



## **Role of non-linear dynamics on the ventilation of the oxygen minimum zone in the eastern tropical South Pacific**

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We analysed the role of non-linear dynamics on the ventilation of the oxygen minimum zone (OMZ) of the eastern tropical south Pacific (ETSP) by using a coupled physical-biogeochemical model. The main result showed that non-linear dynamics increases ventilation of the ETSP from the Equatorial Current System and the Peru Coastal Current (PCC). Around the Equator, the non-linear dynamics intensified the Equatorial Under-Current (EUC), increasing the eastward transport of oxygen-rich waters. This induced a shallowing of the oxygen minimum and a reduction of the OMZ thickness. By intensifying the northward transport of PCC and narrowing the Peru-Chile UnderCurrent (PCUC), the non-linear dynamics increased the northward transport of well ventilated waters from the southern origin. Further, the non-linear dynamics inhibited the northward extension of the low oxygen waters, by intensifying the southward transport of the PCUC. The reduction of outgoing flow of low oxygen waters caused a vertical expansion of the OMZ south of 6°S. These results emphasize the important role played by non-linear dynamics on the ventilation of the OMZ.