Small increases in temperature can change ocean life

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A NEW study has found that microhabitat warming of 2° C causes significant shifts in the structure of marine communities.

The UWA study investigated how whole communities of marine organisms respond to short term warming events or 'heat waves'.

UWA Oceans Institute Dr Dan Smale and co-author of the work says "we were able to show that the ecological performance of certain species—including an invasive pest—is altered by short-term warming".

On land, it is quite easy to experimentally control climate variables, such as air temperature or humidity, but conducting climate experiments in the sea is far more difficult.

"We built our own system that can control temperature at the micro-habitat scale," says Dr Smale.

"The fact that we recorded significant responses to a relatively small warming treatment of 2° C was quite a surprise, considering that temperature naturally fluctuates through the year by ~5°C" —Dr Smale. Image: Xander Rood

Hot plates that warmed the surrounding boundary layers above ambient temperature were deployed at sites in the Swan River and Hillarys.

There was a pronounced difference in the magnitude of response between key taxa Dr Smale says .

In the in the Swan River, the globally distributed marine sea squirt pest Ciona intestinalis increased its coverage on hotplates.

This appeared to be due to larger individuals, suggesting that early-stage growth and development rates may increase under higher temperatures.

While at Hillarys, the warm-water ascidian, Didemnum perlucidum, exhibited a very strong response on hotplates, even over-growing other species.

"The fact that we recorded significant responses to a relatively small warming treatment of 2° C was quite a surprise, considering that temperature naturally fluctuates through the year by ~5°C," Dr Smale says.

During summer, when ambient temperatures are highest, additional warming strongly influences the ecological performance of some marine organisms, and some invasive pests are facilitated by seawater warming.

The hot plate system was a success in conducting in situ experiments, although Dr Smale admits it doesn't fully simulate 'real' heat waves which occur at much greater spatial scales.

"We hope to develop the hot plate system so that multiple experimental units can be deployed in 'natural' marine habitats."

Dr Smale hopes to run experiments further afield.

Ultimately, we hope to run experiments in subtropical locations like the Abrolhos and Coral Bay to examine how short-

term warming affects key habitat formers like corals and seaweeds."

Predicting changes of key marine species is problematic and currently hindered by limited knowledge of how warming effects interactions and ecological processes in the wild.

The experiment formed part of a larger body of work with the Oceans Institute and the Marine Biological Association of the U.K.

Written By Sarah Curran-Ragan

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