

Upper ocean mixing processes and their impact on the mixed layer heat balance during the onset of the Atlantic Cold Tongue.

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In cooperation with:

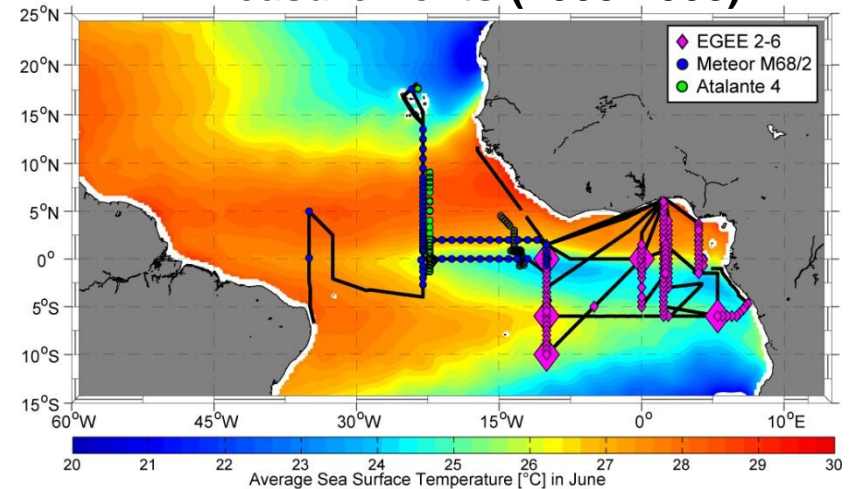
- M. McPhaden and P. Freitag
- B. Boulès
- P. Brandt, S. Thomsen, G. Krahnemann, T. Fischer and R. Hummels



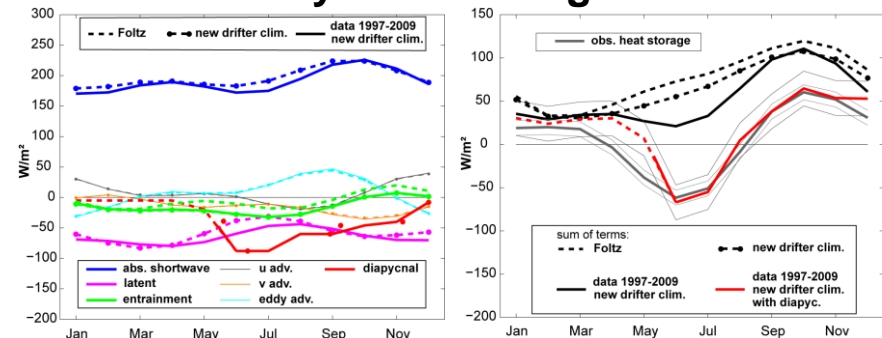
Motivation

- loosely-tethered microstructure profiles (>2000) were collected during many cruises to the tropical Atlantic in the past 7 years
- data allowed to quantify
 - spatial and temporal variability of mixing
 - regional and seasonal averages of turbulent heat flux divergences.
- sampling strategy implied
 - few repeat profiles at a single location
 - short time series (max ~ 1 day)
- data set was not adequate for understanding mixing process

Loosely - tethered microstructure measurements (2005-2008)



Mixed layer heat budget at 10°W



MicroRider / Glider Package

MicroRider: microstructure probe (Rockland Scientific) with sensors

- 2 shear
- 2 fast temperature
- pressure
- 3-D accelerometer

data rate recorded at 512 Hz

Glider measures additionally:

- salinity
- oxygen
- chlorophyll
- Turbidity

Power of MicroRider is supplied by Glider (consumption: 625mW at 5V),
Sampling (on/off) is controlled by Glider



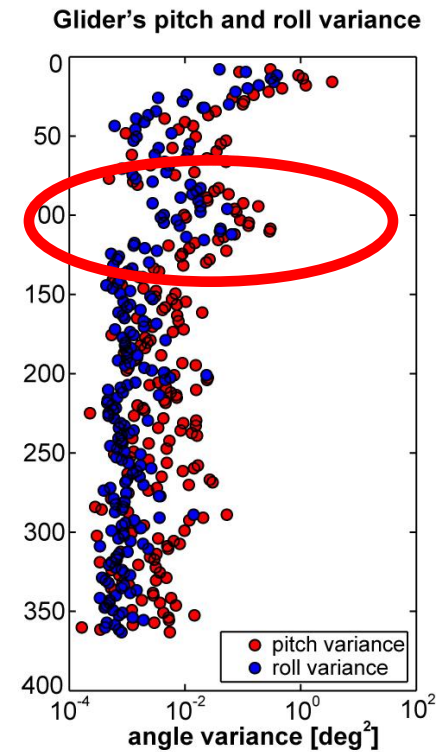
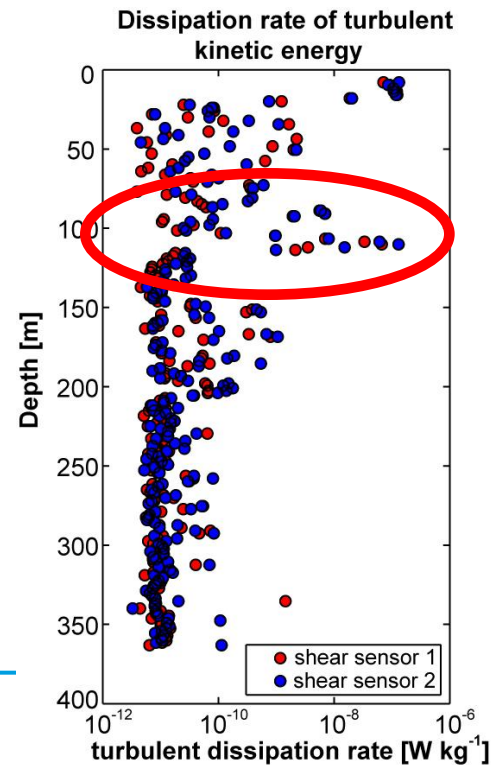
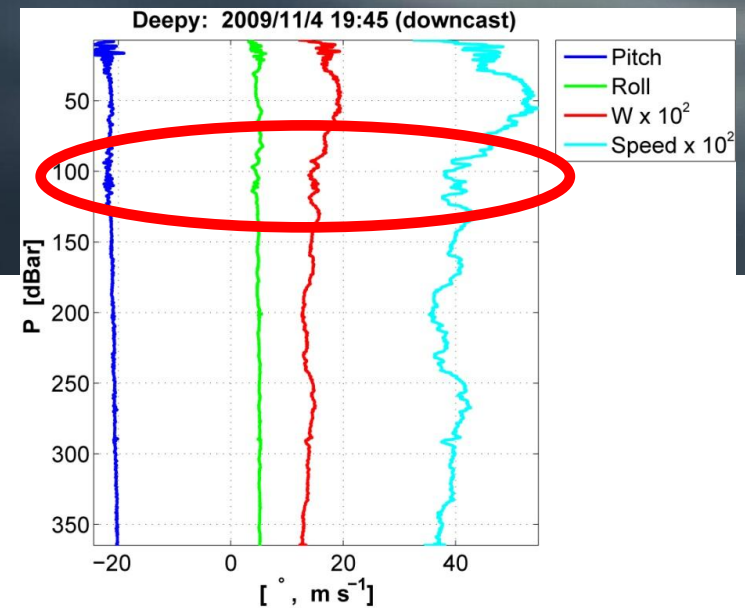
MicroRider sensors



Turbulence Measurements on Gliders

System performance:

- low noise level ($\sim 1 \times 10^{-10}$ W/kg)
- autonomous measurements of up to 5 weeks possible
- Glider movements in elevated oceanic turbulence is comparable to that of an airplane in well developed atmospheric turbulence

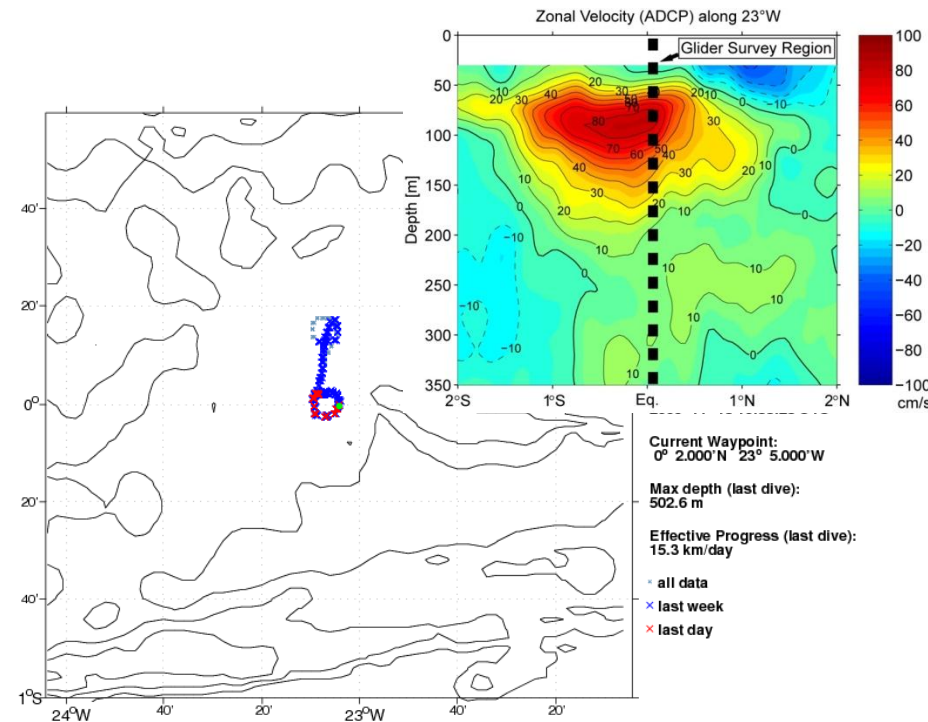


Measurement Campaign

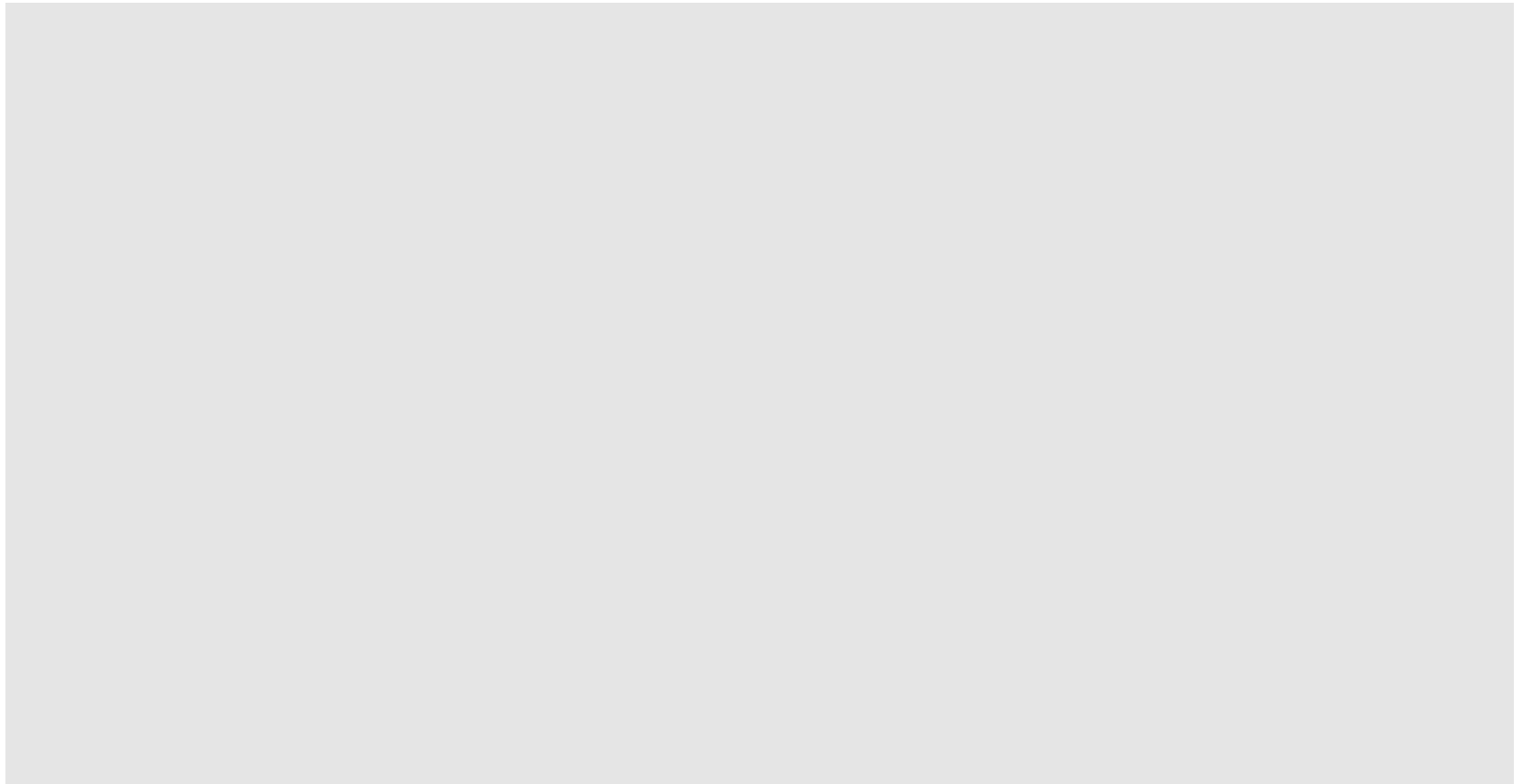
Altogether, 3 MicroRider/Glider time series from 0-350m are available. For each deployment, the package was programmed to survey at a PIRATA buoy, where additional meteorological data and velocity time series from subsurface moorings were available.



Deployment	Duration	Location	Profiles
Nov. 2009	6 days	23°W	256
May 2010	7 days	10°W	237
June 2010	24 days	10°W	381



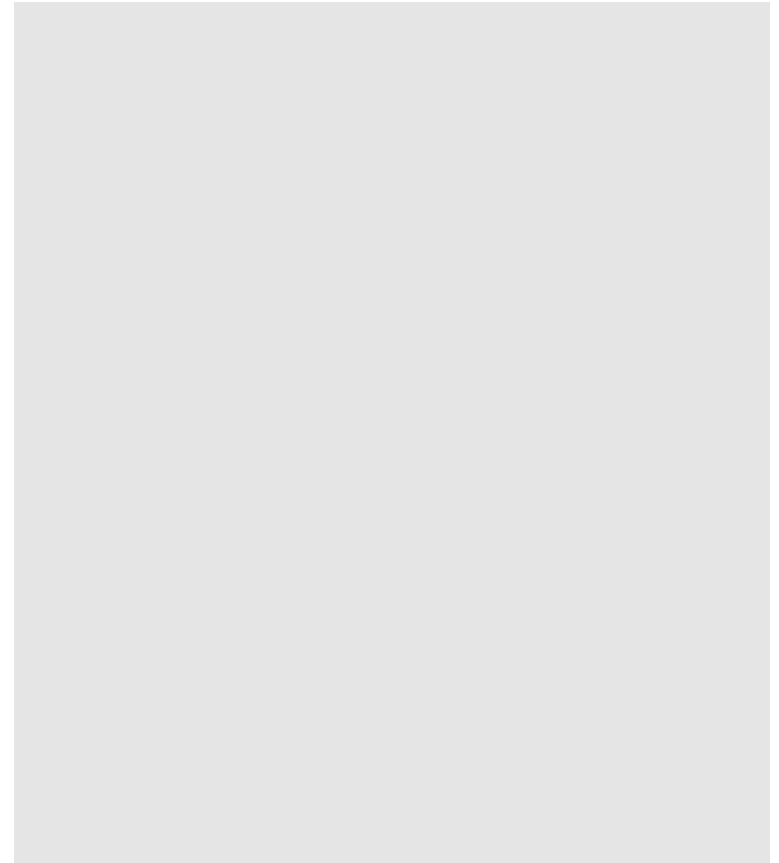
Time series of turbulent kinetic energy



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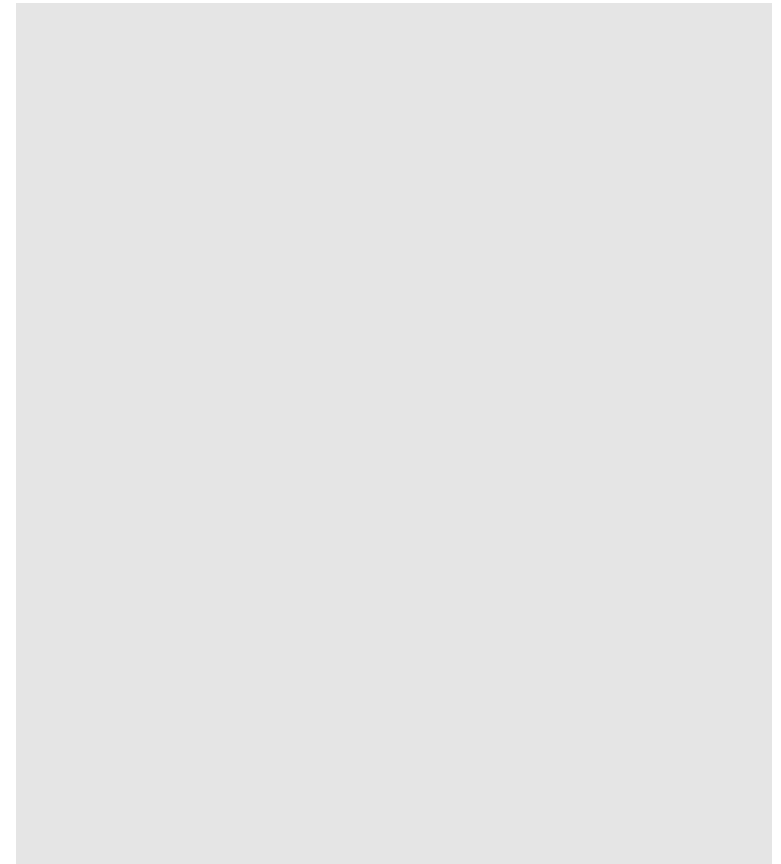
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- Aliquam lorem semper nisi



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