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2013 Update of NOAA's Annual Greenhouse Gas Index

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Indexes are becoming increasingly important in communicating messages about climate change to a diverse public. Indexes exist for a number of climate-related phenomena including heat, precipitation, and extreme events. These help communicate complex phenomena to the public and, at times, policy makers, to aid in understanding or making decisions. Several years ago, NOAA introduced a unique index for expressing the influence of human-emitted, long-lived greenhouse gases in the atmosphere (DJ Hofmann et al., Tellus, 2006, S8B 614-619). Essentially 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 record that go back to 1750. The AGGI is normalized to 1.00 in 1990, the Kyoto Climate Protocol baseline year. At the end of 2011, the AGGI was 1.30, indicating that global radiative forcing by long-lived greenhouse gases had increased 30% since 1990. During the 1980s CO_2 accounted for about 50-60% of the annual increase in radiative forcing by long-lived greenhouse gases, whereas, since 2000, it has accounted for 85-90% of this increase each year. After nearly a decade of virtually level concentrations in the atmosphere, methane (CH4) increased measurably over the past 2-3 years, as did its contribution to radiative forcing. In addition to presenting the AGGI for 2012, increases in radiative forcing will be evaluated and discussed with respect to the contributions from CO_2, CH4, nitrous oxide (N2O), chlorofluorocarbons (CFCs), and other emerging greenhouse gases.