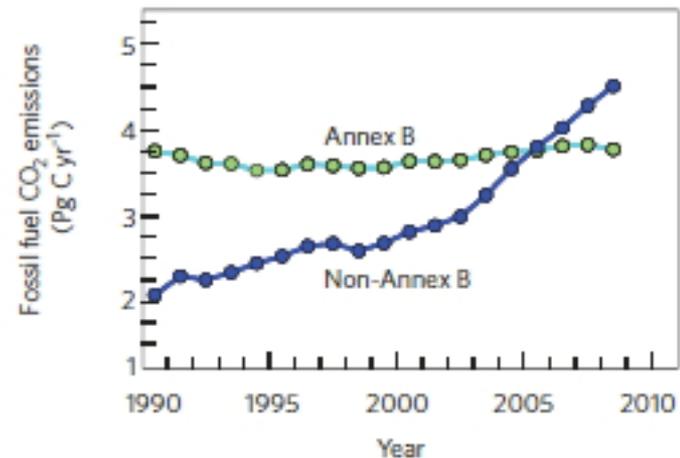
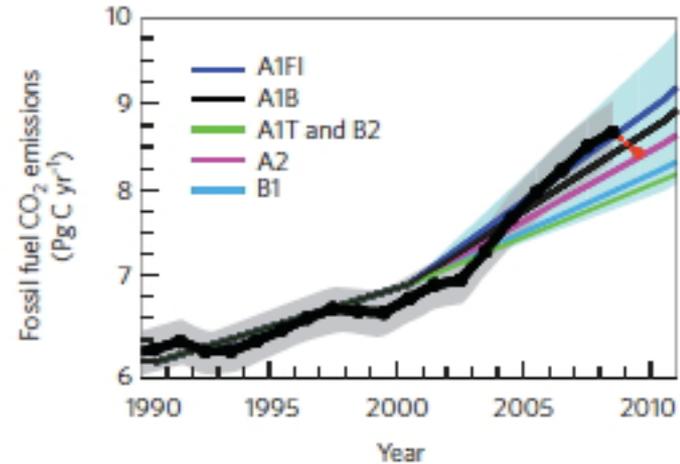


The Global Carbon Balance for 2008

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Funding: DOE Office of Science, Biological and Environmental Research

- Global CO₂ emissions from fossil fuels and cement grew 2% in 2008, reaching 8.7 Pg C, despite the global recession. This is 41% above the 1990 Kyoto reference year.
- Emissions from non-Annex B countries have more than doubled since 1990. The largest emitting countries are now, in order: China, US, India, Russia, and Japan.
- About ¼ of recent growth in emissions in developing countries is due to production of goods that were exported to and consumed in developed countries.
- Projections of GDP for the full year of 2009 lead us to expect that emissions for 2009 will be about 2.8% below those of 2008.
- The atmospheric growth in CO₂ for 2008 was 1.8 ppm, slightly below the 2000-2008 average.
- Over the last 60 years natural carbon sinks have not grown as fast as anthropogenic sources and the airborne fraction of anthropogenic emissions has likely increased slightly (from 40 to 45%). There is large year-to-year variability.



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Abstract:

Efforts to control climate change require the stabilization of atmospheric CO₂ concentrations. This can only be achieved through a drastic reduction of global CO₂ emissions. Yet fossil fuel emissions increased by 29% between 2000 and 2008, in conjunction with increased contributions from emerging economies, from the production and international trade of goods and services, and from the use of coal as a fuel source. In contrast, emissions from land-use changes were nearly constant. Between 1959 and 2008, 43% of each year's CO₂ emissions remained in the atmosphere on average; the rest was absorbed by carbon sinks on land and in the oceans. In the past 50 years, the fraction of CO₂ emissions that remains in the atmosphere each year has likely increased, from about 40% to 45%, and models suggest that this trend was caused by a decrease in the uptake of CO₂ by the carbon sinks in response to climate change and variability. Changes in the CO₂ sinks are highly uncertain, but they could have a significant influence on future atmospheric CO₂ levels. It is therefore crucial to reduce the uncertainties.

Citation:

Le Quéré, C., M.R. Raupach, J.G. Canadell, G. Marland, and 27 others, 2009. Trends in the sources and sinks of carbon dioxide. *Nature Geoscience* DOI 10.1038/ngeo689.