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Environmental map project for Future Asia study

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As the third Earth Summit was held at Rio in June 2012, international cooperative research is indispensable for the solution of global environmental issues. ICSU (International Council for Science) has been implemented international cooperative programs on global environments of WCRP, DIVERSITAS, IGBP, and IHDP in 1980s to 1990s and started a new program as Future Earth (FE) in 2012 by integrating them. In the FE, Japan is expected to play a central role as a research hub in Asia. RIHN established Japan office as GEC (Global Environmental Change)-JAPAN and has stated to prepare for studies of Future Asia (FA).

FE-FA study aims to unify natural environmental studies on the atmosphere, hydrosphere, pedsphere, and biosphere and human-social studies as a transdisciplinary science. RIHN (Research Institute for Humanity and Nature) has been implemented domain-based projects on the human-nature interactions after its establishment in 2001, and started design-based projects for sustainable society after 2011 to meet this tendency on international environmental researches. In the realm of FA, a number of detailed information regarding human-environmental interactions and the wide recognition and use of this information in society is indispensable. Material behavior study is in a stage of exploring a new field to meet this FE-FA study.

All natural and artificial materials are composed of elements. As most elements are composed of stable isotopes (SI), which have a potential as a finger-print of element, elemental and SI data can be utilized as the basic information of transdisciplinary science. Isotope Ecology based on carbon and nitrogen isotopes has been developed in IGBP and DIVERSITAS researches. Isotope Hydrology based on hydrogen and oxygen isotopes has also been contributed to WCRP and IGBP researches. In the FE-FA studies, water, food, and health, which are sustainable basis of human body in addition to air and biota, are considered to be important. Accordingly, in order to foster the FA study, it is required to use biological elements and their SI used in ecological and hydrological studies as well as metal elements and their SI used in solid-earth sciences such as geology. RIHN hosts advanced SI instruments of both elements and aims to explore isotope environmental study based on the multiple information of both SIs.

Fur Future Asia, RIHN, as an inter-university organization, proposes a basic project to build the data base and map of elements and SIs of environmental materials by linking with universities and research institutes over Japan to Asia. This project aims to foster the resource development of researchers and users of SI, the promotion of RIHN's SI instruments, and the integration of SI methods for environmental study. A combined map of SI with other GIS information can enhance the reliability of environmental diagnosis based on precautionary principle. In case of Saijo city of Ehime prefecture, the environmental map was made with citizens to enhance their capacity building and is used for preparation of the groundwater law for its sustainable use. SI maps are called as ISOSCAPE in EU and USA and are utilized for food security and considered as a nation resource like DNA database. This map information is also utilized in paleo-environmental, archeological and other studies. We would like to discuss the potential of isotope environmental study toward FA study.

Keywords: future asia, environmental map, precautionary principle, isotope environmental study, human resource development, cooperation