Scientists are on board the R/V JOIDES Resolution for two months to investigate the interaction of currents and monsoons in and around Western Australia. They retrieve and analyze ocean floor core samples that carry clue's to Earth's past.

IODP [1] and r/Science AMAs[1]

[1]Affiliation not available

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Abstract

The International Ocean Discovery Program (IODP) conducts scientific ocean drilling expeditions throughout the world's oceans in search of clues to Earth's past. The current expedition is Expedition 356: Indonesian Throughflow, aboard the U.S. vessel for scientific ocean drilling, the JOIDES Resolution (http://www.joidesresolution.org). On this expedition we are investigating the interaction of currents and monsoons in and around Western Australia. We'll do that by drilling sediment samples from six different sites in the northwest Australian shelf, to see how sediments have changed over the last 5 million years. We'll use the data we collect to work out how the Indonesian Throughflow and Leeuwin Currents have changed over this time, and the patterns of the northwest Australian monsoon over the same period. We will also use our data to study the movement of the Australian tectonic plate. The scientific objectives are to: Look at the history of the Indonesian throughflow and Leeuwin current a. See how the flow of these currents has affected the development of reef systems Look at how these currents have affected climate a. Understand the history and changes of the Australian monsoon b. Understand the nature and timing of aridity (dryness) in Australia Construct subsidence curves a. Better visualize the vertical movement of the Australian plate b. Investigate changes in sea level c. Look at the subsidence history A team of 30 scientists from around the globe are on board for two months to work on these questions. Hand-in-hand with the amazing technology required to drill deep into the ocean floor, we are collecting the core samples that hold clues to answer these questions. Join us to ask us anything about this intriguing science, how we got here, what we hope to discover, and our lives on board the ship! We will be back at 1 pm ET (10 am PT, 5 pm UTC) to answer your questions, ask us anything!

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Science AMA Series: Scientists are on board the R/V JOIDES Resolution for two months to investigate the interaction of currents and monsoons in and around Western Australia. They work around the clock

IODP R/SCIENCE

ABSTRACT

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Look at the history of the Indonesian throughflow and Leeuwin current

a. See how the flow of these currents has affected the development of reef systems

Look at how these currents have affected climate

a. Understand the history and changes of the Australian monsoon

b. Understand the nature and timing of aridity (dryness) in Australia

Construct subsidence curves

a. Better visualize the vertical movement of the Australian plate

b. Investigate changes in sea level

c. Look at the subsidence history

A team of 30 scientists from around the globe are on board for two months to work on these questions. Hand-in-hand with the amazing technology required to drill deep into the ocean floor, we are collecting the core samples that hold clues to answer these questions.

Join us to ask us anything about this intriguing science, how we got here, what we hope to discover, and our lives on board the ship! We will be back at 1 pm ET (10 am PT, 5 pm UTC) to answer your questions, ask us anything!

CORRESPONDENCE:

DATE RECEIVED:
September 20, 2015

DOI:
10.15200/winn.144266.68024

Hello! I've currently got 20 million years of samples from ODP site 806 sitting in my office waiting to be digested! You guys do great stuff.

Will you be collecting samples to generate a new sea level rise record from the Sunda Shelf? A new record from there would be huge for our ability to fingerprint the sources of ice melt during Melt Water Pulse 1-A, and I'd be extremely excited to know this research was being done.

Keep up the good work!

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Ocean_Chemist
No we are not in this area, we are drilling the northwest shelf of Australia

Thanks for taking time to answer questions. I imagine six weeks into the expedition this is a welcome distraction!

The Indonesian throughflow is a really interesting phenomenon, given the limited area for transport between the Western Pacific and Indian oceans. The physical oceanography has been a bit tricky to measure directly, and the political instability of places like East Timor has not helped. This expedition is going to produce fascinating results on its history.

I am curious if anyone aboard is interested in the biogeography of the region. That is to ask, will anyone be trying to evaluate the magnitude and relative importance of the throughflow in moving species like planktonic formaminifera or coccolithophores between the bodies through time?

Wrathchilde
We anticipate using microfossil and macrofossil biogeography to chart Indonesian connectivity with the West Pacific Warm Pool

Welcome and thank you for your time,

How will your data and the subsequent analysis translate into meaningful action for your regular person living in the region? Does it affect their lives in any way?

adenovato
We look into the past (for paleoclimate and paleoenvironment) to understand times when conditions were similar to what our world might be in the future. if we don't understand the past how can we see into our future

Could you please give some background on the general use of the word "monsoon" in this context? Is the Australian Monsoon related to the Asian Monsoon - that is, is it affected by the Himalayas and the Indian-Asian collision? Or is it caused by something else? It would help contextualize all of the work IODP has been doing in this area over the last year or so. Thanks,

Menthol22
Unlike the Indian monsoon the Australian monsoon is not related to topography, it is more related to the amount of sunlight reaching the northern half of the Australian continent. So the Australian monsoon in the past has been controlled more by orbital cycles compared to the tectonic influence of the Indian monsoon

How does an ocean current affect climate, and what impact (if any) do humans have on currents?

karalani
Ocean currents strongly affect the regions adjacent to them. For example the south flowing warm Leeuwin current keeps the West Australian coastline keeps it a bit warmer and wetter than if the north flowing colder West Australian Current was dominant. Global warming might change the intensity of these currents and therefore may change the climate adjacent to them

What kind of time resolution is possible? Can you get data on year by year variations, or only over longer time ranges?

Will these studies help in understanding the current climate warming trend?

MasterFubar
We hope to get orbital scale records (ie. samples every 10,000 years). To understand our current climate trend we need to look into the past (for paleoclimate and paleoenvironment) to understand times when conditions were similar to what our world might be in the future. If we don't understand the past how can we see into our future

Hey! I was just wondering what kind of equipment/methods you guys are using to analyse the sediment samples, what kind of results you're getting on how this actually relates to the effects of the currents on the sea floor!

Keep up the research!

Squidrang
check out http://iodp.tamu.edu/labs/ship.html to see all the wonderful equipment on the JOIDES Resolution. We are using microfossil and macrofossil biogeography to chart Indonesian connectivity with the West Pacific Warm Pool, this tells us when the warm south flowing Leeuwin Current was flowing along the coast of West Australia

Wanted to say this...you guys are doing a truly remarkable job....So naturally your work mostly involves using data from inside the sea bed and oceanic currents....can you just give us a small enough gist of what kind of analysis do you run with the data collected....like spectrometry, vapor contend determination etc, etc.

etimejumper
The ship is a large floating geoscientific research facility that has an array of laboratories and equipment that is used intensively during each expedition, including facilities to investigate the chemistry, physical properties, magnetism, fossils and microbiology of recovered material, as well as visually describe the appearance and composition of it. Find out more about the ship: http://iodp.tamu.edu/labs/ship.html

How hospitable is the drilling environment you're in to good recovery? Are there a lot of sands and other obstacles?

Menthol22
Recovery has been variable, but generally good. The overall average recovery is 70%. The main problem for recovery hasn't been sands, but interbedded hard and soft layers that have occurred in some intervals. In such cases, the soft material can be washed away and not recovered. However, we have over 4700 m of core, so we're not complaining.