

The Pacific Decadal Oscillation and Japanese history

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The Pacific Decadal Oscillation (PDO) influences climate and the weather in circum-Pacific region. In this study, we discuss changes in Japanese society and famines based on our proxy record of the PDO during the last 2900 years.

A Beppu Bay U_{37}^k -based temperature record indicates that the amplitude of the PDO was larger from 300 BCE to 100 BCE, from 1200 CE to 1500 CE, and from 1700 CE to 1900 CE. The first period corresponds to the late Yayoi period that was characterized by a succession of wars. The second period corresponds to the developing period of medieval feudal society. In the Muromachi period, riots frequently occurred when the PDO was in the positive phase. In the Edo period, major three famines occurred when the PDO was in the positive phase. The positive PDO likely tended to induce a cool-wet or a hot-dry summer in Japan, resulting in lean harvest, destabilizing society.

Diatom records from the Japan Sea and the Okhotsk Sea indicate an intensification of the Tsushima and Soya Warm Currents around 1200 CE (Koizumi et al., 2006; Shimada et al., 2000), which may have been related to the shift of the behavior of the PDO. This timing corresponds to the period of Ainu culture establishment. Changes in fishery resources caused by intensified warm currents may have changed the life style of Hokkaido residence.

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