Geophysical Research Abstracts
Vol. 12, EGU2010-12987-1, 2010
EGU General Assembly 2010

Reconciling cumulative and short-term targets for carbon emissions

Niel Bowerman (1), David Frame (1,2), Chris Huntingford (3), Jason Lowe (4), and Myles Allen (1)

(1) Atmospheric, Oceanic & Planetary Physics, Department of Physics, University of Oxford, Oxford OX1 3PU, UK, (2) Smith School of Enterprise and the Environment, University of Oxford, Oxford OX1 2BQ, UK, (3) Centre for Ecology and Hydrology, Wallingford OX10 8BB, UK, (4) Met Office Hadley Centre (Reading Unit), Department of Meteorology, University of Reading, Reading RG6 6BB, UK

Recent papers have argued that avoiding the potentially dangerous anthropogenic climate change resulting from more than 2˚C of global average warming (since pre-industrial times) will require climate policies to limit cumulative emissions of carbon dioxide (CO_2). In particular, such analyses demonstrate tight correlations between cumulative emissions and peak warming, independent of the timing of emissions. Several different approaches to framing a cumulative emissions target have been put forward, and the relevance of such long-term limits to short-term climate-change policy has also been disputed. One mechanism for relating cumulative emission targets to short-term policies is to assess the emission trajectories required to ensure we do not reach the date at which any given cumulative limit is projected to be breached. We consider the implications of this approach to framing emission targets in the context of a cumulative limit of one trillion tonnes of carbon.

A second objection to using cumulative emissions targets in isolation is that the feasibility and cost of adapting to future climate change will also depend strongly on the rate, not just the magnitude, of warming. Here we show that, while cumulative CO_2 emissions determine the peak resultant warming, it is the peak rate of emission that dictates the peak rate of CO_2-induced global warming. We therefore suggest that limiting damages due to CO_2-induced warming requires policies to limit both cumulative emissions and peak emission rates.