



The oxygen minimum zones in the eastern tropical Atlantic and Pacific oceans: A ventilation perspective

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Oxygen minimum zones (OMZ) in the depth range 100 to 900 m in the Atlantic and Pacific oceans are covering the eastern tropical regions. The minimum oxygen values are reached at 300 to 500 m depth. Oxygen minimum values in the eastern Pacific become suboxic with dissolved oxygen of less than $1\mu\text{mol kg}^{-1}$, the OMZ of the eastern Atlantic is not suboxic and has relatively high oxygen minimum values of about $40\mu\text{mol kg}^{-1}$ in the North Atlantic and about $17\mu\text{mol kg}^{-1}$ in the South Atlantic. The OMZ's are a consequence of a combination of ocean ventilation, which supplies oxygen, and respiration, which consumes oxygen. Decomposing the ventilation in a density following manner into volume and subduction rate it becomes apparent that the OMZ's are located in density ranges where the volume is large and the ventilation is sluggish. However, in addition to sluggish ventilation the consumption through respiration decays with depth and consequently certain density ranges with a large volume but a comparably low subduction are not occupied through an OMZ because the consumption is low enough to prevent an OMZ. Considering present day isopycnal volumes and respiration rates the subduction rates required to prevent an OMZ are derived and compared with independently derived rates.