



“Everybody has a Role to Play in Curbing Carbon Emissions”

— An Interview with Prof. Corinne Le Quéré

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Prof. Corinne Le Quéré.
(Photo courtesy of Prof. Le Quéré)

Prof. Corinne Le Quéré is a world leading researcher in climate change science and policy. Strongly involved in the study of carbon cycle and its interactions with climate change for more than twenty years, she is now Director of the Tyndall Center for Climate Change Research headquartered at the University of East Anglia. She also co-chairs the Global Carbon Project, which is a major effort launched by the international carbon cycle community to provide reliable information on the most recent trends in CO₂ emissions and sinks. Besides, she is author of the 3rd, 4th and 5th (ongoing) Assessments of the Intergovernmental Panel on Climate Change (IPCC) and of the Millennium Ecosystem Assessment.

During the 9th International Carbon Dioxide Conference (ICDC9) held from June 3 to 7 in Beijing, Prof. Le Quéré granted an interview to BCAS reporter XIN Ling. In the interview, she urged every country in the world to take responsibility for emission control at once, and offered some insights into China’s carbon mitigation endeavor.

BCAS: *Why is the study of carbon cycle so important?*

Prof. Le Quéré: We all know that the CO₂ is increasing in the atmosphere very rapidly. But if you look at the fossil fuel emissions and the land use change emissions, only about 45% of these emissions stay in the atmosphere because the rest is taken up every year by what we call the “carbon sinks”, the natural reservoir, on land and in the ocean. The natural reservoirs play a huge service to society by absorbing these emissions, and it’s very important to understand what drives the efficiency of these sinks. For instance, in a warm climate, both the ocean and land sinks become less efficient. The warm water holds less carbon dioxide as a result of chemical processes and changes in

ocean circulation. On the land, the remineralization of bacteria increases with the temperature, which is coupled with changes in water patterns.

BCAS: *Last month, the daily mean concentration of atmospheric CO₂ passed 400 ppm at Mauna Loa Observatory in Hawaii. Some scientists call it a “troubling milestone”. Where are we in the course of post-industrial climate change?*

Prof. Le Quéré: We are going rapidly towards very high levels of climate change. I agree that 400 ppm is a very troubling milestone — particularly we are just breaking through these milestones without any signs of slowing down.

The emission of CO₂ from fossil fuel combustion, which is the biggest driver behind climate change, has increased by 3% per year on average since the year 2000, much faster than the increase in the 1990s at about 1% per year. The global fossil and cement emissions in 2012 are projected to be 58% above the emissions in the 1990. It's incredible.

BCAS: *The scientific community has made great endeavors to address climate-related carbon issues. Are there any new methodologies proposed at this conference?*

Prof. Le Quéré: Yes. I'm impressed by a new methodology for the verification of emissions from the atmosphere that have been applied in the United States, using Carbon 14 and other tracers. Such methods are very promising, because the efforts to reduce emissions are so huge that people really want to know their efforts are working.

BCAS: *How do you describe the performance of Chinese scientists at ICDC9?*

Prof. Le Quéré: Very impressive. Quite a few Chinese researchers reported the spatial distribution of CO₂ emissions and NO_x emissions in China and elsewhere in the world from satellite data. I think China is very ahead in the study of spatial distribution of emissions, and these independent methodologies can be used to verify and better understand the dynamics of emissions, for instance the flow of carbon emissions from east to middle China as a result of regional development. I also heard that China will set off a CO₂ monitoring satellite in a couple of years' time. It's very exciting to have a new monitoring satellite to bring us a lot of information.

BCAS: *What do you think is the overall emission situation in China?*

Prof. Le Quéré: China is now in a very important stage of development, and its GDP has been going up at around 8% for many years, so the emissions in China are increasing very rapidly. Actually it has become the biggest driver of global emission. But we also see China doing humongous efforts to control the emissions, particularly through the improvements in energy efficiency and in the production of renewable energy. Now China is improving its energy efficiency at about 3% per year to offset some of the emissions.

I believe China's position on emission control in the next few years will be critical in terms of sending messages to other countries about how possible it is to limit climate change to a lower level than the current trajectory.



As co-chair of the Global Carbon Project, Prof. Corinne Le Quéré spoke on "Highlights and Reflections on the Global Carbon Budget" during ICDC9 in Beijing, reviewing the main results of the seven carbon budgets published since 2005 and discussing how to reduce the uncertainties and expand the research output in the future. According to her, the global carbon budget effort can "help increase the visibility of carbon cycle science worldwide, strengthen interdisciplinary and international collaborations, and support the climate policy process". (Photo: BCAS)

BCAS: *In your presentation, you mentioned that although China is now one of the biggest emitters in the world, in terms of historical and per capita emissions, some developed countries are on the top of the contribution list. You also said that about 20% of China's emissions are used for the production of goods and services that are consumed in other parts of the world. So from the perspective of a scientist, which factors do you think should be considered in climate change negotiations?*

Prof. Le Quéré: It is a very good question. From the perspective of the science, it does not matter where the emissions are put in the atmosphere. Key issues like justice and fairness don't matter on the scientific perspective because it's only the concentration in the atmosphere that matters. I think the politicians must have a difficult time balancing issues like historical justice, trade and wealth, to consider facts like the UK's emissions are going down because they are importing their emissions from China in large part and China's per capita GDP is still very low compared to that of Europe and the United States.

With the issue of who can actually do something about the emissions, that's where China comes into perspective because it is such a big country. If the emissions continue to grow so rapidly in China, everybody will suffer the consequences — particularly China, a country with such a big population to feed, big needs for water quantity and quality, and increasing risks from extreme events in a warm climate.



I'm very happy that I'm not a policymaker and don't have to make those hard decisions. The only thing I'd like to say is that everybody has a role to play — every country and every people in the country. The role has to be fair, feasible and realistic, both in the context of the country itself and in the context of the enormous global challenge to tackle.

BCAS: *Europe is a pioneer in emission reduction. Its total CO₂ emission is minus now. Any good advice for carbon mitigation in China?*

Prof. Le Quéré: In the UK we have the Climate Change Act since 2008, and the government has made legal commitment to reduce emissions by 80% below the 1990 level by 2050. I see China already has its five year plans on efficiency improvements and possibly emission control in the future which are taken extremely seriously by the government, and that's really a positive way forward.

For instance, urbanization is a very big driver of increasing emissions. To urbanize in a less carbon-intensive way, we may have dense cities rather than cities that are spread out, and move the production of energy away from coal to renewable energy where it is possible. By controlling the development of cities in a green way, we will not only reduce carbon emissions but mitigate air pollution, which is another key problem in big cities in China, and maintain the city's ecological and environmental statuses.

In terms of advice, I'm not really sure that I can provide advice to China; I think one should actually look at China for advice because your plans are so well constructed. I only want to say that the implementation and verification of the plans is also very important.



Artist impression of the human perturbation of the global carbon cycle. (Credits: © Global Carbon Project/Glynn Gorick, via the Global Carbon Project website)

I think the reporting and transparency of emissions is an important issue in China. I'm very impressed by the amount of statistics and the reporting organizations in China. Nevertheless, I suggest that the transparency be ensured all along so that other countries can understand China's efforts and difficulties in reporting emissions in a country that grows at eight to ten percent per year.

BCAS: *Last question. We talked all about carbon science in Beijing. But how can scientists convey their research to the policymakers and the public?*

Prof. Le Quéré: I absolutely agree with you in the responsibility for scientists to communicate their results. There are established pathways for communications. For instance, the Intergovernmental Panel on Climate Change (IPCC) publish their assessment reports every seven years, which is a very good system in my view: scientists lay out their science, then policymakers set the questions and review the manuscripts; if the policymakers and their advisors don't understand, scientists have to clarify their text. I think this process has been very fruitful in terms of communicating quite a lot of details, including what is it that we understand, what is it that we are sure or almost sure about, what is the evidence, where are the remaining uncertainties, and what are the things we frankly don't understand yet.

In the UK, the government does inquiries and publishes questions. Recently they have asked "what is the state of low-carbon emission project with China?" They also asked whether the 80% target to 2050 is still the right target. Scientists can respond to these inquiries, and the Tyndall Center always tries to respond when we have something to bring. I know that in China there are a lot of established communications based on research projects that are targeted at trying out mechanisms like the emission trading scheme, which are carried out in collaboration with policymakers.

The public aspect is more difficult because it depends on the communicating skills of scientists. At the Tyndall Center we have a professional communicator who is responsible to make a news story of our publications. It works very well at institutional level.

BCAS: *Thank you very much. Good luck to you, to the Tyndall Center and the Global Carbon Project!*