"It created peer pressure"

Bjorn Stevens, Director at the Max Planck Institute for Meteorology, on the global climate summit in Paris

At the UN climate conference in mid-December 2015, the 194 Parties to the United Nations Framework Convention on Climate Change approved a follow-up agreement to the Kyoto Protocol. Bjorn Stevens, Director at the Max Planck Institute for Meteorology in Hamburg, assesses the agreement and explains the tasks facing research in this area in the future.

Professor Stevens, what made the global climate summit in Paris a success?
Bjorn Stevens: I believe there are several reasons for this. Not least is the fact that we've been trying to explain the causes of global warming for decades, and research has provided plausible explanations for climate change. Other special circumstances also coincided in Paris. Preparations for the negotiations had begun well in advance and were very thorough, and the chief negotiators were very good. Moreover, the approach involving the nations formulating voluntary contributions rather than having emission reduction targets imposed on them from outside was a success. It created peer pressure, which wouldn't have happened with a legislative framework. Finally, there was a very cooperative atmosphere in Paris after the devastating terrorist attacks in November.

Will this agreement put an end to climate change?
No, but I am very optimistic nevertheless. What I mean is that the agreement represents a crucial step because the world is taking resolute action to deal with a global problem of this magnitude for the first time. We're still not on the road to limiting climate warming to a particular temperature, but we have taken the necessary steps to embark on this path.

There were lengthy debates in Paris about whether the temperature rise should be limited to 2 or 1.5 degrees. Aren't the forecasts too uncertain to allow such precise targets?
Correct, the uncertainty factor associated with calculations for the volume of carbon dioxide that we can release into the atmosphere while ensuring that the global mean temperature doesn't exceed one of these limits is a factor of two. And the capacity to emit twice as much carbon dioxide is really a lot. So we must observe how the climate reacts to the measures and possibly adapt them. Given that the Earth adapts slowly to change and there is extensive natural variability, this is no trivial matter.

How will climate change, which will definitely happen, impact the planet at a regional level?
A lot of questions remain open here. The most important questions for Europe may be whether the winter storms will move north or south, whether they will become stronger or weaker, or whether they will continue to follow the same patterns for a longer period. The latter is likely what led to the recent floods in the UK. Unfortunately, we still don't understand enough about the factors on which regional changes in the climate depend.

Should future research be focused on clarifying this?
A lot of resources are currently being invested in producing forecasts for individual regions and calculations as to how a region responds when a certain volume of greenhouse gas is released into the atmosphere. However, when it comes to regional forecasts, we are living in a house of cards that can easily collapse. We are too reliant on the existing models for these kinds of calculations. We would like to believe that the models are viable, but we have little or no proof of this. So we need to take a realistic look at what we know and what we don't know. If we're honest, we must invest a lot more in basic research to obtain reliable regional forecasts.

What are the most important factors of uncertainty here?
Because this question touches on my own research, my view on this is somewhat biased. Nevertheless, I think most scientists would agree that we still don't understand the role of clouds sufficiently well. How do clouds influence the speed and extent of global warming? In addition, the question has recently arisen as to how clouds affect the regional climate and its changes. Another big question is where the carbon dioxide that was absorbed on land has gone to. And whether or not the land masses will retain their enormous appetite for carbon or whether, in the worst case scenario, the carbon that has been absorbed will be released again.

Bjorn Stevens

Will the basic researchers have completed their work when they answer these questions?
Certainly not. In my view, the value of basic research lies elsewhere: only basic research provides real surprises. Many people don't admit to themselves that the limits of their thinking are too narrow. When it comes to broadening our view of the world, there's nothing more powerful than basic research. And by the surprises we encounter through it, I don't mean that things turn out differently than we thought, but that things happen that we didn't expect at all. The greenhouse effect of carbon dioxide wasn't discovered because a politician said: "Take a look at what happens when we blow carbon dioxide into the atmosphere." This role was discovered because we wanted to understand the thermal budget of the atmosphere. People were also doing research on ozone in the atmosphere long before the hole in the ozone layer was discovered. The basis for understanding how it came about had already been established. And the ozone hole might never have been discovered if someone hadn't studied ozone in the atmosphere out of pure curiosity.

Interview: Aaron Lindner and Peter Hergersberg

Photo: David Ausserhofer for the MPI for Meteorology