

## Development of climate change projection dataset for Nagano and Gifu prefecture by dynamical downscaling

\*Takeshi Yamazaki<sup>1</sup>, Takahiro Sasai<sup>1</sup>, Hiroaki Kawase<sup>2</sup>, Hidetaka Sasaki<sup>2</sup>, Akihiko Murata<sup>2</sup>, Masaya Nosaka<sup>2</sup>, Toshiki Iwasaki<sup>1</sup>

1. Graduate School of Science, Tohoku University, 2. Meteorological Research Institute

Dynamical downscaling is available to develop high resolution projection dataset for discussing climate change adaptation especially for simulating precipitation, for which statistical downscaling is rather unsuitable. In this presentation, development of high resolution projection for climate change mainly for evaluating impact on ecosystem, water resources and ski tourism in the Northern Alps area of Nagano prefecture. Nonhydrostatic Regional Climate Model (NHRCM) developed by Meteorological Research Institute is used to make the dataset; downscaled from grid spacing of 20 km to 5 km and 1 km for present and future conditions. The simulated area covers Honshu, Kyushu, Shikoku and Japan Sea in 5 km runs, a square with one side about two hundred kilometers in length including the Northern Alps in 1 km runs. Furthermore, we will project snow depth distribution using snow-transport model with a grid spacing of 100 m for the priority area. Each ten member of 31-year is integrated for present and future conditions in 5 km experiment.

The 5 km experiment for d4PDF of present climate is almost completed. Realistic histogram of air temperature is obtained by 5 km runs as compared to 20 km boundary condition, and it becomes more similar to observation through a bias correction. Although the snow cover is underestimated with 20 km grid spacing in mountainous areas, clear contrast of snow depth between mountainous areas and basins is presented due to improvement of terrain in 5 km simulations. Moreover, it is confirmed that heavy snowfall is caused by strong northwesterlies in north part and mountainous region of Nagano prefecture and in basins it is caused by extratropical cyclones along the south coast of Japan through the analysis of pressure pattern for events with having large amount of daily snowfall. However, there are exceptions thus we have to carefully investigate how the snowfall will change due to global warming.

Keywords: nonhydrostatic model, snow cover, global warming