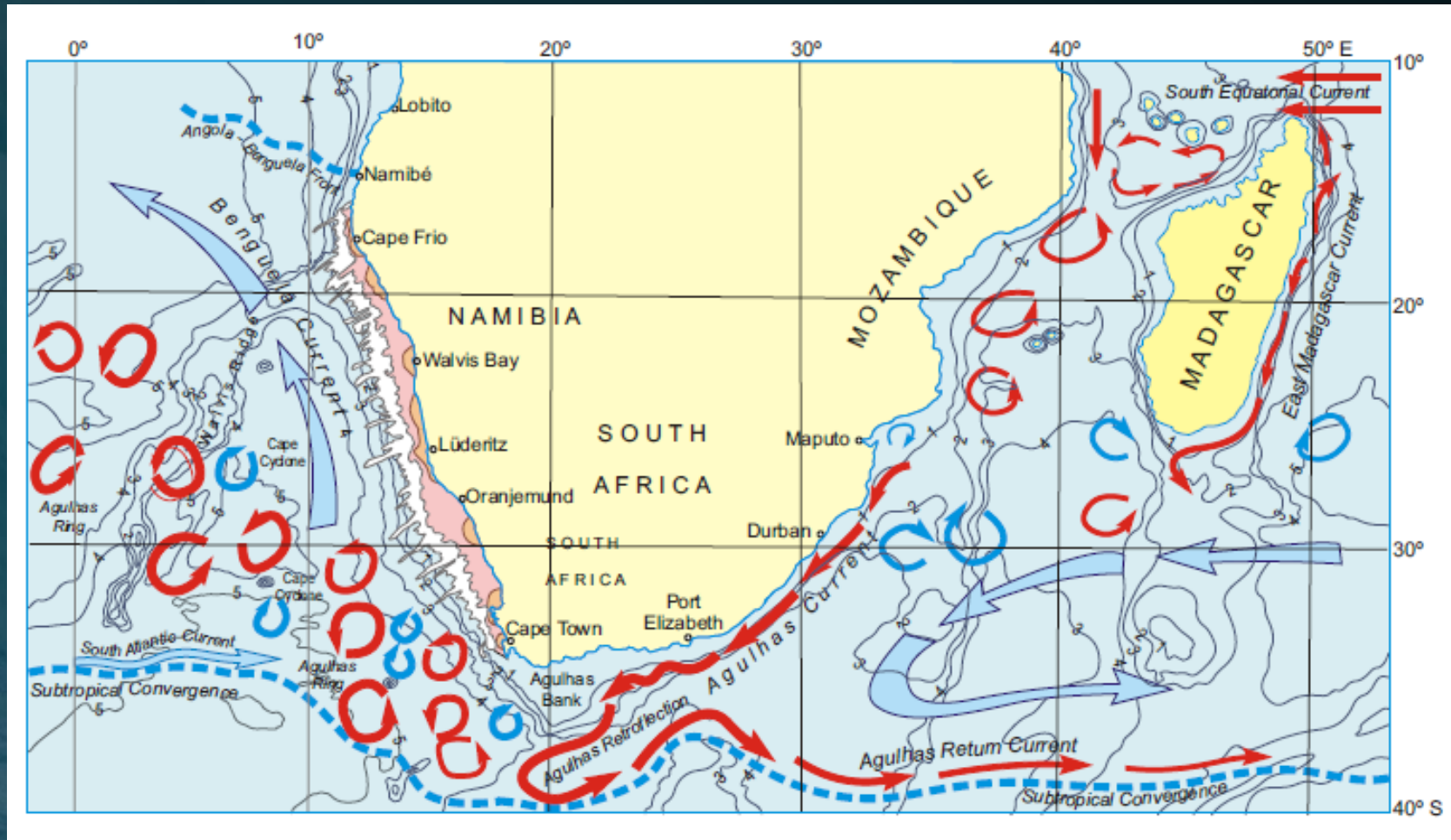
# High resolution Argo profiling in a Western Boundary Current

Tamaryn Morris  
Tarron Lamont  
Romain Cancouët  
Gavin Tutt  
Mbulelo Makhetha  
Isabelle Ansorge  
Borja Aguiar-González  
Juliet Hermes

Tamaryn.Morris@weathersa.co.za

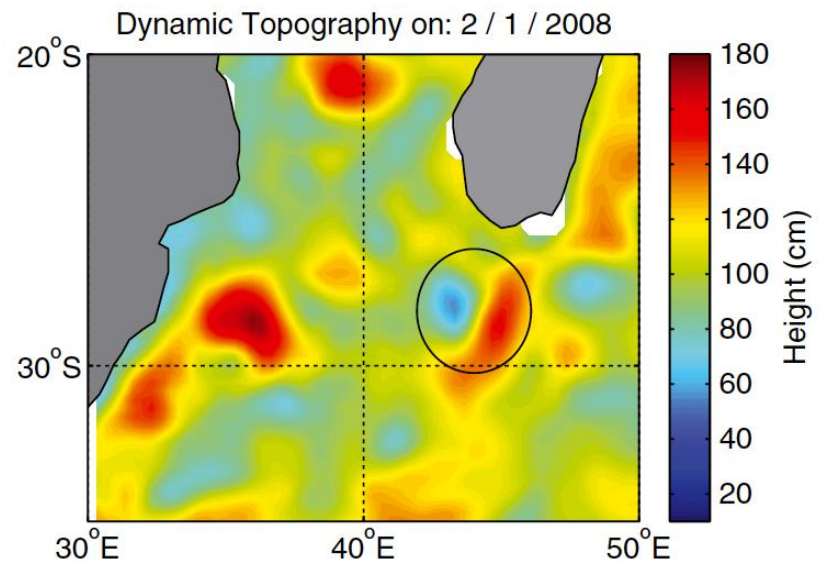
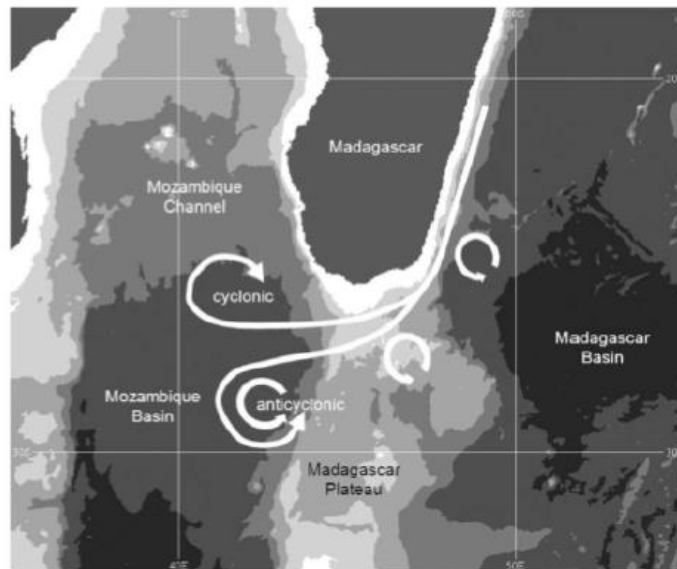
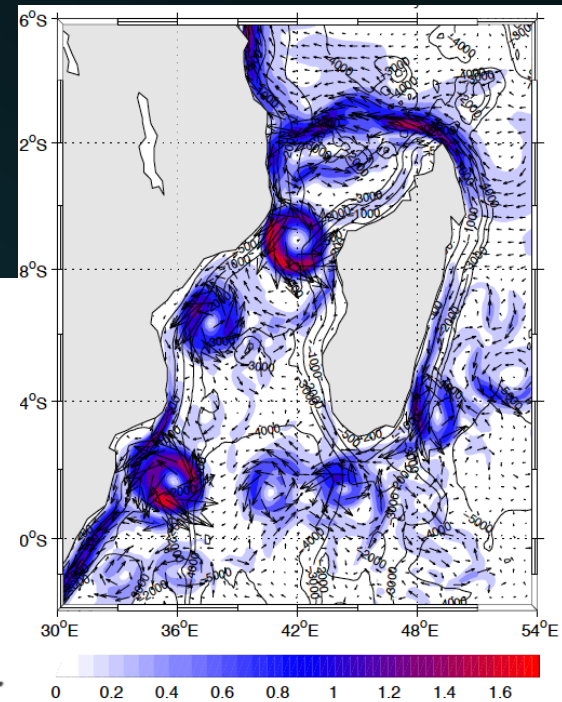
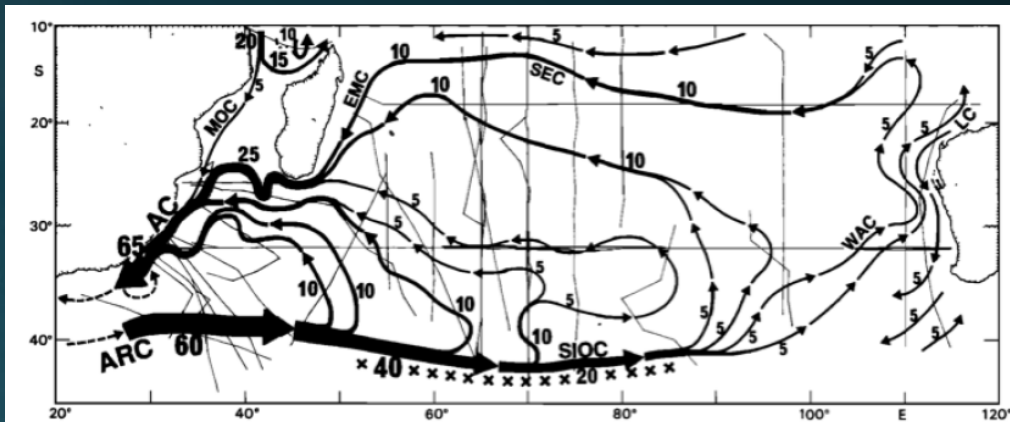


# The Greater Agulhas Current System

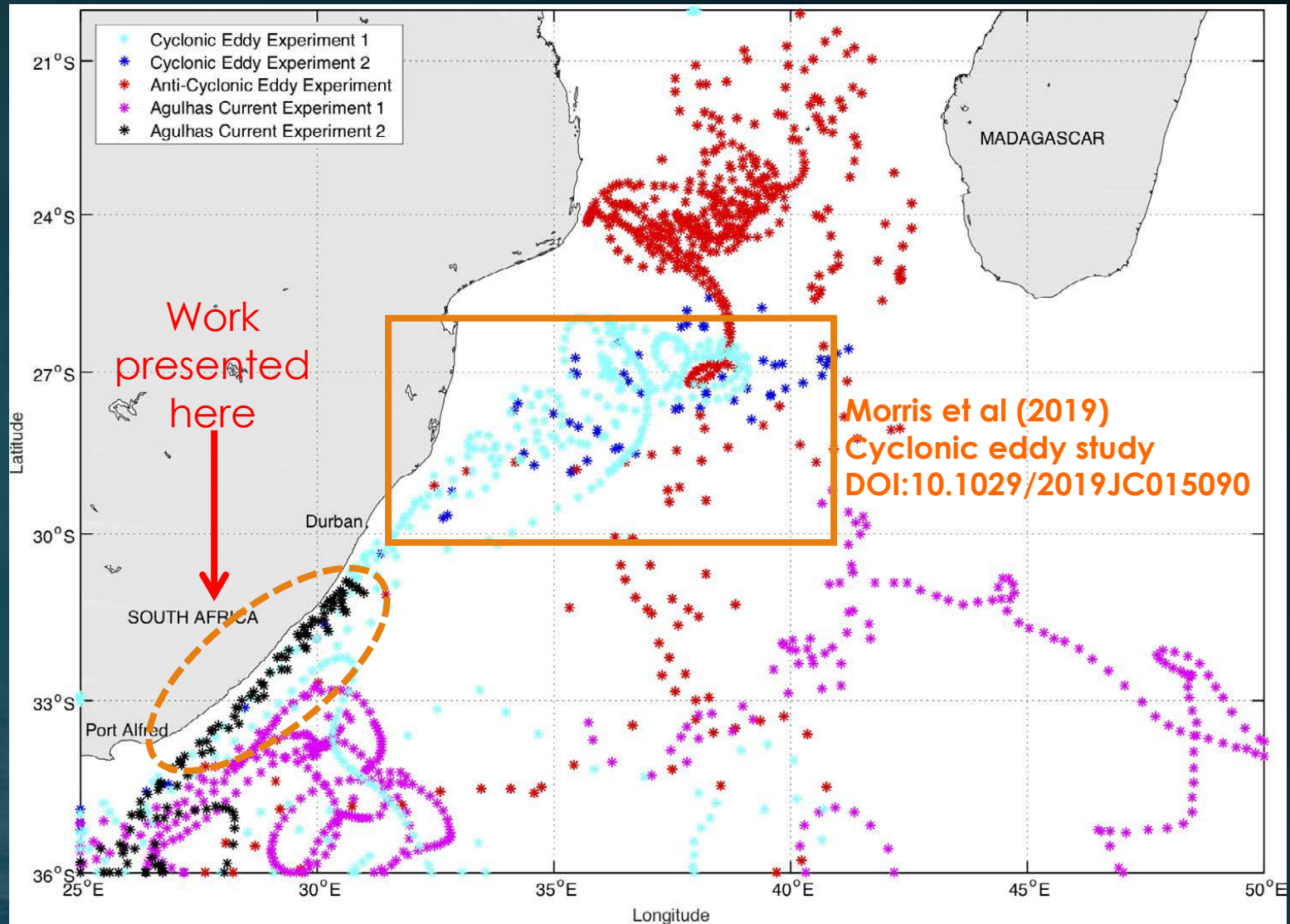




# Source Waters

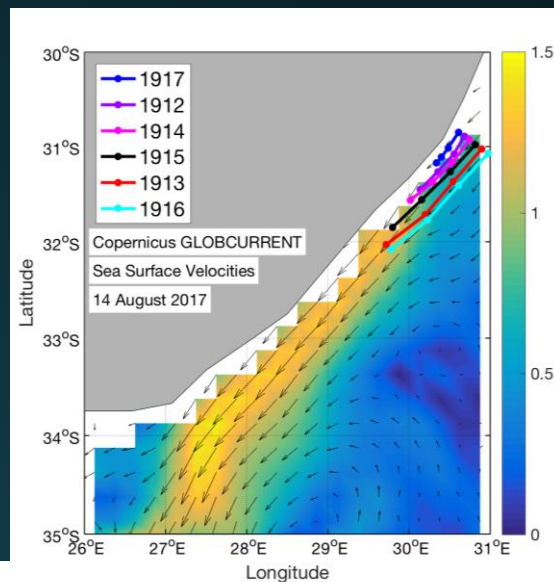
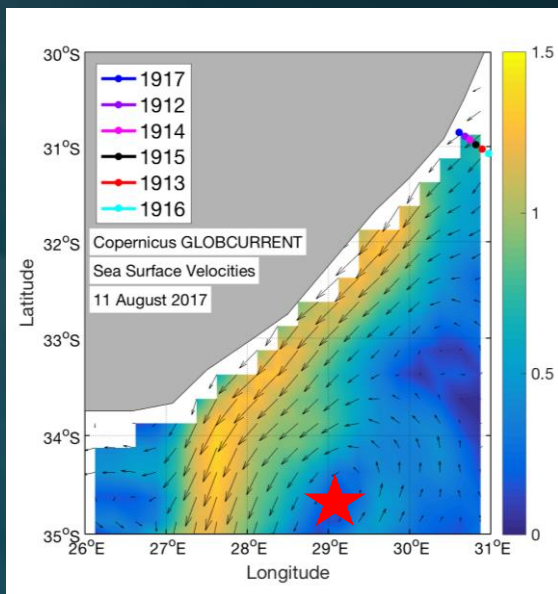


# How to investigate this turbulence using Argo floats?



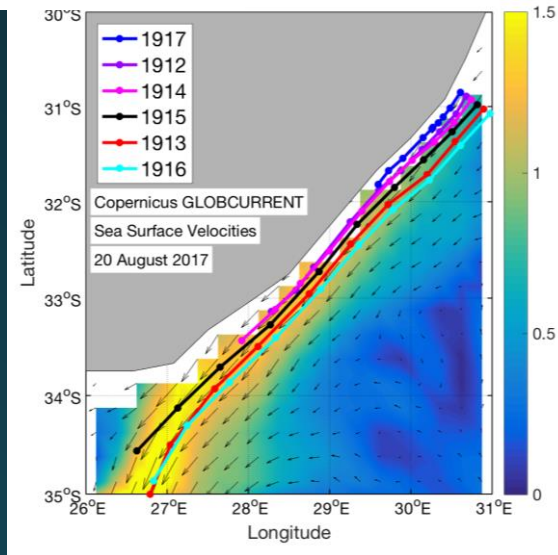
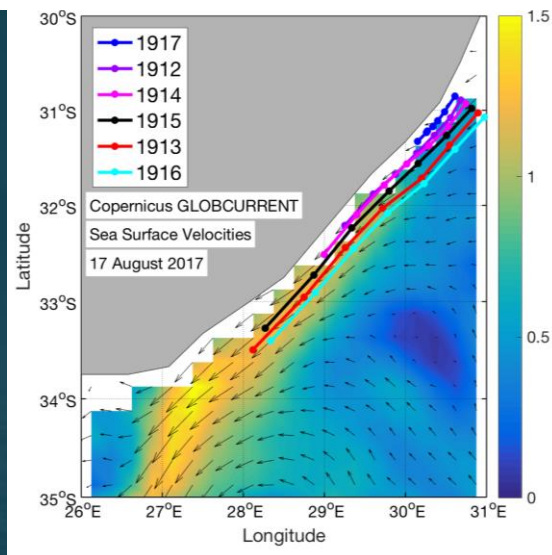


# Agulhas Current MOCCA floats



Six MOCCA floats  
~ 10 nm apart  
Daily profiling  
1000 m park depth  
1000 m profile depth

\* No  
meanders \*  
(in flow of  
current)



# Agulhas Current MOCCA floats

15 days  
 $0.39 \pm 0.39$  m/s

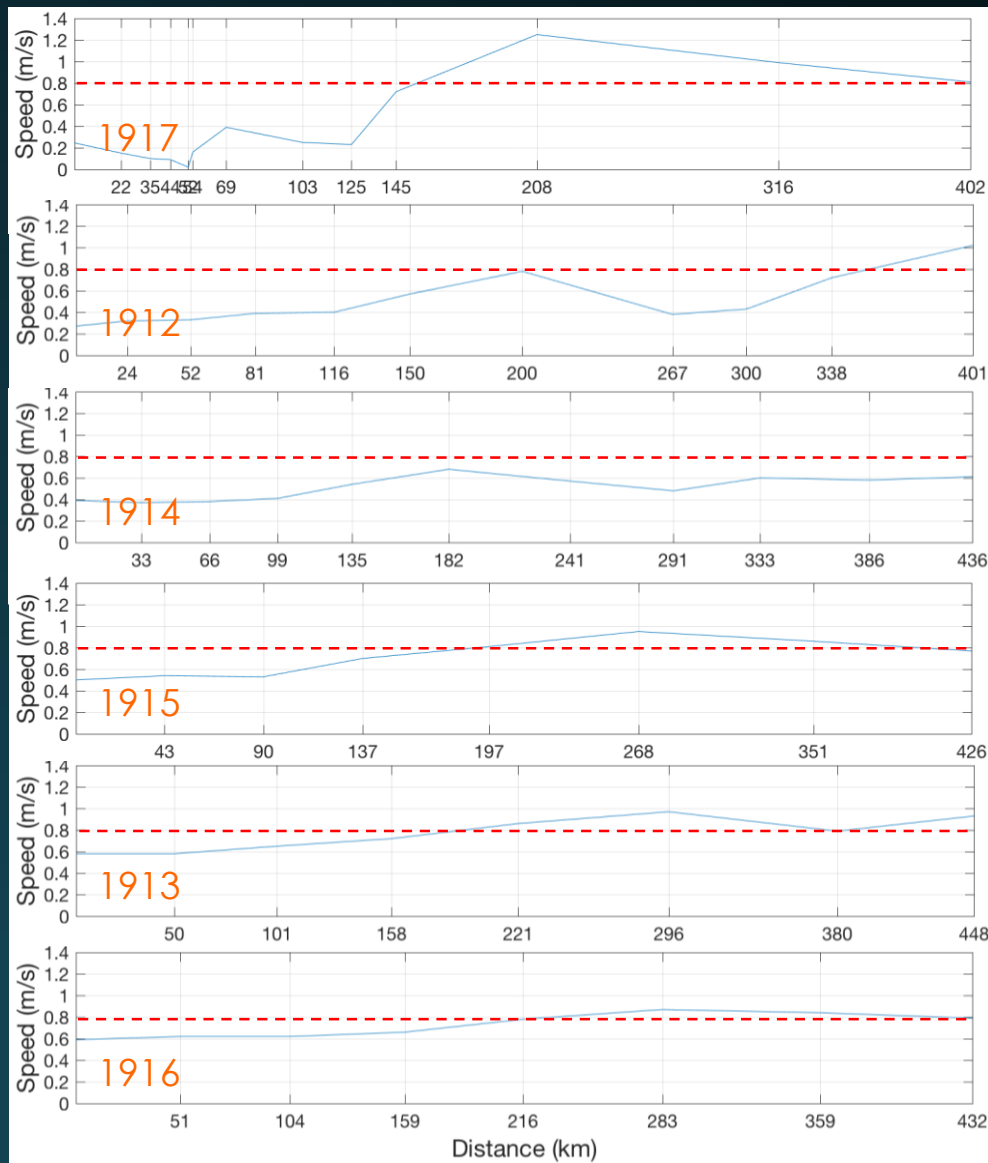
13 days  
 $0.47 \pm 0.26$  m/s

13 days  
 $0.47 \pm 0.17$  m/s

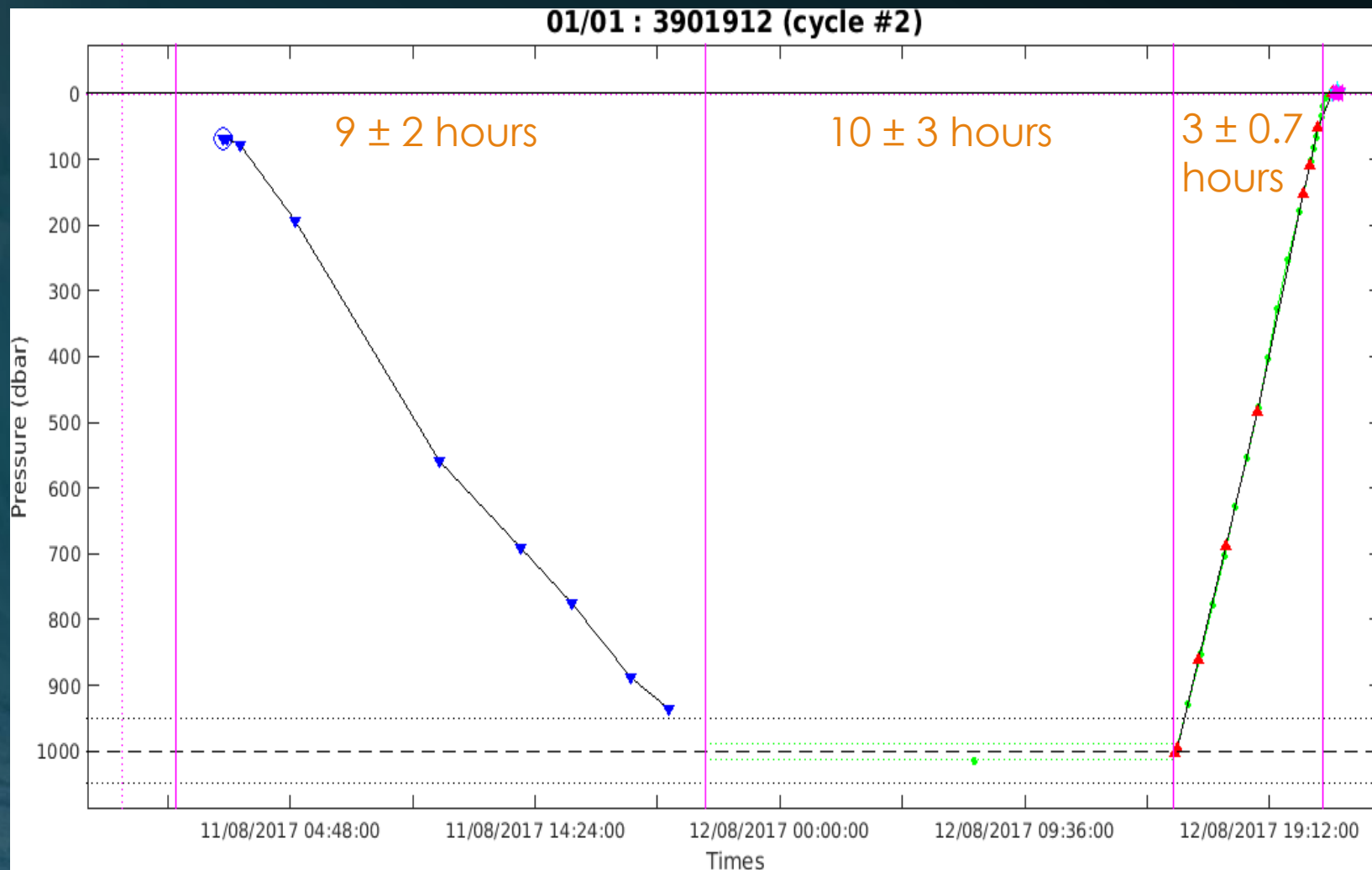
10 days  
 $0.64 \pm 0.28$  m/s

10 days  
 $0.68 \pm 0.28$  m/s

10 days  
 $0.64 \pm 0.25$  m/s



# Agulhas Current MOCCA floats



Calculations courtesy of  
Andrea Garcia Juan  
(Euro-Argo ERIC)



# Agulhas Current MOCCA floats

Coastal

15 days  
 $0.39 \pm 0.39$  m/s

Inshore of  
 Agulhas Current

13 days  
 $0.47 \pm 0.26$  m/s

Inshore of  
 Agulhas Current

13 days  
 $0.47 \pm 0.17$  m/s

Inshore of  
 Agulhas Current  
 Core

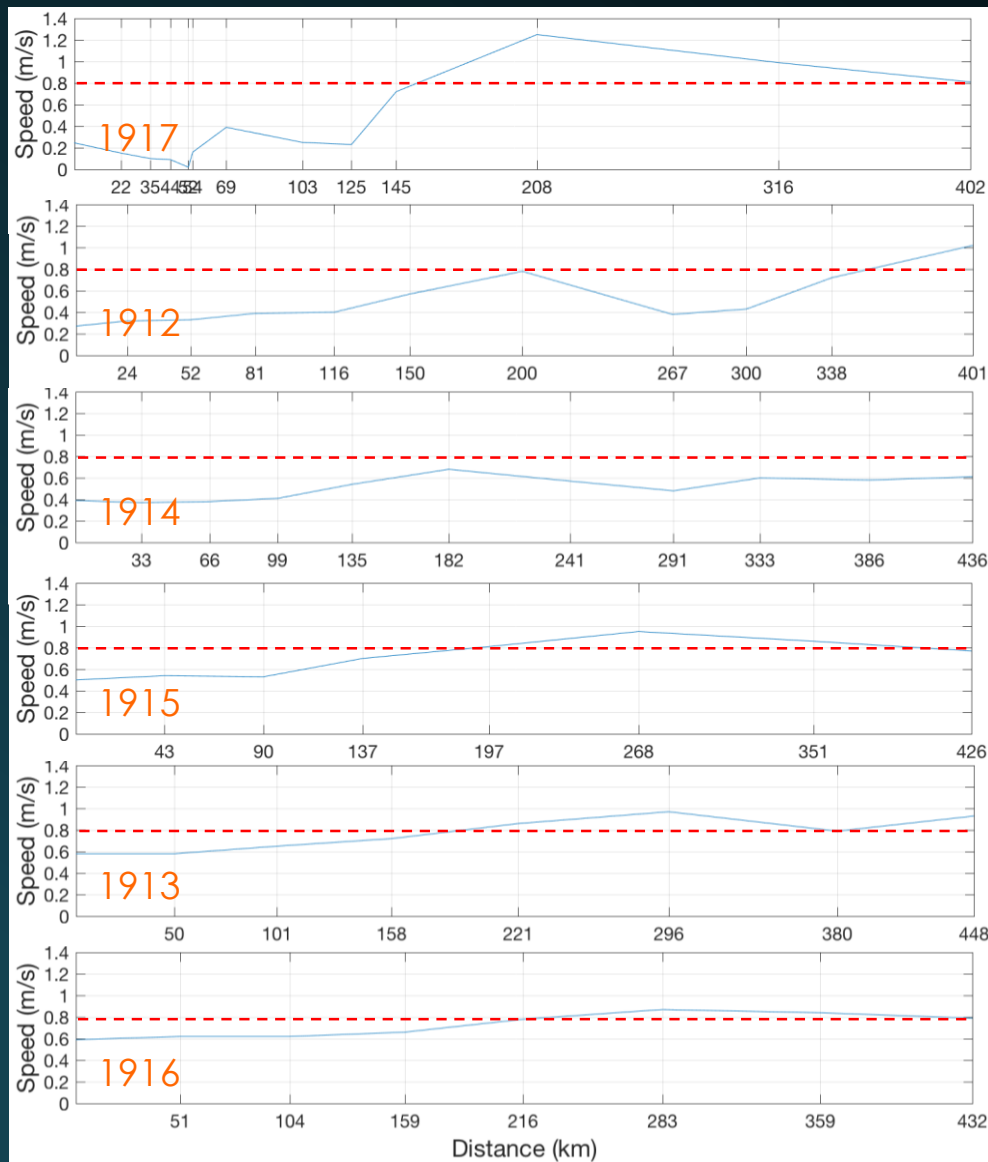
10 days  
 $0.64 \pm 0.28$  m/s

Agulhas Current  
 Core

10 days  
 $0.68 \pm 0.28$  m/s

Offshore of  
 Agulhas Current  
 Core

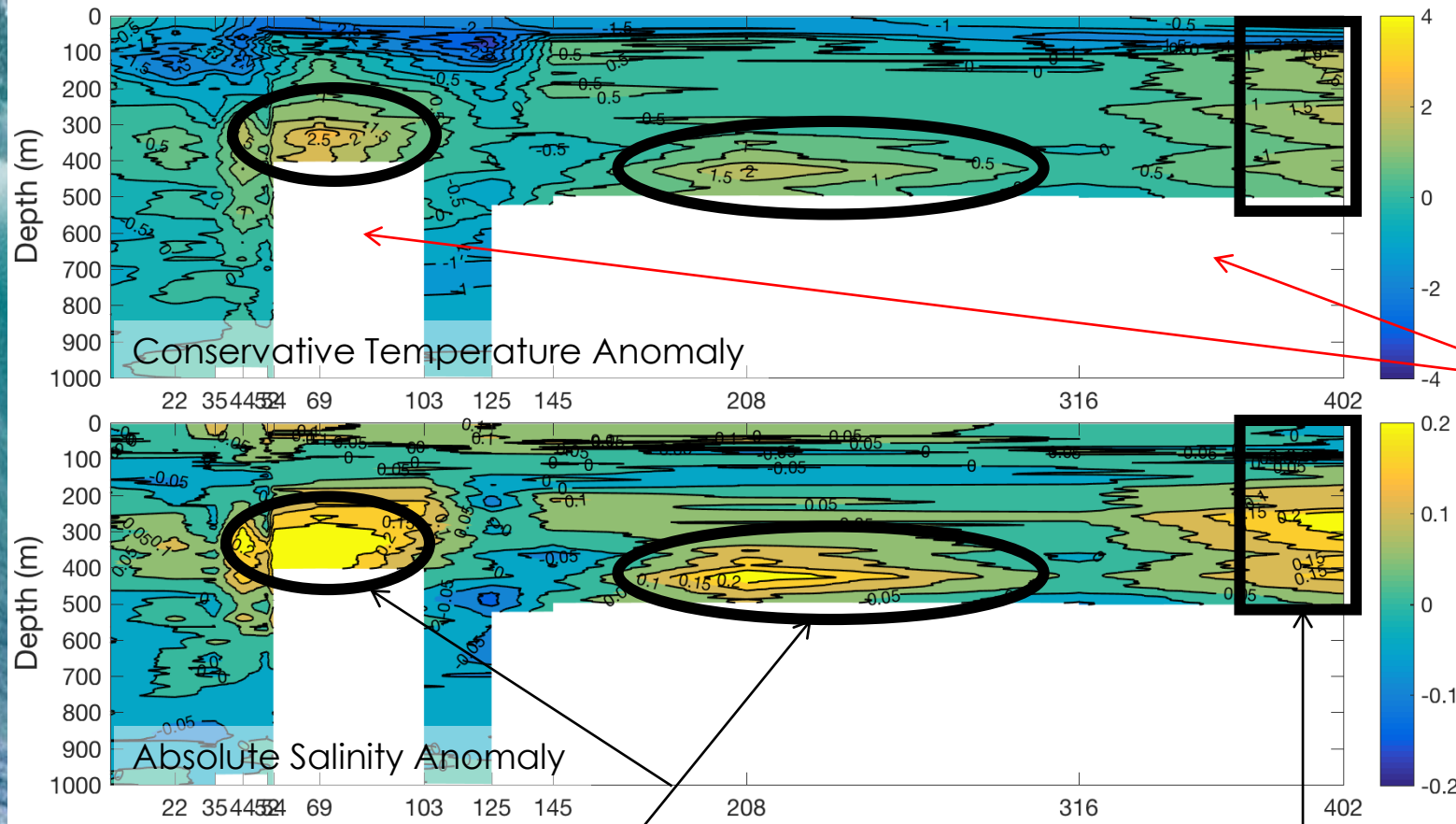
10 days  
 $0.64 \pm 0.25$  m/s





# Agulhas Current MOCCA floats Anomalies

1917 - Coastal



Method:  
CTD on  
deployment  
subtract  
float profiles  
(best one?)

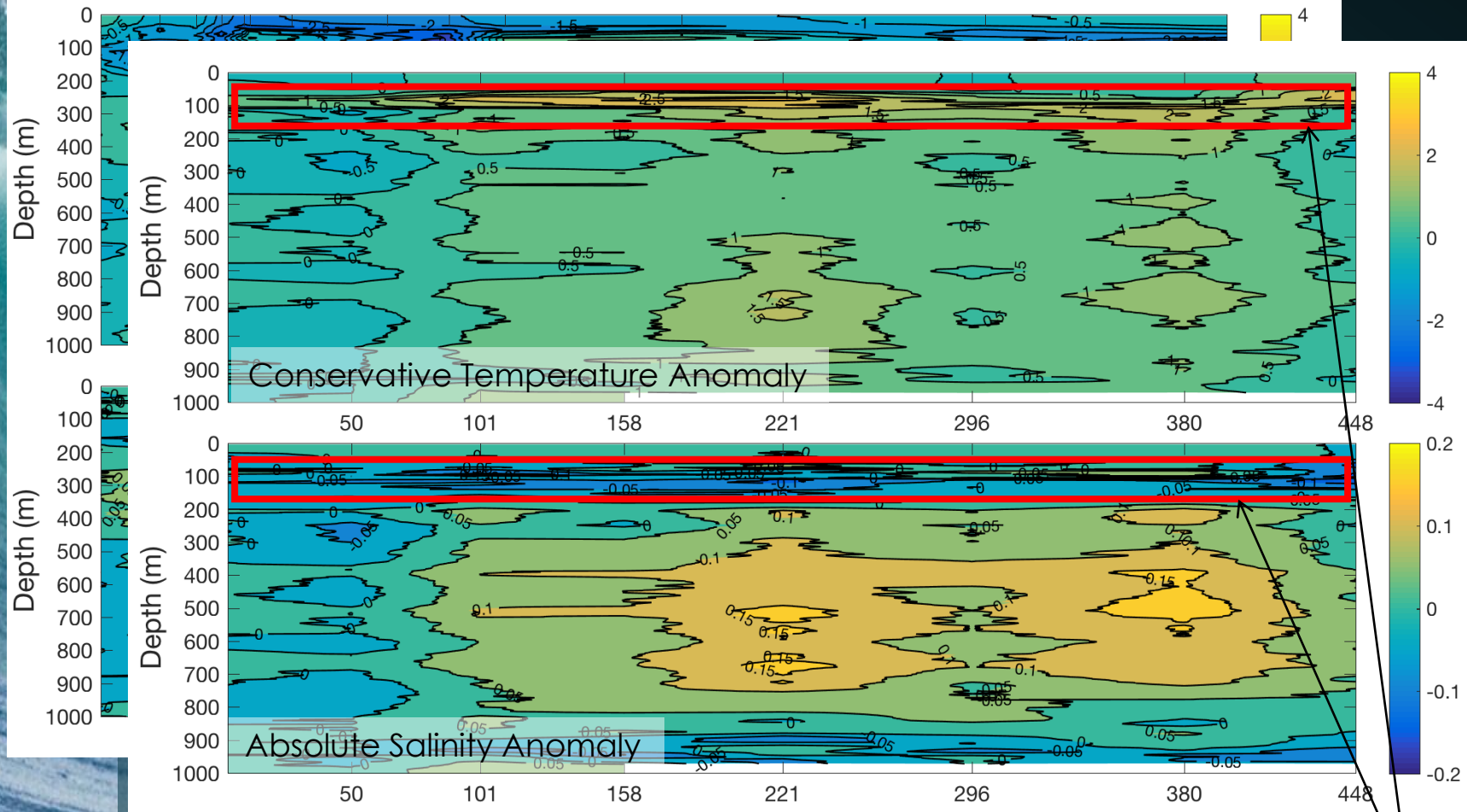
Float  
"grounded"

Shelf-edge dynamics?  
(not upwelling given warmer  
waters)

Interaction of anti-  
cyclonic eddy to the  
south and intensifying  
Agulhas Current

# Agulhas Current MOCCA floats Anomalies

1913 - Core



Initial negative

Then positive anomalies subsurface

Warm, fresh  
layer at 100 m

Mixing?

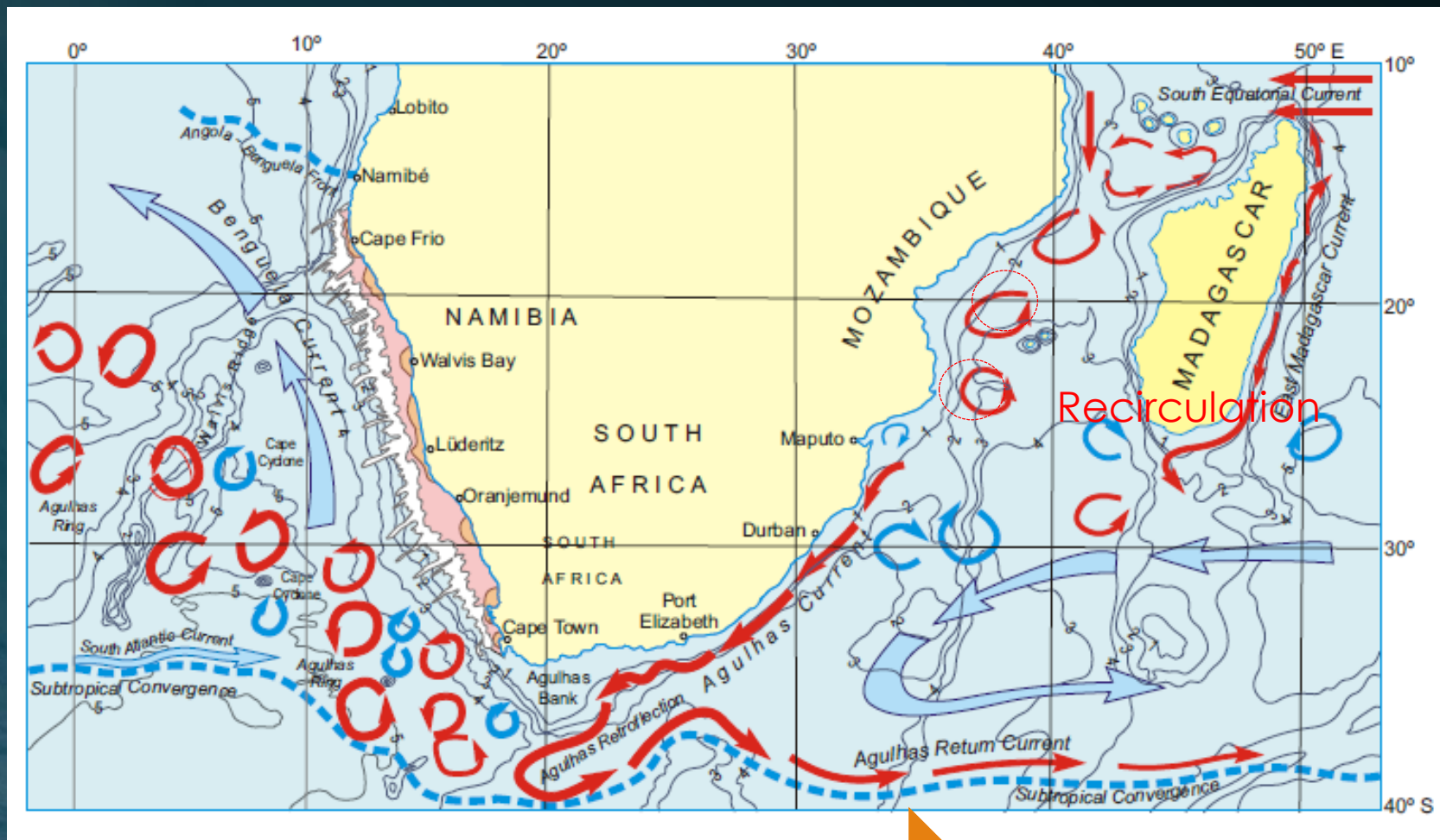
# Agulhas Current MOCCA floats

What next?

- Identify anomalies and potential interactions with shelf / slope of the east coast of South Africa
- Volume, heat and salt transport of this snap-shot of the Agulhas Current study
- What implications will this and continued studies have on dynamics such as rainfall, the Thermohaline Circulation and the AMOC?



# Finally, where does this water go...



ACC and Frontal Zones

# Finally, where does this water go...

Region	High-Resolution floats (n=16)*	Standard mission floats (n=132)**
Return Current	18.75 %	51 %
Return Current and recirculates	18.75 %	9 %
South Atlantic	25 %	15 %
<b>Southern Ocean</b>	<b>37.5 %</b>	<b>12 %</b>
Undetermined	-	13 %

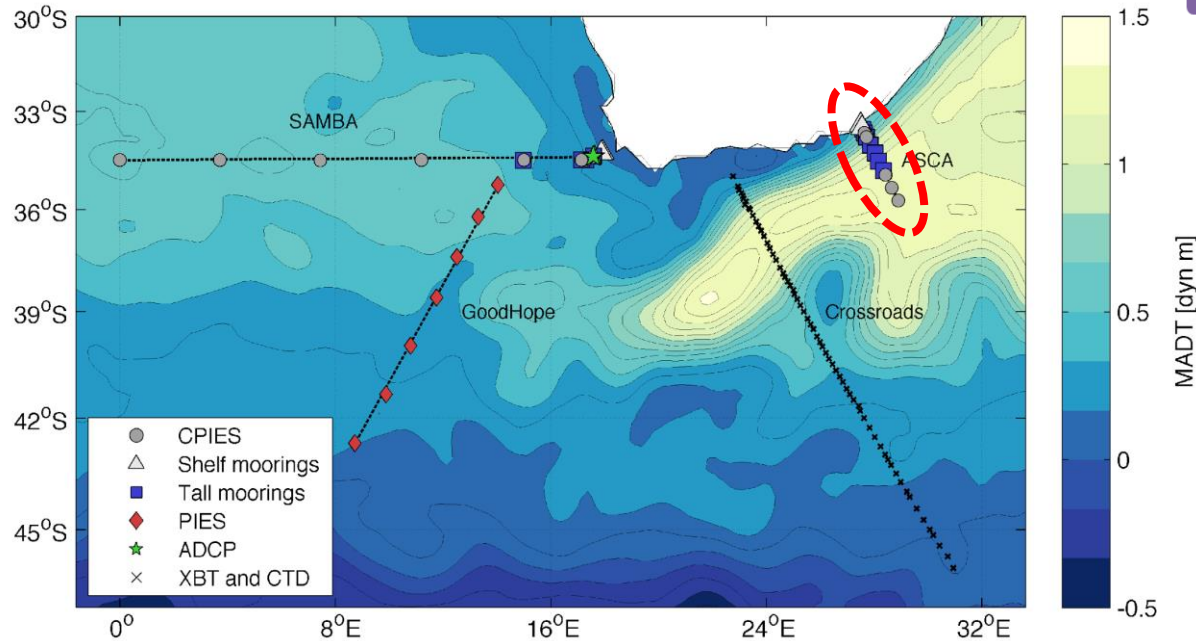
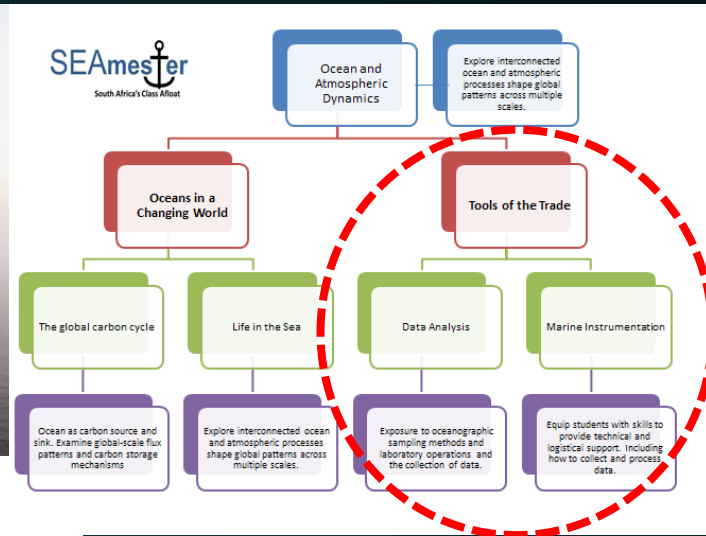
\* Park depths 300-650 m, profile from 1000 m, daily and five-daily profiling

\*\* As of end 2017

**Argo2020:** Manage floats in regions of increased turbulence (eddies, WBC) but increasing profiling frequency, thus allowing for additional measurements. Potentially also shallower park depths to “capture” features.

7th Euro-Argo Science Meeting: 22-23 October 2019, Athens, Greece

# Future deployment options in the Agulhas Current: SEAmester



7th Euro-Argo Science Meeting: 22-23 October 2019, Athens, Greece



# Acknowledgements

Master, crew and scientific team onboard the Research Vessel *Algoa* for the Transkei 2017 cruise where floats were deployed and validation CTD casts undertaken

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