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Impact of climate changes on water and nutrient transport in central Japan and leading to climate change adaptation strategies

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Abstract

The temperature in Japan has been rising 1.7 times faster than the world's average due to ongoing global warming. The effects of the dramatic change have also begun to appear in the weather and the water cycle of Toyama, since Toyama is well-watered having an annual precipitation (~2,300 mm) about four times as high as that of the world's cities with the same latitude. The rise in temperature has turned snowfall into rainfall, and as a result, the amount of snowfall in this area has decreased by up to 50% over the past 40 years. The reduction in the snowfall caused a deterioration in the function of water storage and groundwater recharge. These shifts are expected to increase river water and shallow groundwater volume and a shortened residence time before flowing to the coastal ocean, eventually decreasing nutrient concentrations in the terrestrial water. In order to adapt to the continuing global warming, it is vital to understand the current status of the water and nutrient dynamics in this area and then adopt appropriate measures based on scientific evidence in cooperation with the government. A three year new project (Environment Research and Technology Development Fund, 2-2101) has started including three parts: (1) elucidation of the mechanisms of water and nutrient cycling in the region, (2) identification of factors causing changes in these processes due to climate change, and (3) future forecasts based on observational data and consideration of adaptive measures. Our goal is to contribute the necessary information to the government so that appropriate nutrient management strategies and efforts to conserve sustainable water and nutrient cycles can be implemented for adapting to climate change.

Keywords

nutrient transport, halved snowfall, climate change, adaptation strategies