

## Acceptance speech

20 June 2024

### **Thomas F. Stocker**, awardee in the Climate Change category (16th edition)

I am honoured and deeply humbled to receive the 2024 BBVA Foundation Frontiers of Knowledge Award in the category of Climate Change. In sharing this prestigious award with four of my dear colleagues in polar ice core research, the international collaborative work over many decades, field work under extreme conditions, persistence in the light of obstacles, and passionate assistance in the field and in the laboratories, are being celebrated. Our collaboration across the institutions in Europe builds on the shoulders of our predecessors who prepared the ground and showed us the way. At the University of Bern, these were Hans Oeschger and Bernhard Stauffer, as well as many students, postdocs, scientists, and technicians who have each contributed to our common goal: Unlocking the secrets that are buried in the ice of Greenland and Antarctica.

As a climate modeller, I am particularly excited to share this award with my fellow laureates, because it highlights the convergence of experimental work, field expeditions, and climate modelling to a comprehensive and unified science. This combination creates new knowledge that is fundamental to confront one of humanity's greatest challenges of this age: the safeguarding of our planet Earth, the only home we have.

I am most privileged to have contributed to two complementary scientific achievements.

First, we have measured greenhouse gas concentrations on samples from the EPICA Dome C ice core that covers the past 800,000 years, the longest reconstruction of the atmospheric concentration of CO<sub>2</sub>. This has led to the affirmation that today's CO<sub>2</sub> concentration is over 50% higher than before the ever-increasing burning of fossil fuels. As we reflect on the importance of this scientific result for our decisions on the future of planet Earth, we continue our work, again in a unique European collaborative effort under the project *Beyond EPICA: Oldest Ice*, and seek to access ice that is 1.5 million years old.

Second, as a modeller, my task is to think about mechanisms in the complex Earth system that explain the signals that we measure in the ice cores from Greenland and Antarctica. Benefitting from uncountable discussions with colleagues and even more simulations with a hierarchy of models, I was able to

formulate, together with the late Sigfus Johnsen, *the thermal bipolar seesaw*, a mechanism that explains how abrupt climate swings in the North Atlantic region are transmitted across the equator to the Southern Ocean to create gradual warming and cooling. These temperature changes, recorded in Antarctic ice cores, and mediated by the Great Ocean Conveyor Belt, are in lockstep with CO<sub>2</sub> variations during the last ice age. This demonstrates the tight climate-greenhouse gas coupling on time scales of several 1000 years.

However, sharing this award with my fellow laureates gives me special pleasure, for I have learned a lot from their work, their passion, and their experience in polar research. I also acknowledge my colleagues engaged in climate science, at the University of Bern and across the world, who have accompanied me in this exceptional journey.

Beyond making the next discovery and pushing the boundaries of knowledge further, I have always been convinced that, as scientists, we are also responsible for communicating our results to the public and enabling informed decisions regarding the future of our planet. This is why I have engaged for many years in the Intergovernmental Panel on Climate Change in various roles.

As a Co-Chair of Working Group I for the assessment that provided the scientific basis of the Paris Agreement, I worked with a team of exceptional colleagues, among them two fellow laureates, with whom we integrated the new results from paleoclimate science into the overall body of knowledge about anthropogenic climate change. This has led to a deeper understanding of surprises in the climate system, carbon cycle-climate coupling, and sea level rise, all issues that without knowledge from polar ice cores would be left to speculation.

In closing, I wish to thank my nominator, Professor Joan Grimalt, and the award committee for recognizing us with this distinguished honour.