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Triple I of CO_2 Ocean Sequestration against Ocean Surface Acidification

Toru Sato and Toshitaka Omiya

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Summary: To mitigate the global warming and ocean surface acidification caused by increase of atmospheric CO_2 concentration, ocean sequestration of CO_2 has been proposed. Because the technology has risks on deep-ocean ecosystems, its implementation needs public acceptance. In such a process, environment assessment indices are useful for making decisions. Recently, the Triple I was developed to show totally inclusive index for environmental and economical matters, consisting of ecological footprint, ecological risk, human risk, cost, and financial benefit. The present paper presents the Triple I for CO_2 ocean sequestration, where the object of comparison was set to be the effects of ocean surface acidification and its consequent impacts in the deep ocean. Particularly focused on in this study was the calculation of ecological risk. In general, risk is represented by the products of probability and hazard. Here, the former was obtained by a semi-quantitative probability method based on the results of expert enquiry; the latter was converted to land area by using the species-area relationship. The resultant Triple I became negative and indicated that the technology is worth to implement. Also elucidated is that the ecological footprint and the ecological risk had the largest and the smallest portions, respectively, in the index.

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