

INQUA STATEMENT ON CLIMATE CHANGE

Climate change is real

There is now strong evidence that significant global warming is occurring¹. The evidence comes from direct measurements of rising surface air temperatures and subsurface ocean temperatures and, indirectly, from increases in average global sea levels, retreating glaciers, and changes in many physical and biological systems. It is very likely that most of the observed increase in global temperatures since the mid-twentieth century is due to human-induced increases in greenhouse gas concentrations in the atmosphere (IPCC 2007)².

Human activities are now causing atmospheric concentrations of greenhouse gases – including carbon dioxide, methane, tropospheric ozone, and nitrous oxide – to rise well above pre-industrial levels. Carbon dioxide levels have increased from 280 ppm in 1750 to over 380 ppm today, higher than any previous levels in at least the past 650,000 years. Increases in greenhouse gases are causing temperatures to rise; the Earth's surface warmed by approximately 0.6°C over the twentieth century. The Intergovernmental Panel on Climate Change (IPCC) has forecast that average global surface temperatures will continue to increase, reaching between 1.1°C and 6.4°C above 1990 levels, by 2100.

The uncertainties about the amount of global warming we face in coming decades can be reduced through further scientific research. Part of this research must be better documenting and understanding past climate change. Research on Earth's climate in the recent geologic past provides insights into ways in which climate can change in the future. It also provides data that contribute to the testing and improvement of the computer models that are used to predict future climate change.

Reduce the causes of climate change

The scientific understanding of climate change is now sufficiently clear to justify nations taking prompt action. A lack of full scientific certainty about some aspects of climate change is not a reason for delaying an immediate response that will, at a reasonable cost, prevent dangerous anthropogenic interference with the climate system. It is vital that all nations identify cost-effective steps that they can take now to contribute to substantial and long-term reduction in net global greenhouse gas emissions. Action taken now to reduce significantly the build-up of greenhouse gases in the atmosphere will lessen the magnitude and rate of climate change. Fossil fuels, which are responsible for most of carbon dioxide emissions produced by human activities, provide valuable resources for many nations and will provide 85% of the world energy demand over the next 25 years (IEA 2004)³. Minimizing the amount of this carbon dioxide reaching the atmosphere presents a huge challenge but must be a global priority.

Prepare for the consequences of climate change

Carbon dioxide can remain in the atmosphere for many decades and parts of the climate system respond slowly to changes in greenhouse gas concentrations. Even if greenhouse gas concentrations were stabilized instantly at today's levels, climate would continue to change as it adapts to the increased emission of recent decades. Further changes in climate are therefore unavoidable and nations must prepare for them.

The projected changes in climate will have both beneficial and adverse effects at the regional level, for example on water resources, agriculture, and human health. Major changes in ecosystem function and structure, and in ecological interactions and ranges of species will occur if global temperatures increase more than 2 centigrade degrees. Such an increase will have largely negative consequences for biodiversity and ecosystem services, including water and food supply. The larger and faster the changes in climate, the more likely it is that adverse effects will dominate. Increasing temperatures are likely to increase the frequency and severity of extreme weather events including heat waves and heavy rainfall. Increasing temperatures could lead to large-scale effects such as melting of large ice sheets, flooding low-lying regions throughout the world. The IPCC estimates that the combined effects of ice melting and sea water expansion from ocean warming will cause global mean sea level to rise between 0.2 and 0.6 meters between 1990 and 2100, although larger rises cannot be precluded. Every year, many millions of people will be forced from their land and homes due to sea-level rise.

Developing nations that lack the infrastructure or resources to respond to the impacts of climate change will be most affected. Thus it is clear that many of the world's poorest people are likely to suffer the most from climate change. Long-term global efforts to create a more healthy, prosperous and sustainable world may be severely hindered by changes in the climate. The task of devising and implementing strategies to adapt to the consequences of climate change will require worldwide collaborative inputs from a wide range of experts, including physical and natural scientists, engineers, social scientists, medical scientists, those in the humanities, business leaders, and economists.

INQUA's statement: Global response to climate change

We urge all nations, in the line with the UNFCCC principles⁴, to take prompt action to reduce the human causes of climate change, adapt to its impacts, and ensure that the issue is included in all relevant national and international strategies. Developed nations have been responsible for much of the past greenhouse gas emissions. As parties to the UNFCCC, these nations are committed to showing leadership in addressing climate change and assisting developing nations to meet the challenges of adaptation and mitigation.

We call on world leaders to:

- acknowledge that the threat of climate change is clear and increasing;
- launch an international study to define scientifically informed targets for atmospheric greenhouse gas concentrations and their associated emissions scenarios that will enable nations to avoid impacts deemed unacceptable;
- mobilize the science community to enhance research on Earth's past climate in order to better understand how climate will change in the future, thus enabling better decisions.
- identify cost-effective steps that can be taken now to contribute to substantial and long-term reduction in net global greenhouse gas emissions.
- work with developing nations to build a scientific and technological capacity best suited to their circumstances, enabling them to develop innovative solutions to mitigate and adapt to the adverse effects of climate change, while explicitly recognizing their legitimate development rights; and
- develop and deploy clean energy technologies and approaches to energy efficiency, and share this knowledge with all other nations.

Notes and references

¹ This statement concentrates on climate change associated with global warming. We use the UNFCCC definition of climate change, which is 'a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods'.

² IPCC (2007). Fourth Assessment Report.. INQUA recognizes the international scientific consensus of the Intergovernmental Panel on Climate Change (IPCC).

³ IEA (2004). World Energy Outlook 4. Although long-term projections of future world energy demand and supply are highly uncertain, the World Energy Outlook produced by the International Energy Agency (IEA) is a useful source of information about possible future energy scenarios.

⁴ With special emphasis on the first principle of the UNFCCC, which states: 'The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof'.