



## **Future change in seasonal march of snow depth over Japan**

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Western side of Honshu Island and Hokkaido Island in Japan are ones of the heaviest snowfall areas in the world. Although a heavy snowfall often brings disaster, snow is one of major source for agriculture, industrial, and house-use in Japan. Even during the winter, the monthly mean of the surface air temperature often exceeds 0 °C in large parts of the heavy snow areas along the Sea of Japan. Thus, snow cover may be seriously reduced in these areas as a result of global warming, which is caused by an increase in greenhouse gases. The change in seasonal march of snow water equivalent, e.g., snowmelt season and amount will strongly influence to social-economic activities. Not only natural heritages, such as Shirakami-Sanchi, Shiretoko, and Yakushima, but also cultural heritages, Shirakawa-go, and Hiraizumi, are strongly affected by water resource brought by snow. We performed a series of numerical experiments including present and future climate simulations and much-snow and less-snow cases using a regional climate model. Pseudo-Global-Warming (PGW) method (Kimura and Kitoh, 2008) is applied for the future climate simulations. MIROC 3.2 medres 2070s output under IPCC SRES A2 scenario and 1990s output under 20c3m scenario used for PGW method. The precipitation, snow depth, and surface air temperature of the hindcast simulations show good agreement with the AMeDAS station data. In much-snow cases, maximum total snow water equivalent over Japan, which is mostly observed in early February, is 49 G ton in the present simulation, the one decreased 26 G ton in the future simulation. The decreasing rate of snow water equivalent due to climate change was 49%. Main cause of the decrease of the total snow water equivalent is strongly affected by the air temperature rise due to global climate change. The difference in present and future precipitation amount is little.