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Fossil-Fuel C02 Emissions Database and Exploration System

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The Carbon Dioxide Information Analysis Center (CDIAC) at Oak Ridge National Laboratory (ORNL) quantifies the release of carbon from fossil-fuel use and cement production each year at global, regional, and national spatial scales. These estimates are vital to climate change research given the strong evidence suggesting fossil-fuel emissions are responsible for unprecedented levels of carbon dioxide (CO_2) in the atmosphere. The CDIAC fossil-fuel emissions time series are based largely on annual energy statistics published for all nations by the United Nations (UN). Publications containing historical energy statistics make it possible to estimate fossil-fuel CO_2 emissions back to 1751 before the Industrial Revolution.
From these core fossil-fuel CO_2 emission time series, CDIAC has developed a number of additional data products to satisfy modeling needs and to address other questions aimed at improving our understanding of the global carbon cycle budget. For example, CDIAC also produces a time series of gridded fossil-fuel CO_2 emission estimates and isotopic (e.g., C13) emissions estimates. The gridded data are generated using the methodology described in Andres et al. (2011) and provide monthly and annual estimates for 1751-2008 at 1° latitude by 1° longitude resolution. These gridded emission estimates are being used in the latest IPCC Scientific Assessment (AR4). Isotopic estimates are possible thanks to detailed information for individual nations regarding the carbon content of select fuels (e.g., the carbon signature of natural gas from Russia).
CDIAC has recently developed a relational database to house these baseline emissions estimates and associated derived products and a web-based interface to help users worldwide query these data holdings. Users can identify, explore and download desired CDIAC fossil-fuel CO_2 emissions data. This presentation introduces the architecture and design of the new relational database and web interface, summarizes the present state and functionality of the Fossil-Fuel CO_2 Emissions Database and Exploration System, and highlights future plans for expansion of the relational database and interface.