



Anthropogenic CO₂ emission uncertainties from inventories and statistics: The Carbon Human Emission (CHE) project

Margarita Choulga (1), Greet Janssens-Maenhout (2), Gianpaolo Balsamo (1), Joe McNorton (1), Anna Agusti-Panareda (1), and Richard Engelen (1)

(1) ECMWF, Research, Reading, United Kingdom (margarita.choulga@ecmwf.int), (2) Joint Research Centre of the European Commission, Ispra, Italy

The CO₂ Human Emissions (CHE) project has been tasked by the European Commission to prepare the development of a European capacity to monitor anthropogenic CO₂ emissions. The monitoring of fossil fuel CO₂ emissions has to come with a sufficiently low uncertainty in order to be useful for policymakers. In this context, the main approaches to estimate fossil fuel emissions, apart from bottom-up inventories, are based on inverse transport modelling either on its own or within a coupled carbon cycle fossil fuel data assimilation system. Both approaches make use of atmospheric CO₂ and other tracers (e.g., CO and NO_x) and rely on the availability of prior fossil fuel CO₂ emission estimates and uncertainties (as well as biogenic fluxes for the transport inverse modelling). For a robust estimate of the uncertainty, information from different sources needs to be brought together.

A methodology to calculate CO₂ emission uncertainties based on IPCC guidelines has been developed. Emission uncertainties are calculated for all world countries, under the assumption of two categories of world countries, depending on whether the country's statistical infrastructure is well or less developed. For well-developed statistical infrastructure, emission uncertainties are lower, while less developed statistical infrastructure countries have higher emission uncertainties. A sensitivity analysis is investigating the impact of the well or less developed infrastructure assumption for China, India, and Russia on the global emission uncertainty. Sensitivity experiments with different anthropogenic CO₂ sources distributions will be presented.