EarthBeat
Science

A man sits on a stranded vehicle on a flooded road following heavy rainfall in Zhengzhou, China, July 22. (CNS/Reuters/Aly Song)

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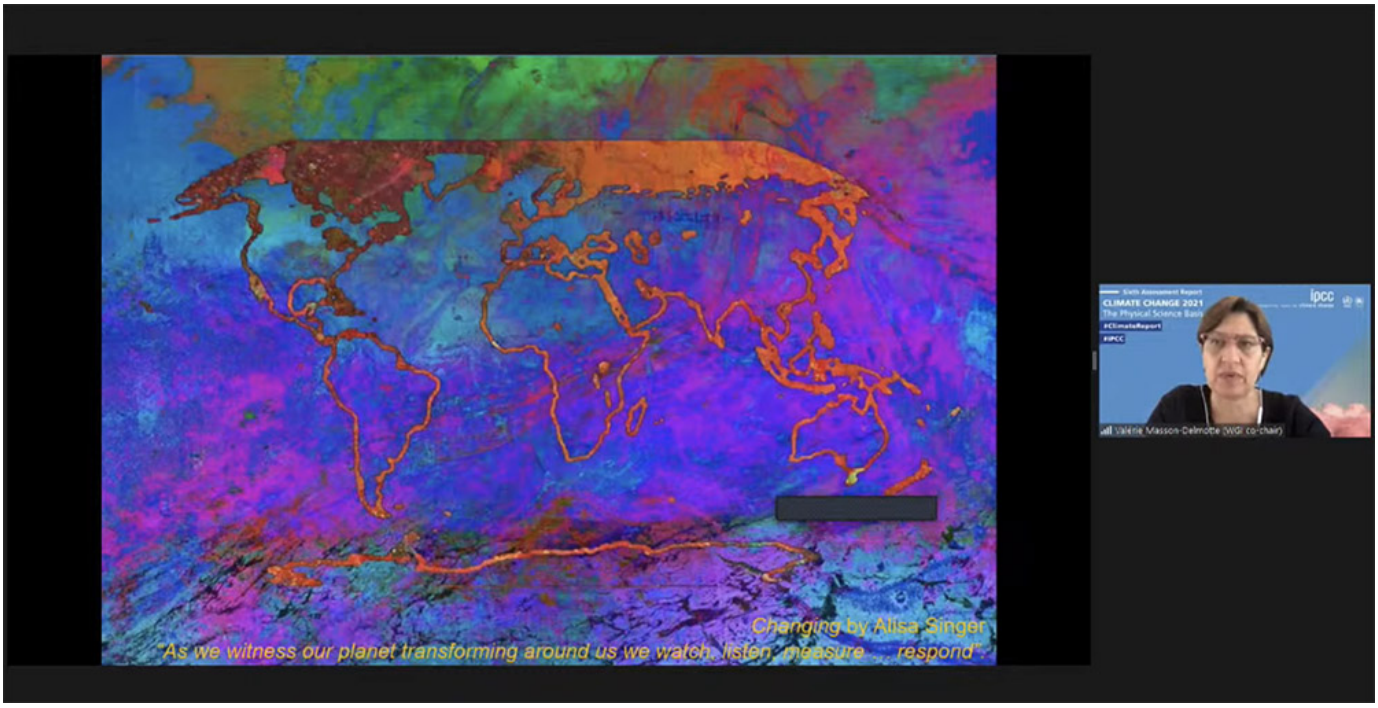
A future of rising temperatures and extreme weather — stronger and more frequent storms and heat waves, combined with intense drought — is unavoidable in the coming decades, according to a new report by an international panel of scientists. But the direst outlooks can still be averted, the experts said, if the world's countries stop burning fossil fuels and take other immediate steps to reduce greenhouse gas emissions from human activities.

The report, released Aug. 9 by the United Nations Intergovernmental Panel on Climate Change, is the group's first review of climate science research since 2013. The IPCC provides periodic assessments on the science behind and risks related to climate change, as well as reports on possibilities for mitigation of and adaptation to impacts.

No region of the Earth has escaped the effects of climate change, and even if emissions were immediately reduced to no more than the amount that the Earth's soil, plants and oceans could absorb naturally, some of the impacts already set in motion would be irreversible within centuries or millennia, the report says.

Although the scientists did not analyze the heat waves, flooding and wildfires that have struck the United States, Europe and Siberia in recent weeks, the events are consistent with their findings about Earth's warming climate.

"The report clearly shows that we are living the consequences already of climate change everywhere, but furthermore, that we will experience further and concurrent and multiple changes" with each fraction of a degree of additional warming, Argentinian meteorologist Carolina Vera, one of the report's authors, said at the virtual press conference where the report was presented.



French climate scientist Valérie Masson-Delmotte shows art used for the cover of the new United Nations Intergovernmental Panel on Climate Change during an Aug. 9 virtual press conference. (NCR screenshot)

Coming less than three months before the next U.N. climate summit, COP26, to be held Nov. 1-12 in Glasgow, Scotland, the report adds even more urgency to the already critical international climate negotiations.

"The grim and disturbing findings of the ... report only reinforce the message of Pope Francis' *Laudato Si*' — we must do everything we can, and now, to protect and defend Our Common Home," Bishop John Arnold, chair of CAFOD, the Catholic Church's aid agency for England and Wales, said in a statement.

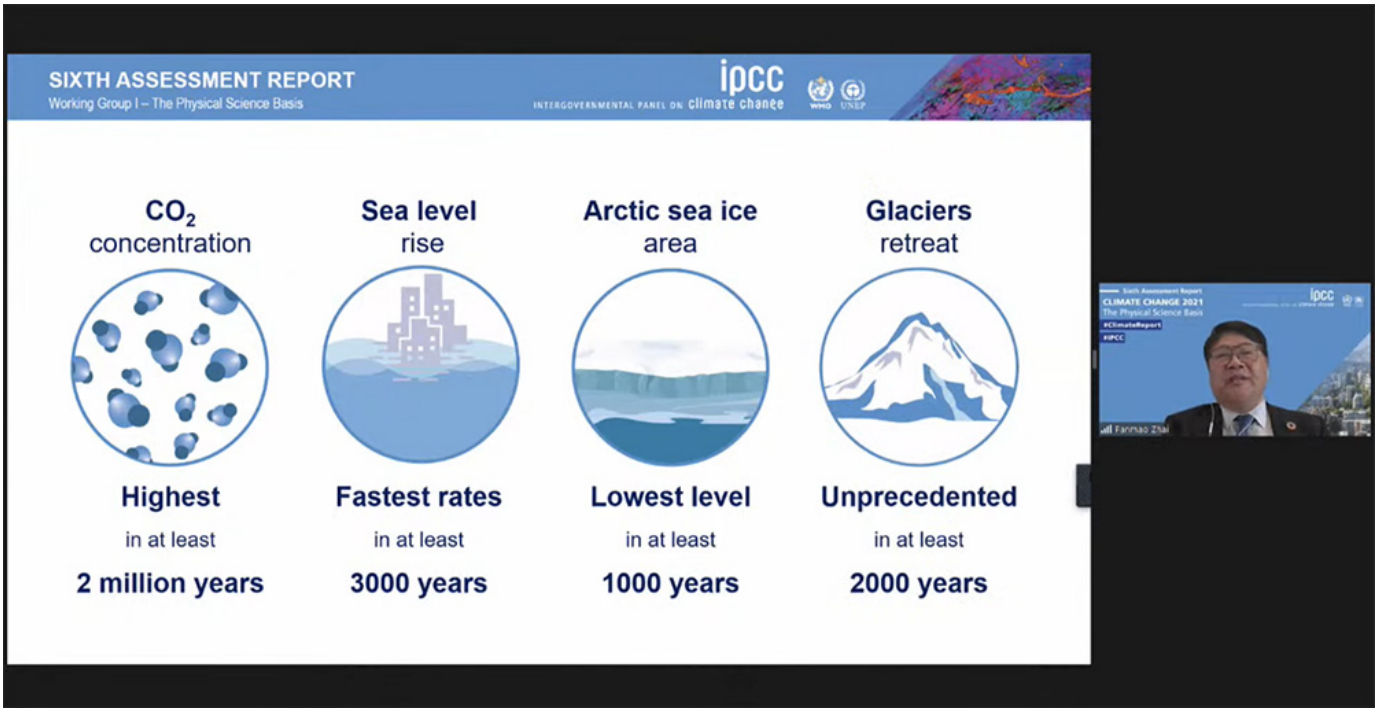
Neil Thorns, CAFOD advocacy director, added that the report "is clear it's an urgent fight to keep below 1.5 degree warming and avoid the destruction that entails, especially for those living in poverty." He urged British Prime Minister Boris Johnson to lead nations at the climate summit to commit to radical actions to change the planet's course of warming.

In preparation for COP26, countries were given until July 30 to submit revised targets for greenhouse gas emissions, but only 110 of the 197 countries that are parties to

the U.N. Framework Convention on Climate Change met that deadline. Several major emitters, such as China, Saudi Arabia and India, were among those that did not submit new targets, known as nationally determined contributions (NDCs).

Nevertheless, delegates from all countries signed off on the new IPCC report, indicating that they accept not only the dire warnings, but also the "unequivocal" conclusion that the sharp rise in temperatures and in carbon dioxide in the atmosphere since the Industrial Revolution is due to human activities.

"It is indisputable that human activities have caused and are causing climate change," Chinese climate scientist Panmao Zhai, co-chair of the working group that prepared the scientific report, said at the press conference. "What's new in this report is that we now have a much more advanced understanding of the connections between the emissions we release and the rise in global surface temperature, and the change to weather and the climate we are seeing around the world."



Chinese climate scientist Panmao Zhai speaks during an Aug. 9 virtual press conference about the U.N. Intergovernmental Panel on Climate Change report. (NCR screenshot)

Nevertheless, he said, humans still have "a chance to stop the negative climate trend [by] the middle of the century," especially by curbing the use of fossil fuels and stopping deforestation, which is a major source of emissions in tropical countries.

Episodes of extremely hot weather have become more frequent and intense since the 1950s, Zhai said. Oceans are also warming, resulting in lower oxygen concentrations and increased acidity, which is already affecting fisheries in some parts of the world. And glaciers, Arctic Sea ice, and ice sheets like those blanketing Greenland are melting.

The report provides a more detailed look at regional impacts of climate change than earlier IPCC assessments. That's partly because of advances in climate science, French climate scientist Valérie Masson-Delmotte, who co-chairs the scientific working group with Zhai, said at the press conference.

Since the working group's last report in 2013, "climate scientists filled in gaps in observations of past climate. They improved climate models and developed new ways to combine many types of evidence," she said. "As a result, today we have the clearest picture of how the Earth's climate functions and how human activities affect it. We know better than ever how the climate has changed in the past, how it is changing now and how it will change in the future."

Since the middle of the last century, carbon dioxide and other greenhouse gases released as a result of human activities have trapped heat in the Earth's atmosphere, raising the average temperature on land by approximately 1.1 degree Celsius over pre-Industrial Revolution levels.

An initial target of limiting the rise to no more than 2 C by the end of this century was revised downward to 1.5 C as part of the Paris Agreement, but at current emission levels the world is on track to overshoot both those figures, and could surpass the 1.5 C goal within the next two decades.

The new report offers five possible scenarios for future warming, based on at what point in this century, and by how much, humans dial back greenhouse gas emissions. In the scenario that assumes a 1.5 C increase in average global temperature, extreme heat waves that occurred once every decade at the beginning of the 20th century would likely occur four times. With a 4 C increase, the most extreme scenario, they would be almost annual events.

Droughts affecting natural ecosystems and agriculture also increase in frequency and intensity under the various scenarios. Although it seems contradictory, so would the frequency of days of heavy rainfall, because of the effect of warmer ocean temperatures.

The report's review of regional climate impacts covers all parts of the globe, including continental and subcontinental breakdowns as well as the warming effects on small islands, oceans, polar regions and urban areas. It also includes an interactive atlas that allows users to look at past, present and projected future climate conditions and download data.

Besides the detailed scientific report, the scientific working group published a technical report meant to help engineers design infrastructure to withstand the impacts of a warming climate, and a summary for policymakers. This report will be followed in early 2022 by assessments from the IPCC working groups studying means of mitigating the impacts of climate change and adapting to a warming world.

Although it does not make policy recommendations, the scientific report underscores the urgency of this year's international climate summit.

"COP26 is very critical," Inger Andersen, executive director of the U.N. Environment Program, said at the press conference. "Obviously, the scientist does not tell the politicians what to do, but they provide the very basis for people to have an understanding. And I would encourage that all [people] recall that, as citizens, we have a role in requesting and ensuring that our governments are aware of that science."