14:50-15:15

Caring for the Geosphere and Active Adaptation: Water and Agriculture in the Tropics

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In the tropics, the geosphere is energy-rich and active, influencing the Earth's system. It is also characterized by the complexity of its mechanisms, ranging from the local to global circulation of atmosphere and water with various time scales. This results in large fluctuations and spatial variations as well as difficulty in making precise predictions. This presentation will focus on caring for the geosphere and active adaptation as the major approaches for living with the tropical geosphere. Caring for the geosphere involves learning about the complex mechanisms and the potential performance of the geosphere. Special attention is paid to temporal and spatial heterogeneity and extreme events. Although the complexity and potentiality of the tropical geosphere, including El Nino and the Southern Oscillation, has been of great concern among advanced scientists since the emergence of global warming in the 1990s, the down-scaling approach of science has not yet examined the micro-geosphere as a fundamental of sustainable humanosphere. The linkage of the scientific down-scaling and up-scaling based on fragmented but elaborate experience and knowledge accumulated in local societies is proposed as an alternative learning process. Active adaptation is the process of developing technology to utilize, manage, and cope with the geosphere. Agricultural technology is selected in this presentation as a typical interface between the geosphere and the humanosphere. Institutionalized technology development and extension have supported the production-, economy-, and market-oriented agricultural transformation in the tropics for the past several decades. These have undoubtedly improved the productivity and profitability of agriculture, but from the viewpoint of sustainability, their achievements are questionable. The double-engine development process that connects civilizing modern technology in the context of the tropical geosphere and societies and socializing indigenous technology in the wider geosphere and societies is proposed as an alternative development process.