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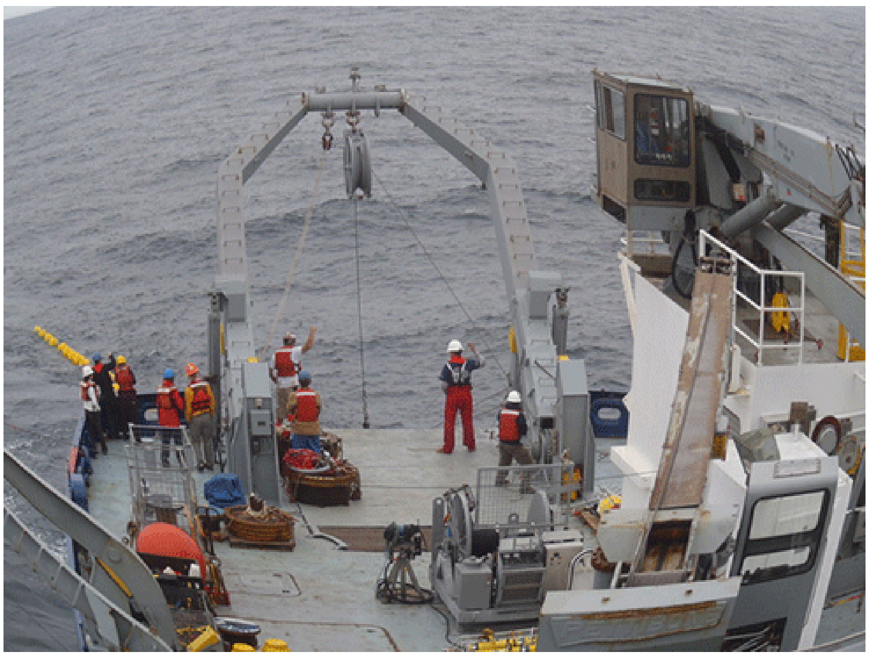
Hidden secrets of the Tasman's giant internal 'waves'

Hobart is the base for a new international ocean study to track the massive internal tides of the Tasman Sea.



Credit: David Murline

The 10-week project, termed T-TIDE, involves two US research vessels, *Roger Revelle,* from Scripps Institution of Oceanography and *Falkor*, operated by the Schmidt Ocean Institute, and research by US, Canadian and Australian scientists.

It will ultimately lead to major improvements in global climate models, and an understanding of biological production concentrating nutrients for fisheries.

According to Australian biological oceanographer, Dr Pete Strutton from the University of Tasmania (UTAS), the Tasman Sea is considered a global internal tide hotspot and a natural laboratory for the study.

Internal tides form when the more familiar regular tides push water across seafloor features such as seamounts or ridges.

The forces created by this movement spawn underwater waves that can travel great distances in the interior of the sea. These waves reflect off the sea surface and seafloor, and can be found at any depth. Far below the surface, waves can be hundreds of metres high, with wavelengths of up to 200 km.

Tasmania stands in the path of a powerful, focused beam of internal tidal waves generated on the Macquarie Ridge, south of New Zealand.

Computer models predict, and satellite observations confirm, that these waves slam into the East Coast of Tasmania after a four-day, 1400 km transit through the Tasman Sea.

What happens next is not so clear, since the wave-breaking and turbulence that results from this impact will happen far below the stormy sea surface.

Dr Strutton says the team hopes to isolate the effects of the internal tide wave from the region's eddies, which are an almost permanent feature of the waters off south-east Australia. Eddies are circular currents that spin off of larger currents and can reduce the width of the tide wave, or change its path.

‘The internal tides and turbulent mixing that occurs in the deep sea off Tasmania is thought to affect the overall circulation of the global ocean,’ he says. ‘Understanding these processes is a critical step in predicting our climate.’

Scientists will study the internal waves by deploying autonomous deep-diving gliders and installing 15 deep sea moorings to study the internal tide’s effects after it breaks 1–3 km down on the Tasmanian continental slope. Continental shelf moorings will be installed to determine the near-shore consequences of the internal tide, supporting research led by Professor Nicole Jones of The University of Western Australia.

High-resolution mapping and sensors that measure long term temperature, depth, salinity and other data will also be deployed. A new on-board, high-performance supercomputer will be used for the first time to communicate real-time data.

Source: UTAS

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