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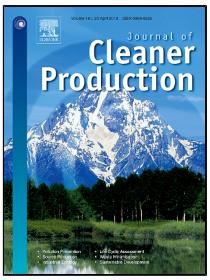

Quantitative analysis of the dynamic changes of ecological security in the provinces of China through emergy-ecological footprint hybrid indicators

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Abstract: Historical evaluation and future projection of ecological security have become increasingly important during the past decades. In this study, we establish a framework on historical evaluation and future projection of ecological security. In particular, historical ecological security evaluation based on emergy-ecological footprint, ecological security projection based on emergy-grey model and an emergy-based evaluation indicator system. This framework is applied to China's provincial ecological security evaluation during 2006-2015. In parallel, a potential projection in the future 100 years for the same area is performed. Results show that (1) Ecological deficit exists in economically developed regions, with more developed and relatively concentrated industrial production in the local; (2) Most of China's western provinces are secure, while mid-eastern China provinces are less secure, with the exception of Tianjin (slightly insecure) and Shanghai (extremely

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