

Japanese climate reconstructions based on historical documents and their climatological significance

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Reconstructions of past climate conditions using instrumental and proxy data have been described in numerous studies worldwide. As the official meteorological observation network of the Japan meteorological Agency was established in the 1870s, proxy data are essential for climate reconstructions in Japan before that time. Diaries, which include daily weather descriptions from the Edo period (the 17th through the 19th century), are one source of potentially useful proxy data. Most of the weather descriptions in these diaries have been coded into a database by Japanese climatologists. The data from these descriptions has been used in a number of reconstructions of the climate of Japan including those of seasonal temperature, length of the Baiu, global solar radiation, and synoptic weather patterns.

Recently instrumental weather records from several locations in Japan from the 19th century, a period for which no instrumental data in Japan were believed to exist, were recovered. The recovered data extend the beginning of the instrumental record back from 1872 to 1819. The temperature and pressure readings in the recovered documents have been converted to modern units and digitized into computer readable form. The pressures were corrected for temperature, height, and gravity where needed. The temperatures were homogenized to correct for according changes in location and to account for various observation schedules. The corrected and homogenized data were shown to be reasonable in comparison with modern data and by homogeneity tests. The temperatures for July and January also showed good agreement with reconstructed temperatures from old diaries.

These two types of historical documentary data are not only individually useful, but they also have a potential for crosschecking with various types of proxy climate data.