

## **Diapycnal diffusivity in the core and oxycline of the tropical North Atlantic oxygen minimum zone**

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Diapycnal diffusivity plays an important role in the ventilation of the Eastern Tropical North Atlantic (ETNA) Oxygen Minimum Zone (OMZ). Studies by Fischer et al. (2013), Banyte et al. (2012) and the synthesis by Brandt et al. (2015) found that diapycnal mixing contributes up to 20%, locally up to 30%, to the oxygen supply in the OMZ. This comparatively high contribution to the oxygen supply for the ETNA OMZ is the consequence of the weak horizontal circulation within the so-called shadow zone of the subtropical gyre (Luyten et al., 1983) and possibly enhanced mixing over rough topography in the seamount area south of the Guinea Dome (Brandt et al., 2015).

Diapycnal diffusivity estimates from two Tracer Release Experiments (TREs) and microstructure measurements in the oxycline and core of the oxygen minimum zone (OMZ) in the eastern tropical North Atlantic are compared. For the first time, two TREs within the same area at different depths were realized: the Guinea Upwelling Tracer Release Experiment (GUTRE) initiated in 2008 in the oxycline at approximately 320 m depth, and the Oxygen Supply Tracer Release Experiment (OSTRE) initiated in 2012 in the core of the OMZ at approximately 410 m depth. The mean diapycnal diffusivity  $D^z$  was found to be insignificantly smaller in the OMZ core with  $(1.06 \pm 0.24) \times 10^{-5} \text{ m}^2 \text{ s}^{-1}$  compared to  $(1.11 \pm 0.22) \times 10^{-5} \text{ m}^2 \text{ s}^{-1}$  90 m shallower in the oxycline. Unexpectedly, GUTRE tracer was detected during two of the OSTRE surveys which allowed to estimate diapycnal diffusivity from GUTRE over a time period of seven years. The results are consistent with the  $D^z$  estimates from microstructure measurements and demonstrate that  $D^z$  does not vary significantly in the OMZ within the depth range of 200-600 m. For both experiments no significant vertical displacements of the tracer larger than 5 m per year were observed over the entire time period of both experiments.

### REFERENCES

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