

## Acceptance speech

16 June of 2022

### **Ellen Mosley-Thompson**, awardee in the Climate Change category (14th Edition)

It was an unexpected thrill to receive the call from Professor Bjorn Stevens alerting us that Lonnie Thompson and I had received the BBVA Foundation Frontiers of Knowledge Award in Climate Change. We thank the BBVA Foundation and the selection committee for this exceptional honor and for acknowledging climate change as a significant area of scientific endeavor. This addition is important, as addressing climate change requires producing deep, interdisciplinary knowledge of how Earth's climate system works. This knowledge is critical to develop robust climate models whose predictions guide our efforts to mitigate the anticipated changes and develop a portfolio of adaptive measures for implementation by both developed and developing nations.

Climate change has been called an existential threat and a threat multiplier due to the many complex mechanisms and feedbacks in Earth's climate system. The 21st century faces numerous challenges, and one of the greatest is dealing with unprecedented, global-scale climatic and environmental changes. Virtually everything depends on how Earth's climate fluctuates. National and global economies, agriculture, quality of life, societal stability, and the availability of food and safe water, among others, depend on a relatively stable climate. Today Earth's climate system is experiencing changes to this stability as polar and alpine ice melts at unprecedented rates and raising global sea level which will result in marine encroachment on coastal cities and wetlands. The retreat of the Arctic sea ice in summer is altering atmospheric circulation patterns and bringing unusual and often extreme weather to the mid-latitudes where much of our food is grown. Adverse climate conditions in poor nations are already contributing to mass migration to wealthier countries, sometimes resulting in strident governmental reactions. The situation will become more critical in the coming decades as mountain glaciers in developing areas such as the Andean and South Asian regions retreat and eventually disappear, resulting in water resource, agricultural, and economic stresses that can exacerbate political unrest. The increases in atmospheric concentrations of greenhouse gases, particularly carbon dioxide and methane, have paralleled the growth in world population and economic development. Evidence from

Antarctic ice cores tell us that current greenhouse gas concentrations are higher now than at any other time in the last 800,000 years.

On a personal note, my interest in science developed early and I thank my parents who are now deceased for their strong encouragement and unwavering support. In the mid-1960s few women were entering science, engineering, and mathematics. I was just the second woman to graduate with a degree in physics from Marshall University in Huntington, West Virginia. I was fortunate to receive a fellowship to study atmospheric science at The Ohio State University in Columbus, Ohio where I joined the Institute of Polar Studies, the predecessor of the Byrd Polar and Climate Research Center. Here I became fascinated by the polar regions and with Antarctica in particular. It was early days in the development of ice core paleoclimatology – the use of the chemical and physical properties deposited in the accumulated layers of snow and ice and preserved in the polar ice sheets on Antarctica and Greenland, and in alpine glaciers from the equator poleward. As graduate students, my colleague and co-recipient of this very prestigious award, Lonnie Thompson, and I began to develop a research program focused on the reconstruction of Earth's climate history using ice cores collected from glaciers around the world. In time we realized that these ice masses were not just recording changes in Earth's climate but were also responding to these changes in ways that pose environmental challenges for the 7.5 billion people on our planet, over 80% of whom live in developing countries that increasingly rely on carbon-based fuels and are developing their economies at the expense of the environment. As the world's population and our technology to exploit natural resources continue to grow, the need to understand human influences on the processes driving climate change and environmental degradation is now more critical than ever. To meet that need we must redouble our efforts to train and support our aspiring scientists, ensure they have opportunities to observe their world first-hand through field experiences, and encourage them to develop the communication skills needed to instill public trust in the scientific enterprise. Sherwood Roland, Nobel Laureate in Environmental Chemistry, who is best known for his contributions to discovering the chemical compounds destroying the ozone layer, asked a poignant question: "What's the use of having developed a science well enough to make predictions if, in the end, all we're willing to do is stand around and wait for them to come true?" It is time for the public and the private sectors to invest in the development and implementation of renewable energy sources at the expense of carbon-based energy.

Finally, we must acknowledge the dedicated members of our research team and our many collaborators who over the years have endured the harsh conditions under which our ice cores have been collected, analyzed thousands of ice samples for many different chemical species and physical properties,



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synthesized massive amounts of data, and helped us communicate the results to the scientific community as well as to the citizens of the world. On behalf of our research team and the paleoclimate and climate science communities, Lonnie and I are extremely honored to accept the prestigious BBVA Foundation Frontiers of Knowledge Award in Climate Change.