

A Data Characterization Framework for Material Flow Analysis

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Supporting information is available on the JIE Web site

Summary

The validity of material flow analyses (MFAs) depends on the available information base, that is, the quality and quantity of available data. MFA data are cross-disciplinary, can have varying formats and qualities, and originate from heterogeneous sources, such as official statistics, scientific models, or expert estimations. Statistical methods for data evaluation are most often inadequate, because MFA data are typically isolated values rather than extensive data sets. In consideration of the properties of MFA data, a data characterization framework for MFA is presented. It consists of an MFA data terminology, a data characterization matrix, and a procedure for database analysis. The framework facilitates systematic data characterization by cell-level tagging of data with data attributes. Data attributes represent data characteristics and meta-information regarding statistical properties, meaning, origination, and application of the data. The data characterization framework is illustrated in a case study of a national phosphorus budget. This work furthers understanding of the information basis of material flow systems, promotes the transparent documentation and precise communication of MFA input data, and can be the foundation for better data interpretation and comprehensive data quality evaluation.

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