



What we learn from updates of NOAA's Annual Greenhouse Gas Index (AGGI)

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Several years ago, NOAA introduced a unique index for expressing the influence of human-emitted, long-lived greenhouse gases in the atmosphere (D.J. Hofmann et al., *Tellus*, 2006, S8B, 614-619). Being a condensation and normalization of radiative forcing from long-lived gases, the NOAA Annual Greenhouse Gas Index (AGGI) was designed to enhance the connection between scientists and society by providing a standard that could be easily understood and followed. The index each year is calculated from high quality, long-term observations by NOAA's Global Monitoring Division, which includes real-time measurements extending over the past five decades, as well as published ice core records that go back to 1750. The AGGI is radiative forcing from these long-lived gases, normalized to 1.00 in 1990, the Kyoto Climate Protocol baseline year. For 2012, the AGGI was 1.32, indicating that global radiative forcing by long-lived greenhouse gases had increased 32% since 1990. During the 1980s CO_2 accounted for about 50-60% of the annual increase in radiative forcing (and the AGGI) by long-lived greenhouse gases, whereas, since 2000, it has accounted for 80-90% of this increase each year. After nearly a decade of virtually level concentrations in the atmosphere, methane (CH_4) has increased measurably over the past 6 years, as did its contribution to radiative forcing (and the AGGI). This year, in addition to updating the AGGI for 2013, increases in radiative forcing will be evaluated and discussed with respect to time-dependent changes in the contributions from CO_2 , CH_4 , nitrous oxide (N_2O), chlorofluorocarbons (CFCs), and other emerging greenhouse gases.