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A hierarchical ecosystem approach to evaluate global warming impacts in three global ecoregions

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Global warming has substantial effects on terrestrial ecosystems in the different Ecoregions. A hierarchical Ecosystem approach was conducted to analyze global warming influences with global warming impacts on the three distinct global ecoregions. The Ecosystem Classification of Land (ECL) has been developed and integrated as a hierarchical system. Recently, the hierarchical ecosystem classifications in 300 Dry Domain of the United States, 100 Polar Domain of Canada, and 500 Plateau Domain of China was demonstrated and explored in studying the environmental system changes and global warming impacts. This article tries to present the distinctive dissimilarity in each ecoregion and demonstrate the ecosystem responses linked to the hierarchical ecosystem structure and ecological function level. In the Dry Domain, the warmer and wetter of Utah's climate gave rise to Rocky Mountain subalpine conifer forests and Great Basin pinyon and juniper woodlands suitable for growing, which correspond to their Utah's Climate life zone, and are affiliated with the Middle levels of ECL from U7 to U4. In the Polar Domain, a warmer and wetter winter of Yokon climate influence the Spruce treeline moving northward and to higher elevations, as well as for the arctic tundra and alpine tundra. Arboreal species grow fast to reach fructification. These are typically appeared in the middle levels of ECL from Y8 up to Y5 and changed the carbon budget to a carbon sink from Y4 to Y2. In the Plateau Domain, an annual air temperature increases by 0.50C/10 y over the last 45 years, and the temperature fluctuations have significantly affected the essential changes in the global energy balance and carbon budget in the upper levels of ECL from Q4 up to Q1.

Keywords: Hierarchical ecosystem approach, Global ecoregions, Dry domain, Polar domain, Plateau domain.

Biography

YanQing Zhang is Senior Research Associate, 2020-present, Department of Geography, School of Computing Science, Simon Fraser University, Canada. He is a Senior GIS Project Manager, 2013-present, Instant Calling Spatial Arch and Resource Planning Management, Canada. He is a Professor, 2018-present, Associate Professor, 1992-1993, Assistant Professor, 1985-1991, Department of Ecology, Northwest Plateau Institute of Biology, The Chinese Academy of Science, Xining, China.

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