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## Agean Sea Seen As Driver Of Changes In The Eastern Mediterranean

*Science Daily* — The process of deep-water formation involves the sinking of aerated surface waters down to the bottom of the ocean. This process replenishes the deep ocean with oxygen, which is otherwise consumed by decomposition of organic material raining down from the surface waters where primary productivity occurs.

However, releases of freshwater to the ocean reduce the sea surface density, which in turn suppresses new deep-water formation. A failure of deep-water formation eventually leads to oxygen depletion at the seafloor, eliminating benthic life and promoting the accumulation of organic carbon in the sediments.

In the eastern Mediterranean sedimentary archive, the (quasi) periodic occurrence of dark, organic-rich layers (so-called sapropels) bears witness to past failures in the deep-water formation process. Marino et al. investigated a sapropel layer deposited between 119,000 and 124,000 years ago in the Aegean Sea, an important region for eastern Mediterranean deep-water formation. They found that injections of large volumes of freshwater into the eastern Mediterranean led (within about 40 years) to a collapse of Aegean deep-water formation, causing a termination of benthic life and an onset of high rates of organic carbon accumulation at the seafloor.

Within about 650 years, the oxygen starvation had expanded all the way up through the water column toward the surface layer where light penetrates (the so-called photic zone), which they recognized by the occurrence of organic compounds synthesized by green sulphur bacteria that require both sulphide and light. Marino et al.'s study provides new insight into the great sensitivity of the Aegean Sea deep-water overturn system to substantial perturbations in the basin's freshwater cycle, and highlight the associated profound ecological implications.

Reference: "Aegean Sea as driver of hydrographic and ecological changes in the eastern Mediterranean"

Gianluca Marino et al., National Research Council, Institute for Coastal Marine Environment, Porto di Napoli, Calata Porta di Massa, Naples, 80133; Italy. *Geology*, Pages 675-678.

*Note: This story has been adapted from a news release issued by Geological Society of America.*



MODIS satellite image of the Aegean Sea. (Credit: NASA/Goddard Space Flight Center)

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