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CRITICAL ANALYSIS OF THE LIFE CYCLE IMPACT ASSESSMENT METHODS

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Abstract

The diversity of life cycle impact assessment (LCIA) methods may create barriers to life cycle assessment (LCA) since the focus and outcomes generated could be quite different. Furthermore, these could lead to different interpretations and hence affect the robustness of LCA. While previous studies have attempted to compare various LCIA methods, their results are limited to the cases that were used in their respective studies. To assist LCA participants in selecting a suitable LCIA method to achieve the LCA goals, it is necessary to identify both the similarities and the differences between the commonly used LCIA methods. The most reliable and consistent way to carry out such analysis is by referring to the environmental impact categories of the various LCIA methods. This paper proposes a new approach to compare the LCIA methods by using a set of correlation Tables, which describe the differences of the impact categories being investigated. It is found that the results generated by different LCIA methods in terms of climate change, acidification, ozone depletion, and energy resources are indeed quite consistent. However, ecotoxicity and human toxicity are the two impact factors with the greatest variations amongst different LCIA methods. The results of this study are cross-validated by referring to previous studies, and the results confirm that they are generally in line with the previous observations. This study should help deepen our understanding of the divergences of various LCIA methods and thus facilitate the choice of appropriate LCIA methods for LCA.

Key words: characterization, comparison, correlation analysis, LCA, LCIA

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