



Variability in subtropical-tropical cells drives oxygen levels in the tropical Pacific Ocean

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Previous studies found a negative trend in oxygen concentrations in tropical regions during the last decades. Employing a biogeochemical circulation model, we highlight the importance of wind-driven ocean transport associated with the Subtropical-Tropical Cells (STCs) in setting the oxygen levels in the tropical ocean. The observed and simulated slowdown of the STCs by 30% from the 1960s to the 1990s caused a decrease in oxygen transport to the tropics. Transport of phosphate was similarly reduced, decreasing export production and respiration. The effects of physical transport and biological consumption partly compensate, damping oxygen interannual and decadal variability. Our results suggest that the observed residual oxygen trend in the tropical Pacific is mainly driven by changes in oxygen transport. Accordingly, the observed recent strengthening of the STCs leads us to expect a pause in the oxygen decrease or even an increase of tropical Pacific oxygen values in the near future.