Goldschmidt 2025 Abstract
https://doi.org/10.7185/gold2025.27624

Increased carbon storage in the deep Northwest Pacific during the Pliocene-Pleistocene transition

GUODONG JIA

State Key Laboratory of marine Geology, Tongji Univeristy

In the far reaches of the deep North Pacific Ocean, there lies a vast reservoir of respired carbon, potentially acting as a pivotal player in the drop of atmospheric CO_2 levels and the cooling of the planet during the transition from the Pliocene to the Pleistocene. However, evidence to support this hypothesis has been scarce. This work, by examining various organic and inorganic indicators from the South China Sea, reconstructs the changes in oxygen levels in the upper deep waters of the northwest Pacific since the latest Miocene. The findings reveal that oxygen levels were higher in the early Pliocene, followed by a prolonged period of oxygen depletion from 3.6 to 1.8 million years ago. This significant deoxygenation suggests an increase in the sequestration of carbon, which in turn could have contributed to the decline in atmospheric CO_2 levels. Intriguingly, this period of oxygen depletion corresponds with the expansion of oxygen-poor deep waters from the North Pacific into the western Pacific, which is likely the result of the gradual tectonic deformation of the northwestern Pacific basin. The study underscores the intricate interplay between tectonic activity, ocean circulation, and the oxygen-carbon cycle that have influenced Earth's climate over geological timescales.