

## Enhanced West Philippine Sea intrusion diminishes hypoxia conditions in the Pearl River estuary

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The hypoxia condition (dissolved oxygen <2 mg/L) in the Pearl River estuary is worsening in the past decade, partly due to the rising anthropogenic activities. For instance, excess nutrients cause enhanced biological productivity in the surface ocean. Yet, dead phytoplankton sink to the bottom of the coastal zone, where they decompose and consume oxygen. If the oxygen consumption rate exceeds the supply rate, then hypoxia or even anoxia may develop, leading to so-called dead zones. Here we show that a strong invasion of high dissolved oxygen but low nutrients West Philippine Sea seawater into the South China Sea in the form of Kuroshio occurred around 2003-2004. Apparently due to the oxygen supply carried by the remnants of the intruded Kuroshio, little hypoxia developed off the Pearl River estuary, where the anoxic condition develops in some years with weak Kuroshio intrusion.

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