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Climate change impacts for emission paths that peak and decline.

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The AVOID programme has produced emission scenarios that represented possible future global emission pathways for greenhouse gases during the 21st century. Differences between the scenarios are detailed in a simple fashion by varying three parameters: the year in which emissions peak globally, the rate of emission reduction, and the minimum level to which emissions are eventually reduced. The scenarios show emissions gradually deviating after the peak year from a baseline, the A1B SRES scenario.

In this paper, the PAGE2002 integrated assessment model is used to find the climate change impacts of a range of these scenarios, and then comparing these with the impacts for the baseline A1B scenario, in order to deduce the avoided impacts. PAGE2002 is the model that was used to perform the impact calculations in the Stern review. It uses relatively simple equations to capture complex climatic and economic phenomena. This is justified because the results approximate those of the most complex climate simulations, and because all aspects of climate change are subject to profound uncertainty. To express the model results in terms of a single 'best guess' could be dangerously misleading. Instead, a range of possible outcomes should inform policy. PAGE2002 builds up probability distributions of results by representing over 50 key inputs to the calculations by probability distributions, making the characterization of uncertainty the central focus.

We find that the date at which global emissions peak is a stronger driver of avoided impacts than is the rate at which emissions are subsequently reduced. By 2100 policy scenarios in which emissions peak in 2016 avoid about two thirds of the impacts globally compared to the A1B reference scenario. Policy scenarios in which emissions peak in 2030 only avoid about one half of the impacts.