Control of Black Carbon, the Most Effective Means of Slowing Global Warming

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Abstract

Under the Kyoto Protocol of 1997, no control of black carbon (BC) was considered. Recent studies, though, have suggested that BC and non-CO₂ greenhouse-gas emission controls might slow global warming. Yet, no study has compared the effects, over time, of theoretically reducing BC versus CO₂ or CH₄ emissions. In this study, a global model was used to compare the effects of such reductions. The model treated eight important feedbacks of aerosols to climate. Results suggest that the most efficient method of controlling global warming over the next 20-50 years, in terms of the magnitude and speed of a cooling, is control of fossil-fuel BC and associated organic matter. It is further shown that late-model diesel vehicles enhance global warming more than do equivalent gasoline vehicles, yet fuel-tax and carbon-tax laws favor diesel in many countries. It is concluded that control strategies for global warming should include control of BC along with control of CO₂ and other greenhouse gases.