Co-blogger Dan Farber points to a story in Tuesday's NY Times about a new study by NOAA's Susan Solomon and others of the environmental effects of allowing carbon dioxide to equilibrate at levels much above its current 385 ppm. As Dan points out, the prospects for already dry areas are frightening.

There's another important lesson from the Solomon study.

Global climate change is the perfect political storm, a problem that combines almost all of the features that make it tough to get politicians and voters excited about dealing with environmental threats. It requires a global response, its effects are still largely in the future, they are difficult to forecast at the local level, and some of the steps needed to address it will carry clear short term pain.

To make matters worse, because carbon dioxide has a very long residence time in the atmosphere, the effects of yesterday's and today's emissions will be felt for hundreds or thousands of years. That means that our daily activities are creating problems for our distant descendants. It also means that cutting emissions will not quickly correct the problem. It will only slow and limit the worst effects, something much more difficult to observe or get political credit for.

Even if the most drastic emission cuts currently contemplated are implemented on the most rapid proposed time scale, climatic change will continue for generations. According to the NOAA press release, the Solomon study (which as of Tuesday morning was not available at the PNAS web site) finds that

> changes in surface temperature, rainfall, and sea level are largely irreversible for more than 1,000 years after carbon dioxide (CO_2) emissions are completely stopped.

That might seem like a powerful spur to immediate action, but it is likely to have the opposite effect. To the extent that emission cuts carry economic and social costs, those costs will be very difficult to maintain if they cannot be tied to observable progress on a reasonable time scale. Such progress is not likely to be observed with respect climate or atmospheric CO2 levels.

That makes the CO2 problem more politically challenging than the ozone depletion problem to which it is sometimes compared. Once the Montreal Protocol kicked in,

drastically limiting CFC emissions, levels of ozone-depleting substances in the upper atmosphere quickly peaked and the ozone hole began to repair itself within a matter of years rather than centuries. EPA expects the ozone layer to be fully healed in 50 years.

Perhaps the ability to track greenhouse gas emissions and to forecast avoided consequences will be enough to maintain our political resolve. Or perhaps, as Berkeley Law professor Eric Biber suggests (subscription required), combining emission reductions with adaptation efforts more likely to provide rapid observable success will help.

The only thing that seems clear at this point is that reducing greenhouse gas emissions is a thorny political problem, and one that is not going to get easier over time.