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An integrated approach to evaluate biodiversity and ecosystems conducted by GRENE (Green Network of Excellence) Environm

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The global degradation of biodiversity and ecosystem has became a big concern since the last decade of 20th century. To tackle this problem, several activities including Convention on Biological Diversity (CBD) are now on-going. To carry out these activities, it needs to assess present status of biodiversity and ecosystem.

Biodiversity, ecological, climatological, and environmental data are required for developing indicators that are effective in assessing the states of biodiversity and ecosystems. However, most existing data are inaccessible or unavailable because they are either scattered among many databases or are unpublished. Therefore, our project aimed to collect metadata about biodiversity and ecosystems information at the first. We achieved progressive steps in sharing metadata through cooperation with Japan Long Term Ecological Research Network (JaLTER). JaLTER Metacat (http://db.cger.nies.go.jp/JaLTER/) provides information such as location, availability and format of ecological observation data in Japan. The next step was accumulation of biodiversity and ecosystems data based on the above metadata. We collected observational data from separate layers such as species distribution, community structure, ecosystem and flux. One of the main data sources at the species and community levels is the vegetation survey data conducted by The Ministry of the Environment in Japan. Using the output of this survey, the plant distribution database including 344,718 records for 4,160 species was developed. The data format of this species occurrence database was compliant with the Darwin Core standard (http://rs.tdwg.org/dwc/) in order to maximize reusability. The third step was a spatial interpolation of species and community distribution. Together with environmental data (such as climate, geography, soil type and land cover), we predicted potential species geographic distributions in a broad area using the ecological niche modeling method. These interpolated data for species and community distribution would be an indispensable infrastructure for mapping CO_2 flux, ecosystems function and so on. These mappings are the on going process in cooperation with JapanFlux (http://www.japanflux.org/) and AsiaFlux. (http://asiaflux.net/). We are planning to evaluate the state of biodiversity and ecosystems through integration of these predictions and environmental data stored in Data Integration and Analysis System (DIAS: http://www.editoria.u-tokyo.ac.jp/projects/dias/) for further steps.

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