

# Deep-ocean sentinels on northern climate watch

July 28 2011

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The Australian Institute of Marine Science research vessel, Solander, prepares to depart Darwin for the mooring deployments. Photo by: Jed Garland, AIM

Three deep-ocean moorings have become the foundation for a new drive to measure change in currents linking the Pacific and Indian Oceans through the Indonesia Archipelago – a key factor influencing Australia's climate.

Up to 3,000 metres tall and carrying an array of special marine sensors, the moorings were deployed earlier this month as part of an international collaboration to monitor the Timor Passage and Ombai Strait – two strategic deep [ocean](#) channels which act as 'chokepoints' in the global system of ocean currents.

Valued at over \$1 million, the moorings were deployed as part of Australia's Integrated Marine Observing System (IMOS). They are one

of several deepwater mooring arrays being deployed in a project led by CSIRO Wealth from Ocean Flagship scientists Dr Bernadette Sloyan and Dr Susan Wijffels.

The moored instruments will enable oceanographers to see how warm, fresher tropical waters may influence Indian Ocean ecosystems and tropical weather systems which bring rains to Australia.

"Known as the Indonesian Throughflow, this powerful system of ocean currents influences the seasonal climate in Australia," Dr Sloyan said. "But it is their contribution to global climate, particularly their influence on long-term changes, that is at the heart of this current research."

During a recent 12-day research expedition aboard the Australian Institute of Marine Science research vessel, RV Solander, scientists recorded numerous [deep-ocean](#) profiles of elements, including temperature and salinity, as a check against data gathered by the moorings' sensors.

Dr Sloyan said the Indonesian Throughflow is an important pathway for the transfer of climate signals around the world's oceans. During their transit through the Indonesian Archipelago, [Pacific](#) waters are converted into a distinctly fresh Indonesian sea profile that is clearly observed across the South Indian Ocean.

Key influences on these changes are: Pacific and Indian Ocean winds, the seasonal monsoon and rainfall patterns over the western tropical Pacific Ocean.

"While the heat and fresh water carried by the Throughflow are known to affect the characteristics of both the Pacific and Indian Oceans, variations year-to-year and from decade to decade concerning the size, depth and distribution of the flow remains a troublesome unknown.

"The ocean data collected by the sensors will increase the accuracy of ocean circulation and climate models and advances here will have beneficial outcomes for [climate](#) assessment in the Australian and wider region," Dr Sloyan said.

Provided by CSIRO

Citation: Deep-ocean sentinels on northern climate watch (2011, July 28) retrieved 20 April 2024 from <https://phys.org/news/2011-07-deep-ocean-sentinels-northern-climate.html>

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