

Broecker: “What we need are tougher measures against climate change”

- Wallace S. Broecker wins the first edition of the BBVA Foundation Frontiers of Knowledge Awards in the Climate Change category
- In 1975 Broecker became the first scientist to warn the world about climate change, one year before the first evidence of warming
- The presentation ceremony will take place on June 18. Their monetary amount and the breadth of disciplines addressed place the BBVA Foundation Frontiers of Knowledge Awards second only to the Nobel Prize.

U.S. researcher Wallace S. Broecker (Chicago, 1931), winner of the first edition of the **BBVA Foundation Frontiers of Knowledge Awards** in the **Climate Change** category, published an article in *Science* back in 1975 with the title “Climate Change: Are We on the Brink of a Pronounced Global Warming?” He thus became the first person to use the term “global warming” and to predict that by the early 21st century temperatures would be climbing as a result of human-induced CO₂ emissions. A prediction that has proved all too true.

The BBVA Foundation Frontiers of Knowledge Awards are intended to recognize and promote research of excellence. The breadth of disciplines addressed and their monetary amount - a combined purse of 3.2 million euros spread over eight prize categories - place them among the world’s foremost award schemes.

The presentation ceremony will take place on June 18 in the BBVA Foundation’s Madrid headquarters under the presidency of the Minister of Science and Innovation, Cristina Garmendia, and the BBVA Foundation President, Francisco González. The event will welcome eminent members of the international

scientific community and high-level government institutions alongside personalities from the worlds of business and the arts.

An interesting prediction

In the paragraphs that follow, Wallace S. Broecker analyzes the current state of play, champions options like carbon sequestering, and ventures some new predictions for the future.

“We are going to need to take tougher measures against climate change in the next few years”, he contends. “It has taken a lot of time to convince citizens that we confront a grave global problem. But the last five years have witnessed a sea change. People have finally accepted that warming exists and that if CO₂ emissions go on rising the planet will heat up even more”.

Broecker dismisses as “coincidence” his prophetic use of the term “global warming”. “I just used these words for the title. I warned in that paper that we were on the brink of a pronounced warming process, and that was in 1975 (...) One year later, it began for real [detection of the first signs of warming], so it was a very interesting prediction”.

The Arctic thaw and abrupt climate changes

But this was not the only terrain first charted by Broecker. He pioneered the study of air-sea interaction back in the 1970s, focusing on the exchange of gases such as CO₂. And he was also the first to explore how the ocean’s absorption of atmospheric CO₂ gives it a key role in global temperature regulation.

More recently, his research has paved the way for another major finding: the fact that the Earth’s climate can change abruptly in very short periods, at times less than twenty years. Today’s rapid thawing of the Arctic polar cap is a good example. The resulting increase in freshwater inflow to the oceans threatens to alter the main current, the thermohaline circulation, distributing heat across the planet. If this happens, it could cause a drastic upheaval in the global climate. But Broecker is not one for alarmism: “We are still unsure about the tipping points for these abrupt changes, so are in no position to make predictions”.

Professor in the Earth and Environmental Sciences Department of Columbia University (New York), Broecker has authored some 400 scientific papers and numerous books dealing with climate change. At the age of 77, he continues to engage in front-line research. His efforts are currently focused on “how the pattern of global precipitation will change as the planet warms”, especially in the world’s drylands. This means sifting through the climate records available from cold basin lakes and cave stalagmites.

More renewable energies, but also CO₂ sequestration

The question is not if but how our planet will change. "Because change it will", says Broecker firmly. The landscape will change, because plant species will have to migrate to cooler regions to escape extinction. Arid zones will become even drier. The shortage of water, and the social and political conflicts it gives rise to, will be among the big problems of the future.

What will not change is our relationship with fossil fuels. "We will continue to depend on them, meaning CO₂ emissions are bound to increase because renewable energies will not suffice to replace them, especially in poor countries. We need to encourage renewables all we can, but I don't think it will be enough", Broecker concedes. "It may take another 50 years before they really take off, so we need a stop-gap solution".

For Broecker, the best hope lies with a technology still at the experimental stage: carbon sequestration and storage. "The idea is to find a supplement to renewable energies, not an alternative. But we need to set to work now on carbon sequestration. We need to learn how to do it in a way that doesn't damage the environment and at an energy and economic cost that stands within the bounds of reason".

Despite everything, Broecker believes that "the next hundred years will be very interesting. I'd love to be around to see what happens. The late Roger Revelle said that this was mankind's greatest geophysical experiment, and he was pretty much right. Some changes will be good, and others bad...".

Partnership with the CSIC and international juries

The Foundation is partnered in these awards by the Spanish National Research Council (CSIC), whose advisory input was instrumental in the appointment of the prize juries. The jury in the Climate Change category was formed by Edward S. Rubin (Carnegie Mellon University, United States); Kenneth J. Davies (Pennsylvania State University and director of the Institute Center for Advanced Carbon Research and Education, United States); Hans J. Schellnhuber (Potsdam Institute for Climate Impact Research); Bjorn Stevens (Max Planck Institute for Meteorology, Germany); Sergio Alonso (University of the Balearic Islands); and Carlos Duarte (Mediterranean Institute for Advanced Studies, CSIC-University of the Balearic Islands).

The BBVA Foundation supports knowledge generation, scientific research and the promotion of culture, relaying the results of its work to society at large. This effort materializes in research projects, human capital investment, specialization courses, grants and awards. Among the Foundation's preferred areas of activity are basic sciences, biomedicine, ecology and conservation biology, the social sciences and literary and musical creation.