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News

Fundamental Research

Climate, environment and circular economy

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**What was sea level over the last five hundred thousand years? To answer this question, Youri Hamon, an IFPEN geologist, is heading for Hawaii with other scientists as part of the oceanographic Expedition of the International Ocean Discovery Program (IODP). To what end? To understand the past evolution of ocean levels and associated climate changes, in order to better inform the future.**

> [Download the press release:](#)

["Fossil coral reefs as a window into the past and future - Start of an international expedition off the coast of Hawai'i"](#)

## **A mission at the heart of oceanography: to better understand the history of the Earth**

As part of the International Ocean Discovery Program (IODP), launched in 2013 and operated by the ECORD Science Operator (for European Consortium for Ocean Research Drilling), the ship of oceanographic Expedition 389, dedicated to the themes of climate and environmental variations, is setting sail.

This scientific ocean drilling program represents a new stage in an adventure whose origins date back to the 1950s (Mohole Project) and the 1960s (Deep Sea Drilling Project), and which brings together 21 nations in the field of marine science.

IODP explores the history and structure of the Earth recorded in seabed sediments and rocks. To this end, the expedition's scientific team is starting a coring campaign in Hawaii's fossil coral reefs, at 11 sites approved by an IODP Environmental Protection and Safety Panel, and to a maximum depth of approximately 110 meters below the seafloor.

## **Hawaiian corals, witnesses to past climate change**

Why Hawaii's coral reefs? Highly sensitive to sea level and global climate change, corals preserve a reliable record of past sea level and climate conditions. The island's volcanic characteristics, which mean that coral reefs grow and sink at a rapid and almost constant rate, make it a privileged area of study.

Scientific coring of these fossil reefs will thus provide a new, continuous record of sea-level variations associated with past climate change, including for several key yet little-known periods beyond 500,000 years, linked to the dynamics of the polar ice caps. This knowledge is crucial for better understanding future ocean dynamics and refining predictive models.

The expedition also aims to establish relationships between multi-scale variations in climate, from the broadest (10,000 to 100,000 years) to the finest (100 to 1,000 years), as well as between inter-annual seasonal variations, and will help identify one-off events such as tropical storms, their frequency, intensity and repercussions in terms of geohazards.

Finally, the campaign aims to characterize the response of coral systems to these fluctuations, and the associated coastal geomorphological modifications.

Would you like to follow the discoveries made during the 60 days of Expedition 389? [Visit the blog](#)

Expedition 389: studying Hawaiian corals to better predict tomorrow's climate  
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Link to the web page :