Geophysical Research Abstracts
Vol. 20, EGU2018-10920-1, 2018
EGU General Assembly 2018

Reproduction of extreme heavy snow and extreme cold summer in 1945 in Japan and their potential influence upon the last stage of the war

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The year of 1945, when the Second World War was ended, was the most abnormal weather and climate in Japan in recent 150 years. Both wintertime and summertime temperatures were the coldest in recent 150 year. Accompanied by this extreme cold weather throughout the winter, heavy snowfall events frequently occurred, and many cities were covered by record-breaking deep snow. For example, maximum snow-depth recorded 7.85 m in a rail way station located in an alluvial plain. The railway, which was main transportation of goods and resources necessary to a war-time economy within Japan, seemed to be almost interrupted by this abnormal deep snow throughout the winter. This abnormal snow might additionally damage the war-time economy at the last stage of the war. The coldest June and July in 1945 may also damage the Japan economy, because the cold summer led to an extremely poor harvest. The estimation of the yield of the rice crop is needed, but there are not sufficient agricultural and meteorological data in 1945 probably due to the worsened war situation. Our tentative regression analysis between the rice crop and summer temperature showed that more than 150 million of people would not be able to eat rice at all in the latter half of this year, if the War would have continued. Thus, these cold weather and climate throughout the winter and summer might additionally exhaust the national strength, but no studies on these abnormal weathers in 1945 upon the Japan economy has been executed because of the lack of data. Thus, reconstruction of snow and temperature in 1945 is essential in order to understand the influence of the abnormal weathers occurred in 1945 upon the Japan economy as the first step.
Here we reproduced detailed spatial-temporal snow-depth distribution in Japan throughout the winter of 1945. We executed numerical simulations by using Weather Research and Forecasting model to reproduce the snow depth distribution in 1945. The simulation area, covering the Japan and Japan Sea with a horizontal grid spacing of 5 km and 32 vertical levels. The simulation is integrated from 1 UTC on 1 November ended on March 1945. The initial and lateral boundary conditions are the Twentieth Century Reanalysis (20CR) gridded at 2°, and the surface boundary condition is COBESST. The simulation successfully derived a detailed snow depth distribution, and confirmed that the average amount of the snowfall in 1945 was much larger than the other years. In particular, the snow of the western part of Japan, where climatological snow depth is relatively small, was much larger than normal. The reproduction of the summer temperature will be also reported.