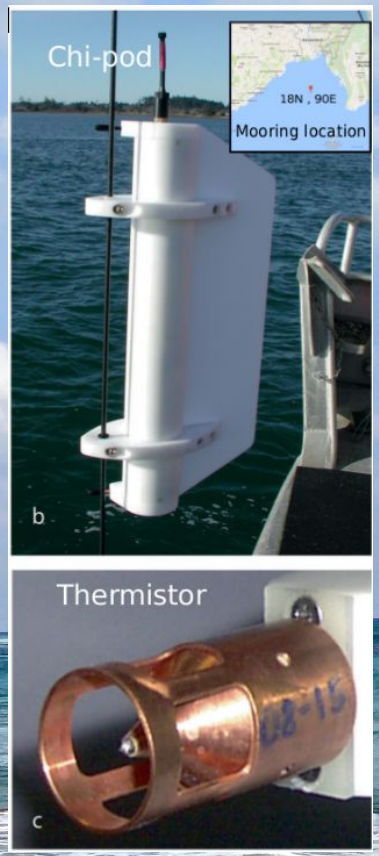
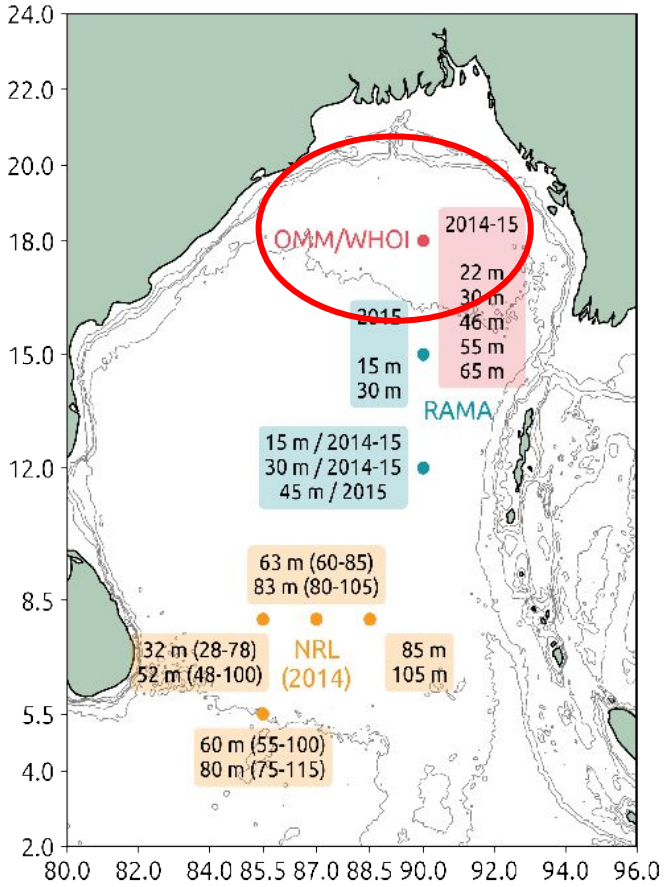
a) Seasonality and
b) Suppression of Turbulence
In 18N BoB, as measured by chipods

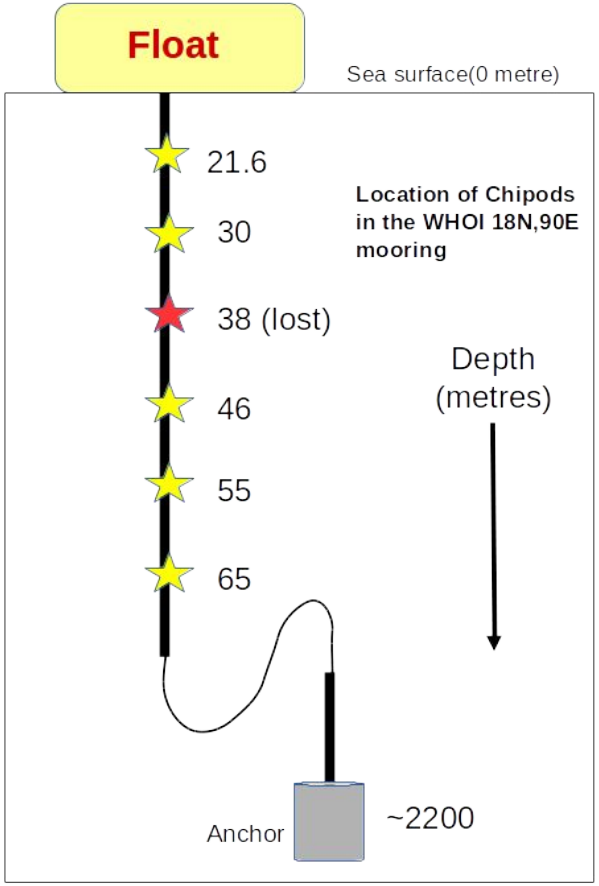


Ritabrata, Emily L S, Rama G, J T Farrar, R A Weller, J N Moum

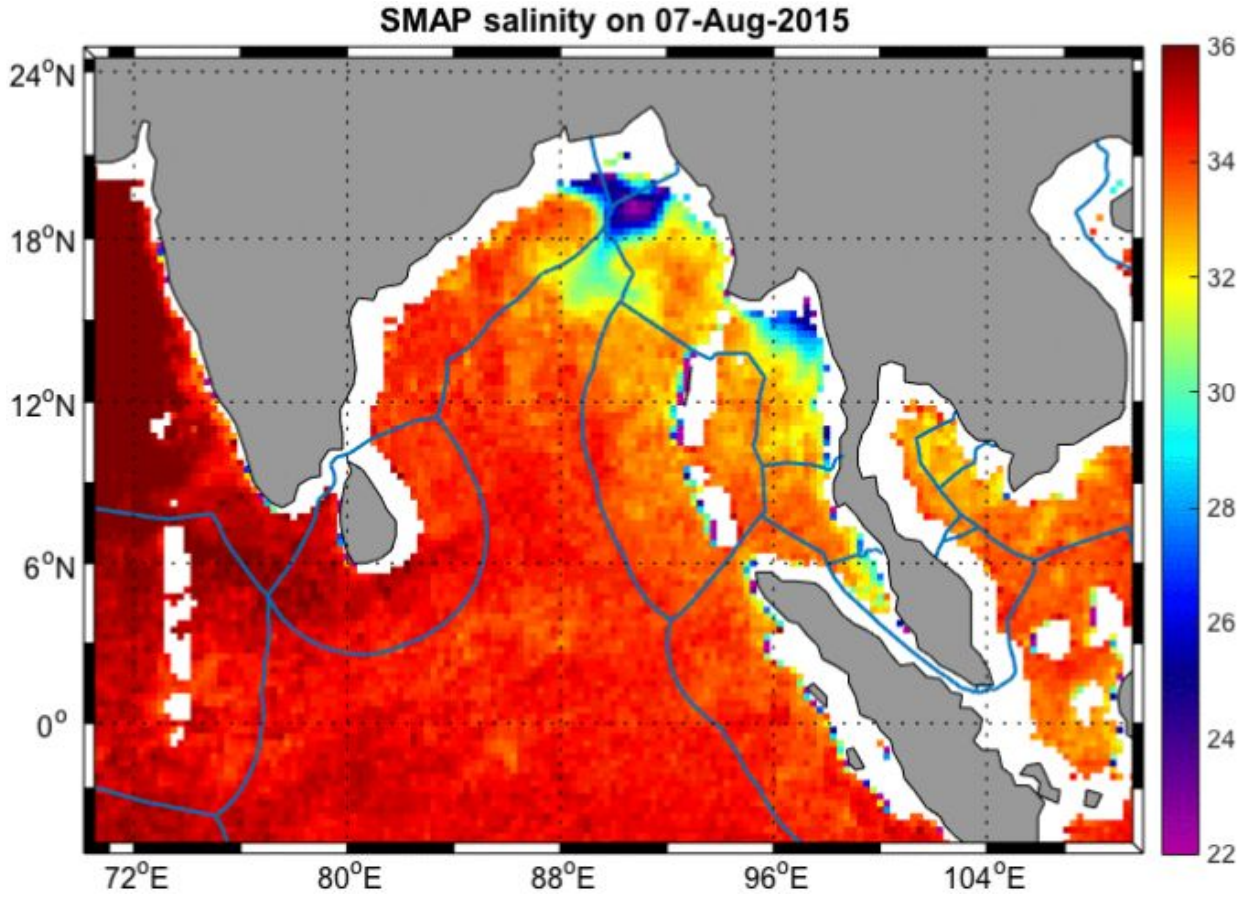
(and others)

AIR-SEA INTERACTIONS IN THE BAY OF BENGAL FROM MONSOONS TO MIXING, Feb 2019





Dec 2014
To
Jan 2016



Courtesy of Andrew Lucas

The interesting Northern Bay

Papa et. al ‘10, Vinayachandran et. al ‘13,
S Lekha, J Buckley et. al ‘18

↓

Eddies and Ekman

Turbulent diffusivity

$$K_t = \frac{\chi}{2T_z^2}$$

Fluid flow speed with Pitot tube u

Measured Quantities

Rate of temperature fluctuations $\frac{dT'}{dt}$

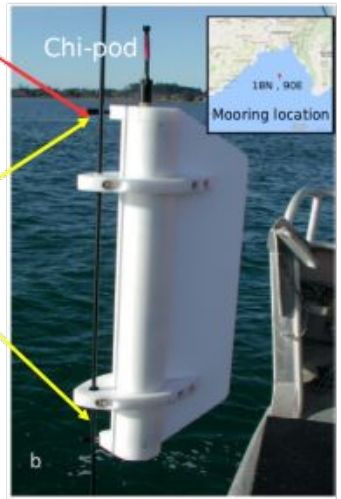
Invoke Taylor's frozen flow approximation

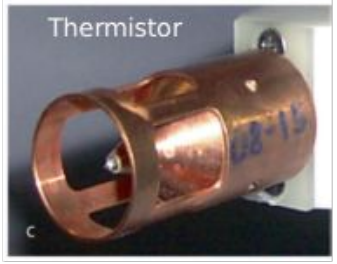
$$\frac{dT'}{dx} = \frac{1}{u}\frac{dT'}{dt}$$

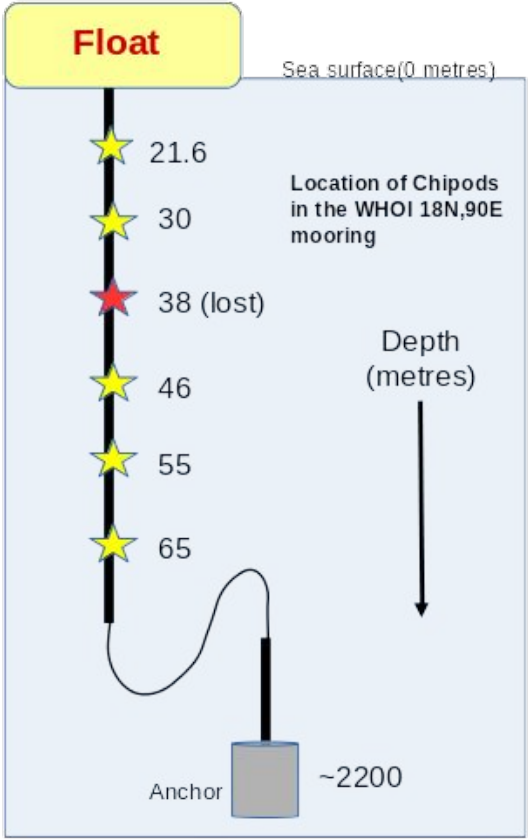
Derived Quantities

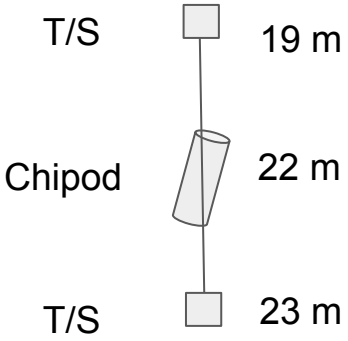
$$\chi = 6D_t\left[\frac{dT'}{dx}\right]^2$$

Isotropic

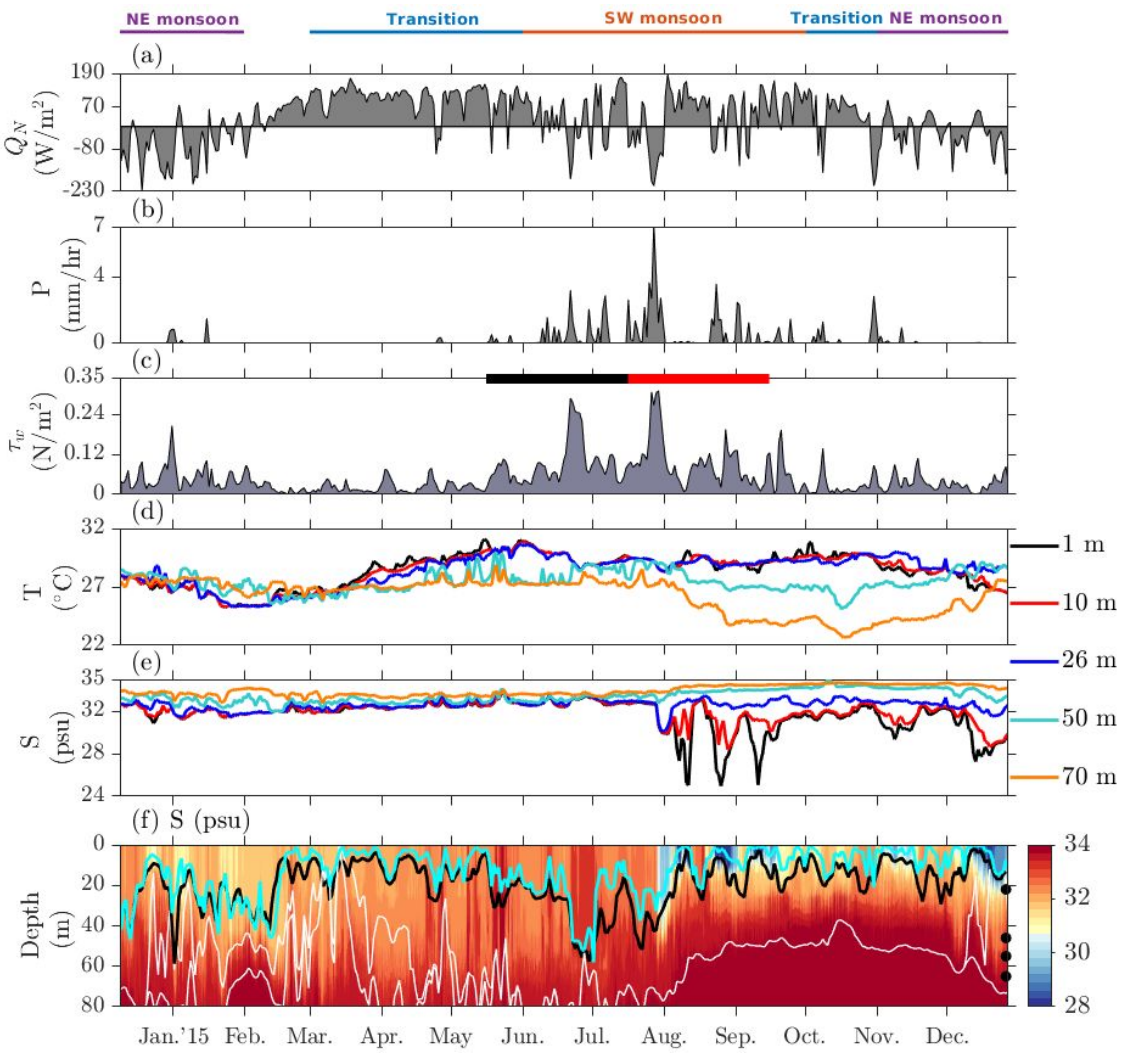








Moum and Nash (2009), Osborn and Cox (1972), Osborn (1980)

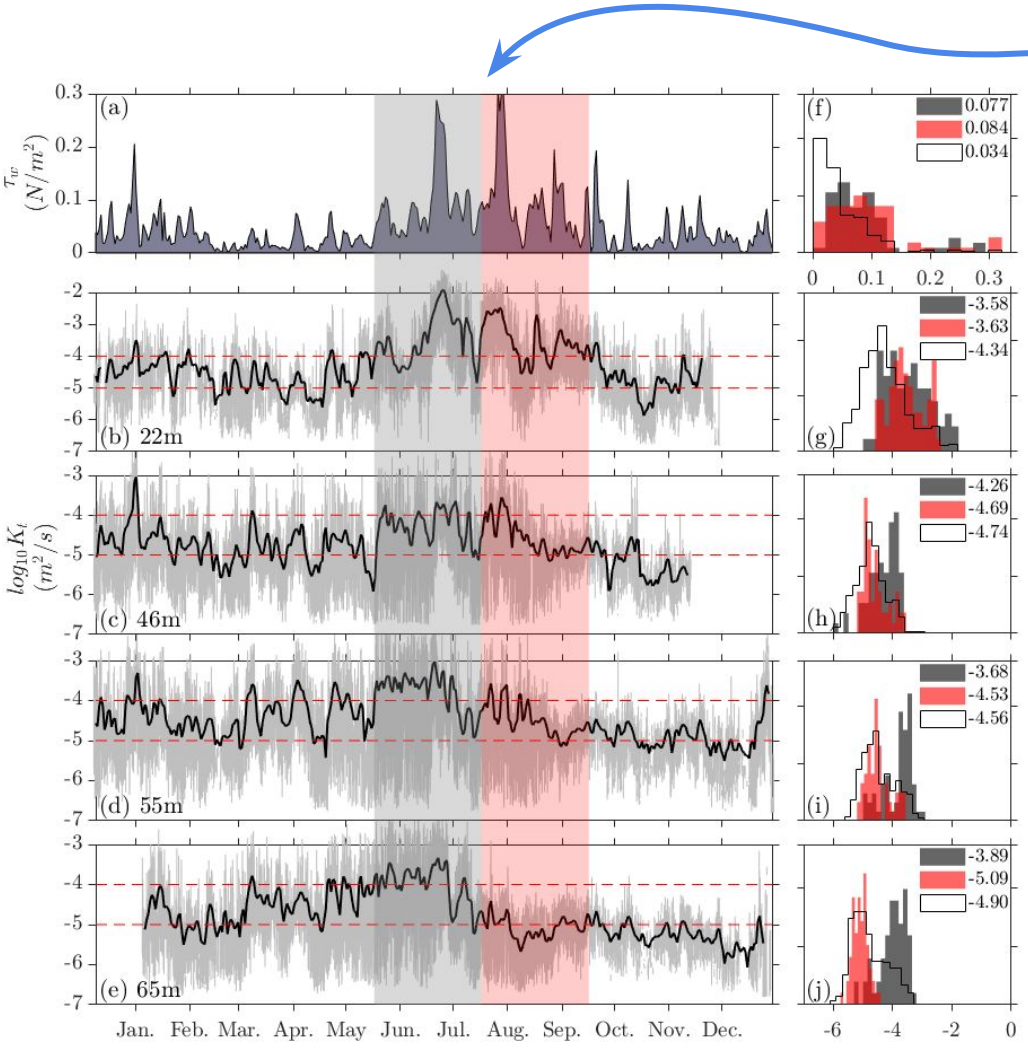


Monsoon of 2015

More in: Weller et. al 2016, 2018

Brief summary of the deployment

MLD based on Lorbacher et. al 2006

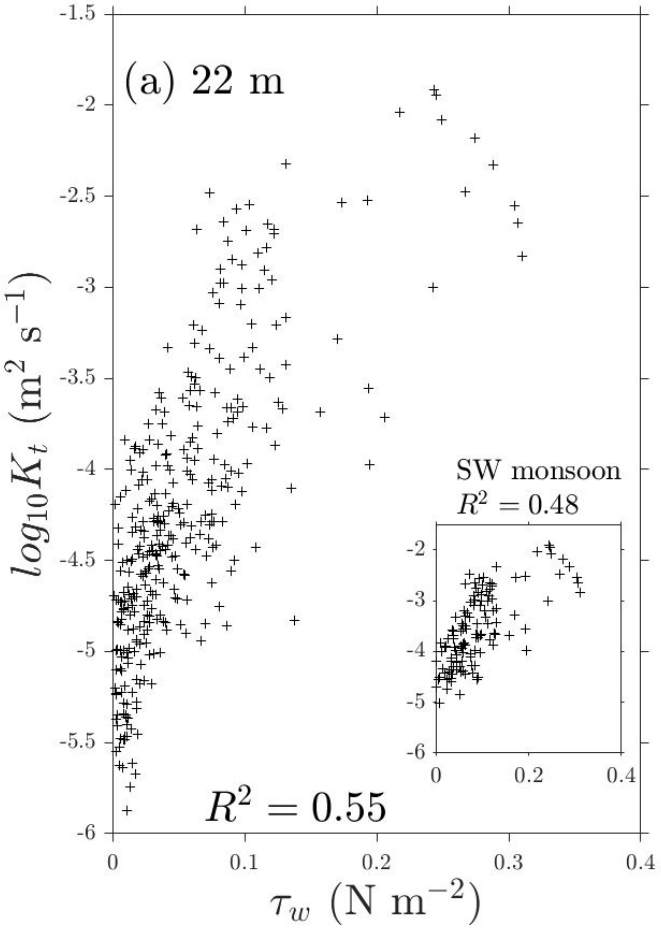


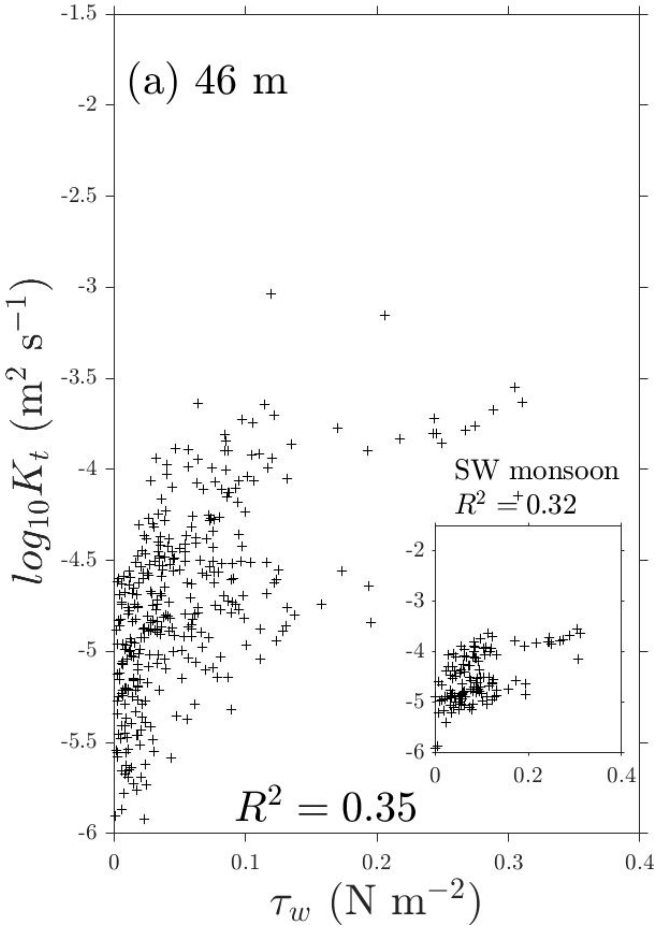
Seasonality in turbulence

Inside/base of the ML

Below the ML

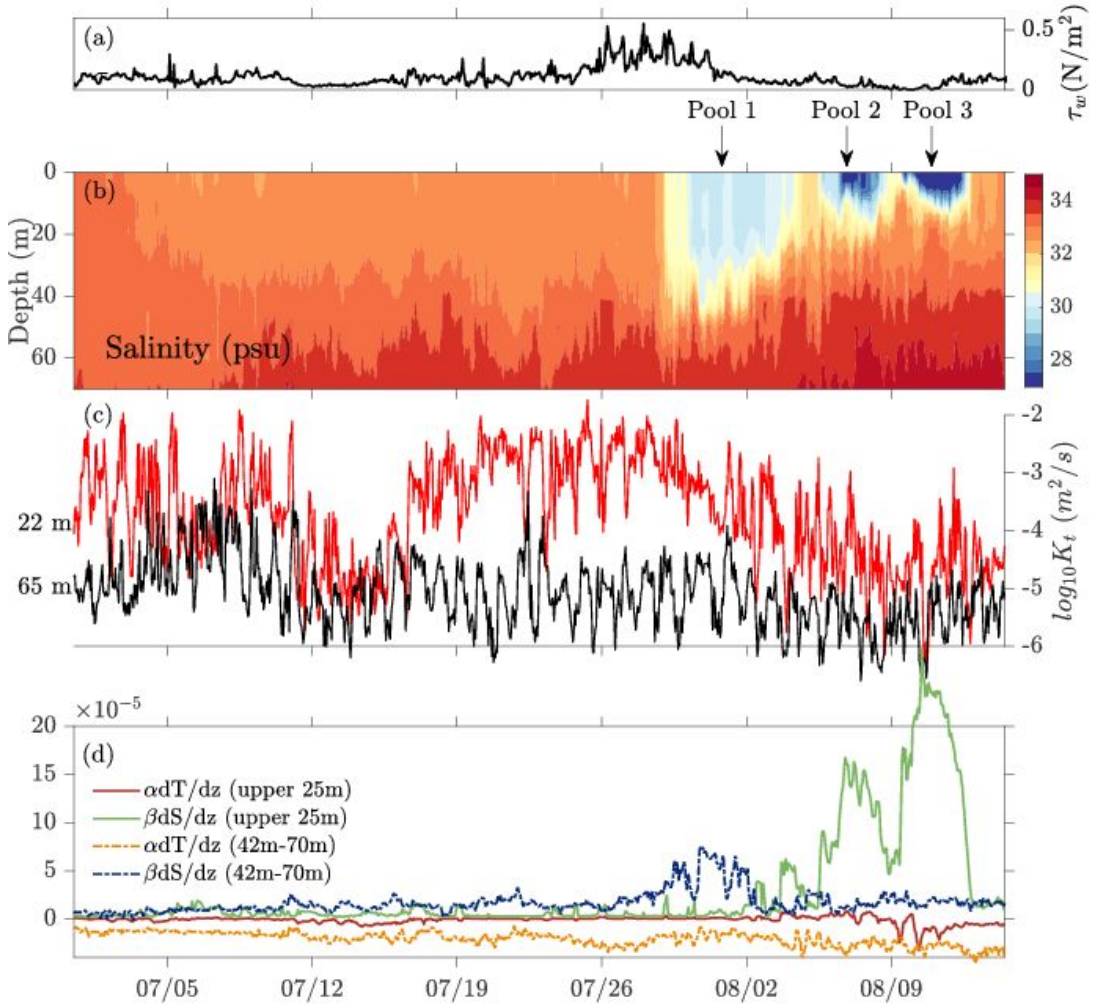
Diffusivity



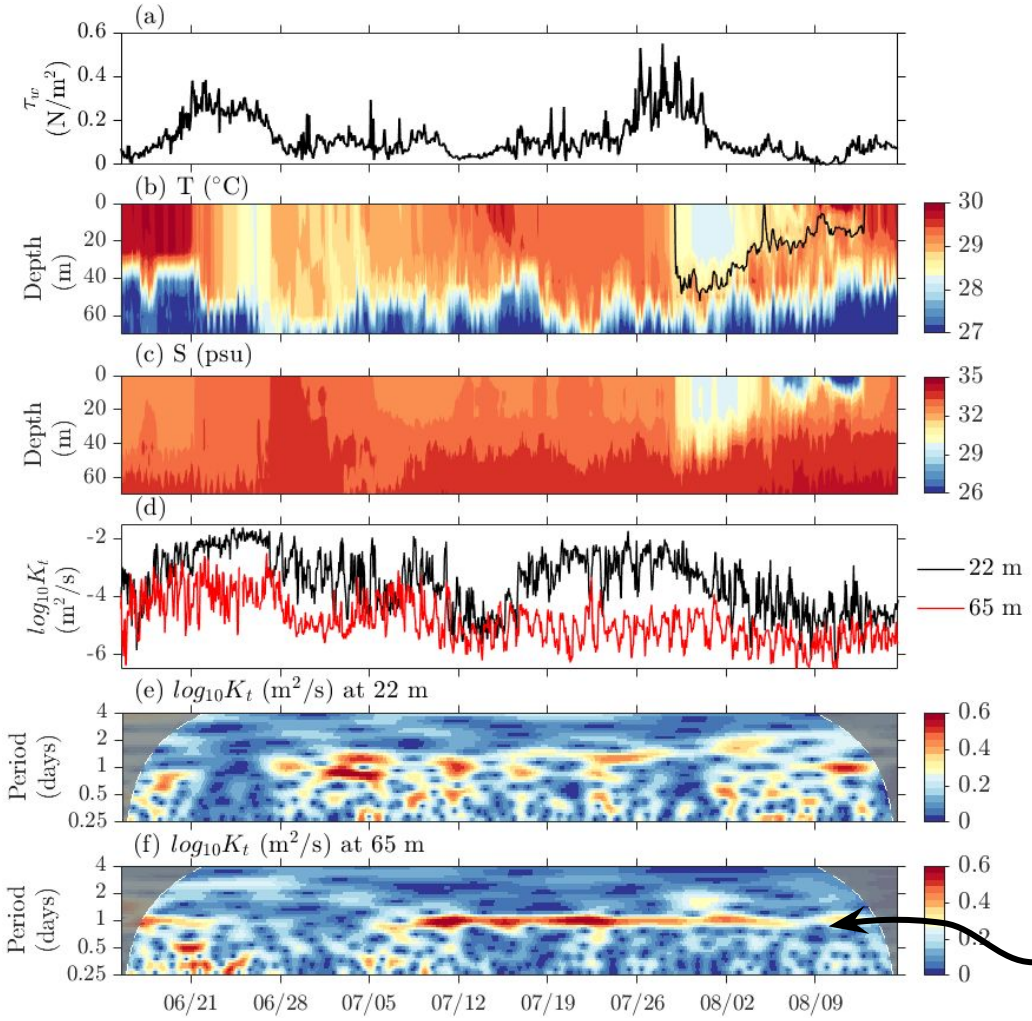


ML deepened below
46 m for a total of 13 days.

Wind Stress

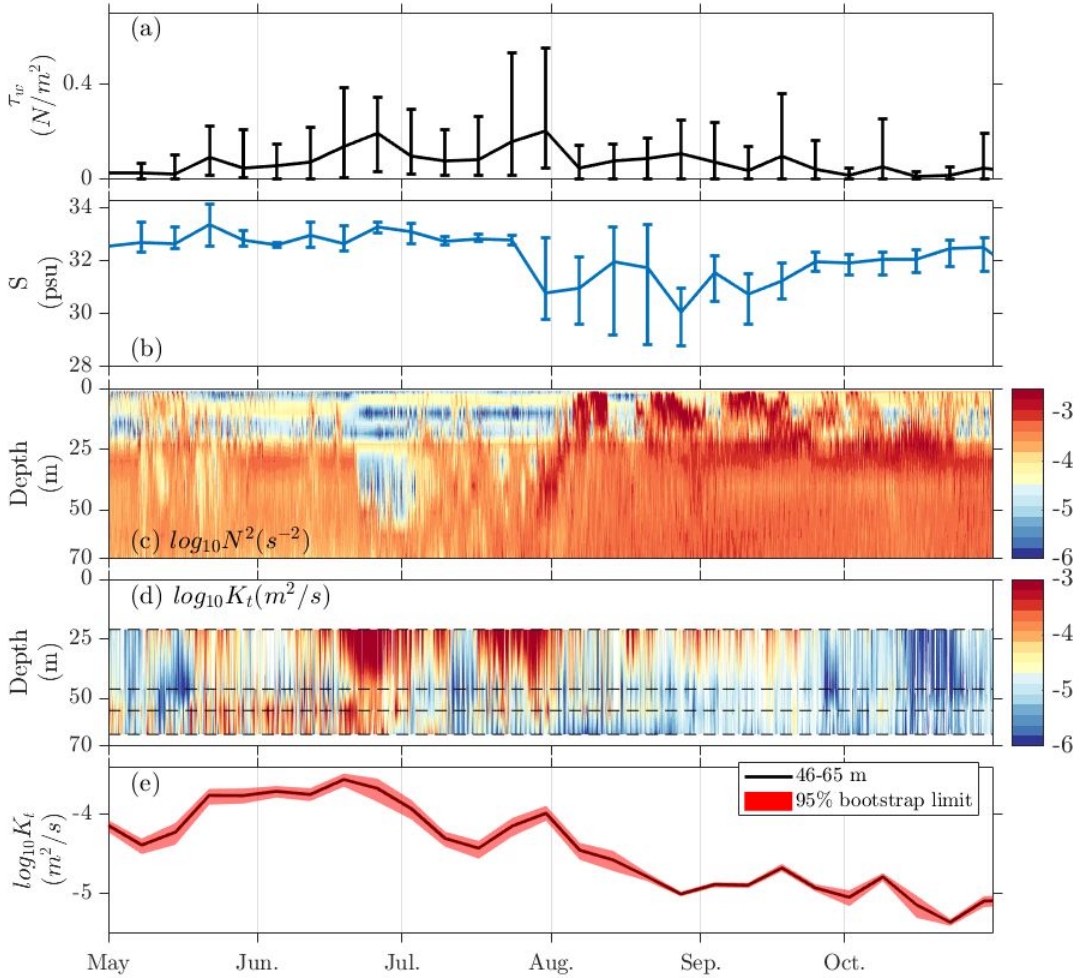


Enhanced salinity induced stratification



Periodicity in turbulence

1-month diurnal signal



SUPPRESSION OF TURBULENCE

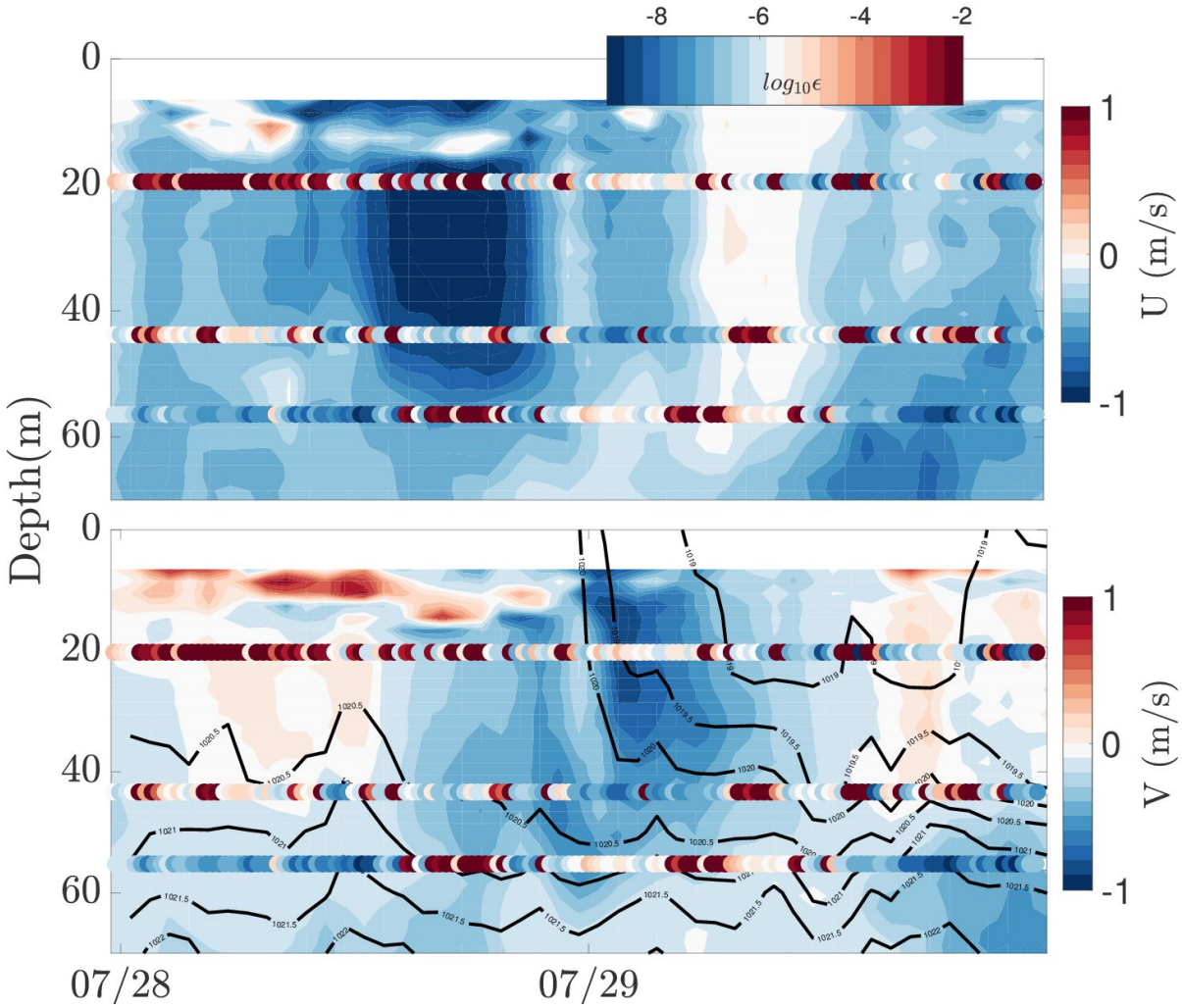
Conclusions

1. The median diffusivity during the transition to the SW monsoon was 1.5×10−5 m2 s−1 which increased to 2.5×10−4 m2 s−1 during the SW monsoon. The highest diffusivity (1.1×10−2 m2 s−1) is observed during the SW monsoon coincident with wind stress in excess of 0.3 N m−2.

2. Prolonged (~4 months) shutdown of vertical mixing below 45m post arrival of low-salinity water. During this shutdown, daily median and mean values of diffusivity remained in the range of 10−5 - 10−6 m2 s−1.

What?

- Turbulence in the northern BoB has a seasonality and shows intermittent behaviour
- This behaviour is a response to **both** stratification and wind forcing
    - Turbulence below the ML shutdown after SW monsoon



Something we are looking at

Thank You