

CALL FOR SCIENTISTS

IODP Expedition 389: Hawaiian Drowned Reefs

An IODP Mission Specific Platform Expedition organised by the
ECORD Science Operator (ESO)

www.ecord.org

DEADLINE 23 Sep 2022

Applications are invited from scientists in countries participating in IODP to join the Science Party for IODP Expedition 389: Hawaiian Drowned Reefs. Any scientist from an IODP member country with expertise relevant to the objectives of the proposal may apply.

Please note that this call supersedes the previous Calls for Scientists in October 2018. We are not carrying over previous applications, and we welcome fresh applications from both new and previous applicants.

The Co-chief Scientists for this Expedition are [Prof. Jody Webster](#) (University of Sydney, Australia) and [Prof. Ana Christina Ravelo](#) (University of California, Santa Cruz, USA).

The proposal upon which this expedition is based was submitted as IODP Proposal #716 'Hawaiian Drowned Reefs'. The proposal describing the primary drill sites, as well as up-to-date expedition information, can be found on the Expedition 389 webpage <http://www.ecord.org/expedition389/>. You may also find it useful to consult a science article on the expedition by the Co-chief Scientists and others in [ECORD Newsletter #35 \(Dec 2021\)](#) (pages 20-23).

Background and Objectives

The overall goal of the drilling campaign is to sample a unique succession of drowned coral reefs around Hawaii now at -134 to -1155 m below sea level. As a direct result of Hawaii's rapid (2.5-2.6/kyr) but nearly constant subsidence, a thick (100-200 m) expanded sequence of shallow coral reef dominated facies is preserved within the reefs. These reefs span important periods in Earth climate history, either not available or highly condensed on stable (Great Barrier Reef, Tahiti) and uplifted margins (Papua New Guinea, Barbados) due to a lack of accommodation space and/or unfavourable shelf morphology. Specifically, these data show that the reefs grew (for ~90-100 kyrs, albeit episodically) into, during and out of the majority of the last five to six glacial cycles.

Therefore, scientific drilling through these reefs will generate a new record of sea-level and associated climate variability during several controversial and poorly understood periods over the last 500 kyr.

The project has four major objectives:

- 1) To define the nature of sea level-change in the central Pacific over the last 500 kyr, we will construct a new, more complete sea level curve from the drowned Hawaiian reefs that will allow: a) more detailed testing of Milankovitch climate theory predictions and; b) improved constraints on millennial-scale sea-level changes over the last 500 kyr.
- 2) To identify critical processes that determine paleoclimate variability of the central Pacific over the last 500 kyr, we will: (a) reconstruct the mean and seasonal/interannual climate variability from massive coral samples; and (b) use these records to investigate how high latitude climate (e.g., ice sheet volume), pCO₂, and seasonal solar radiation impact subtropical Pacific climate. This approach can be used to test theoretical predictions of climate response and sensitivity to changes in boundary conditions and climate forcing.
- 3) To establish the geologic and biologic response of coral reef systems to abrupt sea-level and climate changes, we will: (a) establish the detailed stratigraphic and geomorphic evolution of the reefs in response to these changes; (b) test ecologic theories about coral reef resilience and vulnerability to extreme, repeated environmental stress over interglacial/glacial to millennial time scales; and (c) establish the nature of living and ancient microbial communities in the reefs and their role in reef building.
- 4) To elucidate the subsidence and volcanic history of Hawaii, we will: (a) refine the variation through space and time of the subsidence of Hawaii, and; (b) improve the understanding of the volcanic evolution of the island.

Timing

Until the platform and drilling services are confirmed (estimated late summer 2022) all timings are provisional. It is envisaged that the offshore phase of the expedition will last a maximum of 60 days within a window from mid-August to end October 2023, with only a subset of the Science Party participating. Offshore activities will focus on core recovery, curation, sampling for ephemeral properties, microbiology, ancient DNA (aDNA), biostratigraphy, physical properties, preliminary lithostratigraphy (whole core observed at core ends and through plastic liners), and downhole logging. The cores will not be split at sea.

Subsequently, an Onshore Science Party (OSP) will be held at the MARUM - Center for Marine Environmental Sciences, University of Bremen, Germany, in early 2024 (exact dates to be confirmed), where the cores will be split. The OSP will be a maximum of 4 weeks long, the exact length dependent on core recovery. All members of the Science Party must attend the Onshore Science Party. Please see <http://www.ecord.org/expeditions/msp/> (and linked pages within) for an overview of Mission Specific Platforms in IODP.

Successful applicants will be invited either as an offshore-onshore participant, or as an onshore-only participant. Please note that there are no opportunities for offshore-only participation.

Expertise sought

Opportunities exist for researchers (including graduate students) in all specialties. While other expertise may be considered, specialists in the following fields are required: carbonate sedimentology, corals, sedimentology, paleontology, palynology, organic geochemistry, inorganic geochemistry, structural geology, paleomagnetism, microbiology, ancient DNA (aDNA), physical properties, geophysics, geodynamics, glacial isostatic adjustment, stratigraphic correlation and downhole logging. For the offshore phase of the expedition, we are particularly looking for the following fields: carbonate sedimentology, corals, sedimentology, paleontology, organic geochemistry, inorganic geochemistry, microbiology, ancient DNA (aDNA), physical properties, and petrophysics/downhole logging.

Information webinar

To learn more about the scientific objectives of this expedition, life at sea, and how to apply to participate, please join us for a web-based seminar on **Friday 9 September 2022** at 1pm UTC.

To register, please visit:

<https://www.surveymonkey.co.uk/r/GG6JMC6>

Where to apply - IODP Program Member Offices

Applications for participation must be submitted to the appropriate IODP Program Member Office – please see <http://www.iodp.org/about-iodp/program-member-offices>. In your application, please specify if you are interested in participating offshore-onshore or onshore-only. Please note that there is no option to participate offshore-only.

Applications should reach the appropriate Program Member Office no later than **Friday 23 September 2022**; candidates shortlisted by the Program Member Offices will be considered by ESO and the Co-chief Scientists in autumn 2022.

For further details from ESO, please contact:

David McInroy, ESO Science Manager, dbm@bgs.ac.uk