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Contribution of coastal anticyclones to Black Sea oxygen dynamics

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The Black Sea is a largely enclosed basin that experiences minimal exchange with the Mediterranean through the 0.7 km wide Bosphorus Strait. It receives significant freshwater discharge from several large rivers. Mesoscale eddies are numerous in the Black Sea. They have been observed, tracked, and sampled over several decades. Previous eddy identification efforts have focused on surface circulation, aided by sea surface height maps compiled from space-borne altimeters. We use a 3d high-resolution model solution that solves both physical and biogeochemical variables that enable us to provide a comprehensive evaluation of the oxygen dynamics within the near-shore Black Sea eddy field. By this, we confirm and explain the strong subsurface oxygen anomalies formerly revealed underneath anticyclones on the basis of Argo floats and detail the transport and the biogeochemical processes involved.