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Life cycle toxicity assessment on deep-brine well drilling

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ABSTRACT

The features of a life cycle toxicity assessment (LCTA) model include regionalization, uncertainties, and geographical variability. This study provides a simplified and regionalized LCTA to improve the evaluation of regional toxicity impact based on a case study of deep-brine well drilling in China. Uncertainty analysis was conducted using Taylor series expansions. The proposed LCTA can efficiently quantify the toxicity impact and identify its key contributing factors. Results show that the key factors contributing to the toxicity impact of deep-brine well drilling are steel, electricity, and direct pollutant emissions generated from fluid loss and waste (i.e., waste drilling fluid and drilling cuttings) disposal during drilling.

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