Study grapples with ocean climate stress challenge

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Climate change will allow larger waves to travel over reefs deteriorating conditions for less wave tolerant marine life, such as seagrass. Credit: Tane Sinclair-Taylor

(Phys.org) —Researchers are struggling to solve the challenge of predicting climate change impacts on marine environments.

Research led by University of Queensland scientists has found that predicting such impacts could be more difficult than first thought, due to interactions between ocean ecosystems.

UQ Global Change Institute researcher Dr Megan Saunders said the study, published in *Nature Climate Change* this week, was the first to measure the impact of environmental change on such interactions.

It found sea-level rise could damage tropical marine ecosystems by mid-century.

Dr Saunders said the response of one ecosystem, such as coral reefs, to climate change, could have significant impacts on neighbouring ecosystems.

"As sea levels rise we can expect to see deeper waters over coral reefs, leading to larger waves, more erosion and shoreline damage, and ultimately harsher conditions for seagrass and other ocean communities that rely on wave protection provided by reefs," she said.

"In addition to storing carbon, seagrass acts as a form of shelter for fish, produces high levels of oxygen and offers wave protection, so its destruction could have devastating consequences."

The hundreds of millions of people who live near tropical coasts will be the first affected by sea level rise.

Global Change Institute Director Professor Ove Hoegh-Guldberg said the immediate threats of sea level rise included inundation and inland migration, and many people would eventually lose their food sources and income streams.

"Coastal habitats will be permanently lost and others altered irreparably

as they attempt to acclimatise to the changing conditions," he said.

The research, at Lizard Island on Australia's Great Barrier Reef, involved ecologists, modellers, geographers and engineers from UQ and the University of Wollongong

They mapped coral reefs, measured seafloor topography, and monitored the distribution of seagrass and coral in a set area.

Dr Saunders said the team studied wind data to determine likely changes in wave conditions from rising sea and modelled how the ecosystems might respond to sea level rise.

"Unfortunately we are committed to a certain level of climate change and there will be sea level rise in future years, but strong action to reduce greenhouse gas emissions and other impacts on ocean ecosystems, such as overfishing, could help reduce the damage," she said.

More information: Interdependency of tropical marine ecosystems in response to climate change, *Nature Climate Change* (2014) DOI: 10.1038/nclimate2274

Provided by University of Queensland