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The NOAA Annual Greenhouse Gas Index – 2010 Update

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For the past several decades, the U.S. National Oceanic and Atmospheric Administration (NOAA) has monitored all of the long-lived atmospheric greenhouse gases. These global measurements have provided input to databases, analyses, and various relevant products, including national and international climate assessments. To make these data more useful and available, NOAA several years ago released its Annual Greenhouse Gas Index (AGGI), http://www.esrl.noaa.gov/gmd/aggi. This index, based on the climate forcing properties of long-lived greenhouse gases, was designed to enhance the connection between scientists and society by providing a normalized standard that can be easily understood and followed. The long-lived gases capture most of the radiative forcing, and uncertainty in their measurement is very small. This allows us to provide a robust measure and assessment of the long-term, radiative influence of these gases. Continuous greenhouse gas measurements are made at baseline climate observatories (Pt. Barrow, Alaska; Mauna Loa, Hawaii; American Samoa; and the South Pole) and weekly flask air samples are collected through a global network of over 70 sites, including an international cooperative program for carbon dioxide and other greenhouse gases. The gas samples are analyzed at NOAA's Earth System Research Laboratory (NOAA/ESRL) in Boulder, Colorado, using WMO standard reference gases prepared by NOAA/ESRL. The AGGI is normalized to 1.00 in 1990, the Kyoto Climate Protocol baseline year. In 2008, the AGGI was 1.26, indicating that global radiative forcing by long-lived greenhouse gases had increased 26% 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 (CH_4) increased measurably over the past 2-3 years, as did its contribution to radiative forcing. In this presentation, preliminary values for 2009 will be evaluated and discussed with respect to the contributions from CO_2, CH_4, nitrous oxide (N_2O), chlorofluorocarbons (CFCs), and other evolving greenhouse gases.