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Half a degree extra warming would lead to catastrophic impacts

By Jane Palmer



Mediterranean water shortages are already hindering food production
Ferdinando Scianna/Magnum Photos

At the Paris climate summit last December world leaders agreed to try to [limit warming to below 2°C](#) – and if possible below 1.5°C – in part because they perceived crossing that boundary to be too risky. But no one knew for sure what difference that half degree rise would actually mean.

Now we have a clearer idea: a study estimates that it could have dire consequences, in particular for coral reefs, but also for crop yields and fresh water availability.

“Under a 1.5°C rise coral reefs would be dramatically affected, but there is more opportunity for adaptation and survival,” says lead author [Carl Schleussner](#), a scientific advisor at Climate Analytics in Germany. “However, for 2°C there is very little hope that these systems would be able to survive.”

The researchers analysed the climate models used in the [Intergovernmental Panel on Climate Change \(IPCC\)](#) Fifth Assessment Report, which projected different impacts of warming at a regional level.

Climate hotspots

They looked at changes in extreme weather events, water availability, crop yields, coral reef degradation and sea level rise if the average global temperature were to rise to 1.5°C or to 2°C above preindustrial levels.

Their findings revealed the emergence of “hotspots” – regions that would be disproportionately affected by the half a degree rise.

The Mediterranean, for example, is predicted to have 9 per cent less fresh water than today with a 1.5°C rise; at 2°C that increases to 17 per cent. “This is a region that is highly vulnerable to water scarcity already,” Schleussner says.

The researchers’ analysis also estimated a sea level rise of 50 centimetres by 2100, if the temperature rose by 2°C, as opposed to 10 centimetres if it only rose by 1.5°C. But taking into account [the unexpected Antarctic ice melt, these results might already be a gross underestimate](#).

With crop yields, the team found that those in tropical regions could drop by as much as 40 per cent at 2°C compared with today, with a drop of 25 per cent predicted at 1.5°C. Heat waves in these regions could last up to 3 months at 2°C, 1 month longer than at 1.5°C.

Regional differences

Schleussner hopes that highlighting the regional impacts will help inform policymakers.

“The differences really show up in different regions,” he says. “What our study shows is that if you want to understand the differences between any kind of warming levels in a meaningful way you have to do so in a way that is region specific.”

The IPCC recently announced that it will write a report that will offer an impact assessment of a 1.5°C rise in global warming.

“This study shows that there are significant differences in the impacts of a 1.5°C and 2°C warming,” says [Jan S. Fuglestad](#), research director at CICERO Center for International Climate and Environmental Research in Norway. “Of course there are uncertainties here, but this work gives us a very useful picture.”

“We need more studies,” he says, “but this is a very good first step to fill the knowledge gap.”

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