BLICKWINKEL/ALAMY

Not so peaceful and unchanging

Submarine heatwave transformed the seas

HEATWAVES aren't just a problem for humans. They can reshape marine ecosystems too.

Such extreme weather events will become more common as climate change progresses. They can ravage land ecosystems, but until now little has been known about their effects in the seas.

Events last year in the sea off Australia's west coast suggest that the impact can be extensive and rapid. For more than 10 weeks beginning in January, sea temperatures were between 2 °C and 4 °C warmer than usual along a 2000-kilometre stretch of coast – the area's most extreme warming event since records began.

In November 2011, Daniel Smale at the University of Western Australia in Perth and colleagues surveyed the area, as they have done every year since 2006. The formerly pristine and stable ecosystem had massively changed.

"In less than a year, we can have ecological switches from one kind of habitat to another," Smale says.

The researchers found the ecosystem had lost complexity. The kelp (*Ecklonia radiata*) that covered 80 per cent of the area, providing a range of habitats, had declined to cover just 50 per cent. Mats of algal "turf", which create fewer distinct niches, had moved in instead (*Nature Climate Change*, DOI: 10.1038/nclimate1627).

Smale will return to the area this November to see whether the changes are permanent – he suspects that some will be.

This is not the first evidence of the impact of marine heatwaves. The 2003 heatwave that gripped Europe triggered the marine equivalent in the Mediterranean Sea. Temperatures rose by between 1 °C and 3 °C, and in places 80 per cent of sea fans died (*Global Change Biology*, DOI: 10.1111/j.1365-2486.2008.01823.x).

We don't yet know whether climate change triggered Australia's marine heatwave, but there is good evidence that it was behind the one in Europe. Models suggest that such events will become more common.

Working out what effect that will have on biodiversity is tricky. "It's a thing we all know is important, but it's very difficult to deal with," says Chris Thomas of the University of York, UK.

Thomas predicts that climate change will commit 15 to 37 per cent of species to extinction by 2050 (*Nature*, DOI: 10.1038/nature02121). He says the toll may be made worse by more frequent extreme weather events.

It's a concern shared by the International Union for Conservation of Nature. The IUCN Red List of Threatened Species factors in climate change, but a species that stays stable as temperatures rise gradually might be hit much harder by an extreme event.

"If dramatic ecosystem changes happen, that may be something that takes us by surprise," says Rebecca Miller of the IUCN Red List unit. **Michael Marshall** ■

Three-in-one drug to tackle stubborn TB

AFTER decades rampaging across the globe, tuberculosis has a real fight on its hands. That's thanks to the arrival of a drug combination that could for the first time dramatically shorten treatment and tackle both ordinary and multi-drug-resistant strains of TB.

Called PaMZ, the pill is a combination of the standard TB drug pyrazinamide with the antibiotic moxifloxacin – not previously used against TB – and PA-824, a drug whose potential against TB was reported by *New Scientist* in 2001.

PaMZ could wipe out several resistant strains of *Mycobacterium tuberculosis* – the cause of most cases of TB – which have been spreading through South Africa, India and the countries that made up the former Soviet Union. What's more, it could work in a sixth of the time of existing treatments, at a tenth of the cost – as well as slashing by a third the number of pills required.

"We may have a major solution here," says Mario Raviglione, director of the World Health Organization's Stop TB campaign. The new treatment is "simpler, less toxic and much cheaper" than existing regimes, he says.

It also shows promise in treating TB in HIV-positive people, a real problem in sub-Saharan Africa.

PaMZ's potential emerged from a study in which various permutations of its three constituent drugs, plus one newcomer, bedaquiline, were tested on sputum samples from groups of people with TB in Cape Town, South Africa. PaMZ outperformed all other combinations in the study, killing 99 per cent of TB bacteria within two weeks – matching the existing four-drug treatment (*The Lancet*, DOI: 10.1016/S0140-6736(12)61080-0).

"The new pill could work in a sixth of the time existing drugs need, at a tenth of the cost"

In animal studies, PaMZ killed drug-resistant bacteria equally rapidly, and so could yield the first treatment lethal to both ordinary and resistant strains. It would also bring treatment time for resistant TB into line with that for ordinary TB. Andreas Diacon at the University of Stellenbosch in Cape Town, the studies' lead researcher, hopes to begin a larger trial next year. "If that's successful, we may be able to roll the treatment out within four or five years," he says. Andy Coghlan ■