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Updated US and Canadian normalization factors for TRACI 2.1

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Abstract When LCA practitioners perform LCAs, the interpretation of the results can be difficult without a reference point to benchmark the results. Hence, normalization factors are important for relating results to a common reference. The main purpose of this paper was to update the normalization factors for the US and US-Canadian regions. The normalization factors were used for highlighting the most contributing substances, thereby enabling practitioners to put more focus on important substances, when compiling the inventory, as well as providing them with normalization factors reflecting the actual situation. Normalization factors were calculated using characterization factors from the TRACI 2.1 LCIA model. The inventory was based on US databases on emissions of substances. The Canadian inventory was based on a previous inventory with 2005 as reference, in this inventory the most significant substances were updated to 2008 data. The results showed that impact categories were generally dominated by a small number of substances. The contribution analysis showed that the reporting of substance classes was highly significant for the environmental impacts, although in reality, these substances are nonspecific in composition, so the characterization factors which were selected to represent these categories may be significantly different from the actual identity of these aggregates. Furthermore the contribution highlighted the issue of carefully examining the effects of metals, even though the toxicity based categories have only interim characterization factors calculated with USEtox. A need for improved understanding of the wide range of uncertainties incorporated into studies with reported substance classes was indentified. This was especially important since aggregated substance classes are often used in LCA modeling when information on the particular substance is missing. Given the dominance of metals to the human and ecotoxicity categories, it is imperative to refine the CFs within USEtox. Some of the results within this paper indicate that soil emissions of metals are significantly higher than we expect in actuality.

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Introduction

In life cycle assessment (LCA), classification and characterization are mandatory steps in life cycle impact assessment (LCIA). Classification is the assignment of inventory flows to impact categories (e.g., linking elementary flows to all impact categories to which they contribute). Characterization is the conversion of inventory data to common units within the impact categories and aggregation of the

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