**Japan Geoscience Union Meeting 2011**
(May 22-27 2011 at Makuhari, Chiba, Japan)


ACC030-P01 Room:Convention Hall Time:May 24 10:30-13:00

# Comparison of daily mean air temperatures based on the different measurement intervals and the effect on the trends

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Meteorological observation has been carried out at Tohkamachi Experimental Station, Niigata Prefecture, since 1917. Daily mean air temperature has been calculated based on minute-by-minute data since 1990 when automatic measurement started. Before then, observation was undertaken manually at fixed times, and the interval between these times had changed over time. In this study, I compared daily mean air temperatures based on different statistical methods, in order to investigate the influence of their differences on the long-term trends of annual mean air temperature or winter mean air temperature. Hourly air temperatures from 1997 to 2007 were used for the comparisons. I found that the mean air temperature based on more than six temperature measurements per day was equal to the mean of hourly measurements. On the other hand, the mean value of three measurements per day or the mean value of daily maximum and minimum air temperatures became higher than the mean of hourly measurements. The mean differences for the 11 years were 0.2 $^{o}$C for the mean value of three measurements per day and 0.5 $^{o}$C for the mean value of daily maximum and minimum air temperatures. The differences for the winter mean air temperature (from December to February) were 0.2 $^{o}$C and 0.4 $^{o}$C, respectively. The annual mean air temperature and winter mean air temperature from 1927 to 1989 were corrected using these results. Then I estimated that the rising rate of air temperature from 1918 to 2007 will increase by 0.03 $^{o}$C / 100 yr for annual mean and by 0.07 $^{o}$C / 100 yr for winter mean compared with the present rate without correction.

Keywords: daily mean air temperature, statistical methods, long-term trends

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# Paleo-permafrost Dynamics in the late Quaternary -Potential distribution in Japan-

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Due to small portion of terrestrial areas of Japan compared to the typical grid scale in the large-scale climate models (denoted as GCMs below), the results from GCMs, especially those integrated on coarse resolutions, have not been widely used in geographical or geomorphological investigations and applications. The field survey was intensively conducted until the 1990s to determine the distribution of frozen ground (permafrost and seasonally-frozen ground) in Japan islands during the Quaternary. However, integrated research is still needed on relationship and characteristics of the frozen ground distribution and the paleoclimatic conditions in Japan. We demonstrated that the large-scale frozen ground distribution on the large scale can reasonably be reconstructed through the mapping from the near-surface thermal conditions (i.e. freeze and thaw index, as the cumulative degree-day values below and above the freezing point, respectively), despite simplifications of the determining factors of permafrost in the reality. The methodology was also applied to South America with down-scaling of the horizontal resolution, in which high-resolution topography data were used to correct the surface air temperature with the elevation effect. In this presentation, I will demonstrate the down-scaling results for Japan islands to show the potential distribution of frozen ground at the last glacial maximum (LGM) and Holocene optimum derived from the multiple GCMs. The analysis on relationship between the potential frozen ground type and environmental conditions (e.g., latitude and altitude) will be presented.

Keywords: Permafrost distribution, Global Climate model, Downscaling, Quaternary

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# Antarctic warming event derived by AWS data and satellite microwave observation over East Antarctica

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Automatic Weather Stations (AWS) in the Antarctica provide important weather data especially in inland of the Antarctica. Japanese Antarctic Research Expedition (JARE) has been operating AWS both of ARGOS system and CMOS type. The archived data is almost 20-years long. Inland AWS sites available in the present study are Dome F, Relay Station, Mizuho and JASE2007. Warm years are recorded by AWS in 2009/2010. This area expand large area as inland to the coast. Ice shelf melting can be identified as a daytime melting type and continuous melting type.2009, 2010 were warm year and melting of iceshelf surface was observed over large area and long time.

Keywords: Antactica, warming, iceshelf