Annual Greenhouse Gas and Ozone Depleting Indices: New Products of NOAA Research

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In 2005, NOAA introduced the Annual Greenhouse Gas Index (AGGI). The AGGI is designed to enhance the connection between scientists and society by providing a normalized standard that can be easily understood and followed. The contribution of long-lived greenhouse gases to climate forcing is well understood by scientists and has been reported through international assessments. Nevertheless, the language of scientists often eludes policy makers, educators, and the general public. This index is designed to help bridge that gap. Measurements of the long-lived greenhouse gases – carbon dioxide, methane, nitrous oxide and halocarbons (mainly CFCs) have minimal scientific uncertainty, are independent of climate models, and thus provide a climate benchmark free of controversy. To provide the data required for the AGGI, continuous measurements from NOAA's Baseline Observatories at Pt. Barrow, Alaska; Mauna Loa, Hawaii; American Samoa; and at the South Pole are maintained. In addition, flask air samples are collected through several global networks, including a cooperative program for carbon-containing and other greenhouse gases that provides samples from globally widespread clean air sites. All measurements are reported on World Calibration Scales, produced and maintained by NOAA/ESRL in Boulder. These data are used to calculate annual global average concentrations from which changes in radiative forcing of the global climate since the pre-industrial era (1750) are determined. This includes all major greenhouse gases and 10 minor halogenated gases. Results are normalized to radiative forcing in 1990 to produce the AGGI. This index will be updated for 2005. In addition, a new index, the Ozone Depleting Gas Index (ODGI), will be introduced. It is determined from the global measurements of chlorine and bromine compounds.

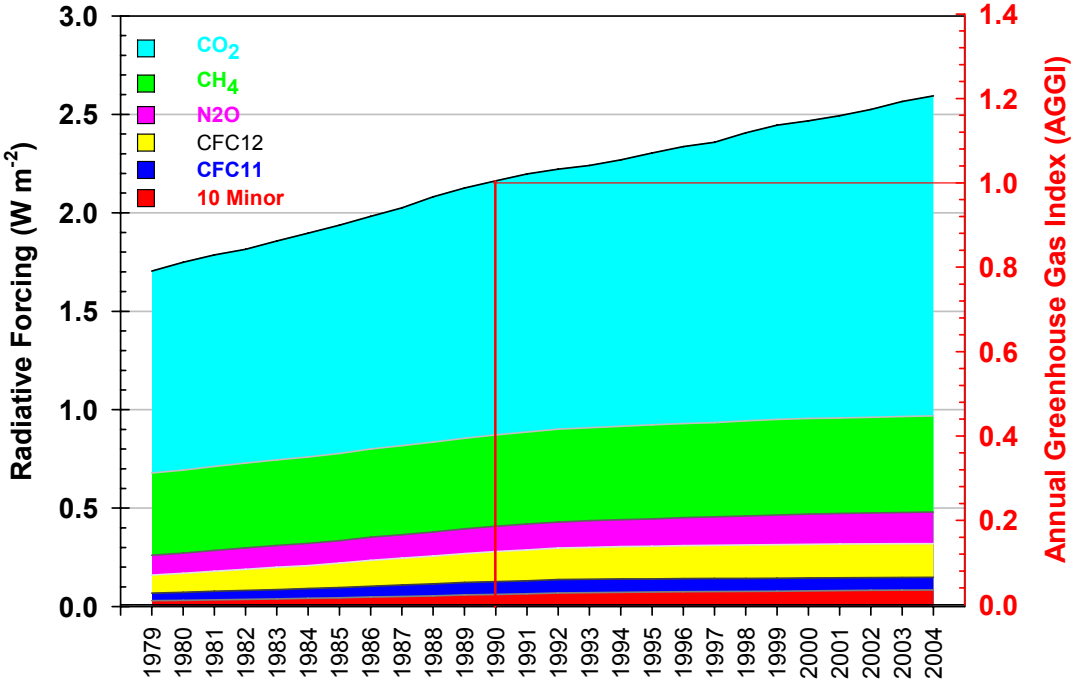

Figure 1. The cumulative contributions to radiative climate forcing by long-lived greenhouse gases relative to the pre-industrial era. The AGGI (red scale on the right) is indexed to 1 in 1990 and had a value of 1.20 in 2004.