

Researchers uncover 340 million year-old oceanic crust in the Mediterranean Sea using magnetic data

August 15 2016



Credit: Tiago Fioreze / Wikipedia

A researcher at Ben-Gurion University of the Negev (BGU) has identified that the eastern Mediterranean Sea contains the world's oldest oceanic crust still in place and could be almost 340 million years-old.

The study reported this week in *Nature Geoscience* was conducted by Dr.

Roi Granot, a senior lecturer in the BGU Department of Geology and Environmental Sciences.

Some of the fundamental tectonic characteristics of the eastern Mediterranean remain unresolved due to the extremely thick sedimentary cover (10 to 15 km) and the lack of accurate magnetic anomaly data. The researchers towed magnetic sensing equipment to collect 7,000 km (4,300 miles) of marine magnetic profiles across the Herodotus and Levant Basins, eastern Mediterranean, to study the nature and age of the underlying igneous crust.

Dr. Granot used the magnetic data to analyze the nature of the crust in the Herodotus Basin, and found that the rocks are characterized by magnetic stripes - the hallmark of oceanic crust formed at a mid-ocean ridge. As magma at a mid-ocean ridge axis cools, magnetization of the minerals in the newly forming rocks align with the direction of Earth's magnetic field.

"Changes in the magnetic field's orientation over time are recorded in the ocean floors, creating a unique barcode that provides a time stamp for crust formation," Dr. Granot says. "The results shed new light on the tectonic architecture and evolution of this region and have important implications on various geodynamic processes."

By using this principle and identifying skewed patterns in the [magnetic stripes](#), Dr. Granot showed that the oceanic crust in the Herodotus Basin could be as much as 340 million years old.

Oceanic crust is typically recycled back into the Earth's mantle relatively rapidly at subduction zones due to its high density, thus most [oceanic crust](#) is less than 200 million years old.

"The area is covered by thick sedimentary coverage, making it unclear

precisely how old the crust is and whether it is even oceanic at all," Dr. Granot says. With the new geophysical data, we could make a big step forward in our geological understanding of the area."

He suggests that the crust might be a remnant of the ancient Tethys Ocean, which existed long before the Atlantic and Indian Oceans. If correct, this implies the ocean formed much earlier than previously thought.

More information: Palaeozoic oceanic crust preserved beneath the eastern Mediterranean, *Nature Geoscience*,
[nature.com/articles/doi:10.1038/ngeo2784](https://www.nature.com/articles/doi:10.1038/ngeo2784)

Provided by American Associates, Ben-Gurion University of the Negev

Citation: Researchers uncover 340 million year-old oceanic crust in the Mediterranean Sea using magnetic data (2016, August 15) retrieved 10 April 2024 from
<https://phys.org/news/2016-08-uncover-million-year-old-oceanic-crust.html>

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