# Interaction of Atmosphere, Hydrosphere, and Biosphere in Northeastern Asia: Outline of the RAISE Project

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In the northeastern Asia including Mongolia and the northeastern China, a climatic shift from humid condition in the northern part to arid condition in the southern part can be found in a relatively narrow, boundary zone. As a consequence of the steep gradient in climatic conditions, a distinct, ecotone, i.e., forest-grassland-desert, is formed in the northeastern Asia. Such a ecotone is sensitive to changes in external environment (e.g., global warming) even though those changes are very small. For instance, changes in external environment may result in desertification in this region. In reality, it has been reported that air temperature in winter and spring gradually has increased and precipitation amount has decreased in the last four decade. A possibility can be pointed out that the warming and drying of the atmosphere induce drastic changes in plant growth and vegetation distribution through changes in hydrological cycle. In addition, changes in human activity as an external forcing can affect natural environments in this region. Overgrazing and inappropriate water use might have already disturbed ecosystem and hydrological cycle of this region. In the light of above discussion, a research project, the Rangelands Atmosphere-Hydrosphere-Biosphere Interaction Study Experiment in Northeastern Asian (RAISE) has been organized to the evaluation of the effects of these changes on the rangeland ecosystem with emphasis on the role of hydrologic cycle in northeastern Asia. The strategy of the project includes field observations for the understanding of the current status of the ecosystem and the modeling of the atmosphere, hydrosphere and biosphere in this area. The models to be produced and optimized for the area will then be used for the prediction of the possible changes of the area in response to likely scenarios of future climate and land use changes.