

Greenhouse Gas Inventory Uncertainties Need Characterization

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- Assessments of greenhouse gases (GHGs) emitted to and removed from the atmosphere are essential for understanding global carbon cycles and both regional and national ramifications of international agreements.
- Inventories of GHGs contain inherent uncertainties that impact scientific conclusions and policy actions.
- GHG uncertainties are not all the same
 - Uncertainties for emissions from land use and land use change are greater than for emissions from fossil fuels
 - CO₂ emission estimates are more certain than estimates for CH₄ or N₂O.
- Full carbon accounting including top-down (atmospheric) and bottom-up (land surface) methods are needed.
- Adequate treatment of the uncertainties in GHGs levels and trajectories will become more relevant with time as policy makers strive to achieve international goals with respect to the control of GHGs.

GHG	Global Emissions (y ⁻¹)	
	Anthropogenic (around 2000)	Natural (around 2000)
CO ₂	26.4 ± 1.1 Pg CO ₂ -eq.	-11.4 ± 2.9 Pg CO ₂ -eq.
CH ₄	9.0 ± ? Pg CO ₂ -eq.	3.5 ± ?? Pg CO ₂ -eq.
N ₂ O	6.5 ± ? Pg CO ₂ -eq.	10.7 ± ? Pg CO ₂ -eq.

Extracted from Jonas et al. Table 11.1

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Abstract:

The assessment of greenhouse gases emitted to and removed from the atmosphere is high on both political and scientific agendas. Under the United Nations Framework Convention on Climate Change, Parties to the Convention publish annual or periodic national inventories of greenhouse gas emissions and removals. Policymakers use these inventories to develop strategies and policies for emission reductions and to track the progress of these policies. However, greenhouse gas inventories (whether at the global, national, corporate, or other level) contain uncertainty for a variety of reasons, and these uncertainties have important scientific and policy implications. For scientific, political, and economic reasons it is important to deal with the uncertainty of emissions estimates proactively. Proper treatment of uncertainty affects everything from our understanding of the physical system to the economics of mitigation strategies and the politics of mitigation agreements. A comprehensive and consistent understanding of, and a framework for dealing with, the uncertainty of emissions estimates should have a large impact on the functioning and effectiveness of the Kyoto Protocol and its successor. This chapter attempts to pull together relevant fragments of knowledge, allowing us to get a better picture of how to go about dealing with the uncertainty in greenhouse gas inventories.

Citation:

Jonas M, White T, Marland G, Lieberman D, Nahorski Z, Nilsson S (2009) Dealing with uncertainty in GHG inventories: How to go about it? pp. 229-245, In: *Coping with Uncertainty: Robust Solutions* [K. Marti, Y. Ermoliev and M. Makowski (eds.)]. Springer, Berlin, Germany [pp. 277, ISBN: 978-3-642-03734-4].