

Factors of the famine of Aomori in the Edo era viewed from the Hirosaki domain diary

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The motive for the study

We focused on the weather attached to the dates recorded in the historical documents and we have restored the weather from the description of the weather recorded in the four historical documents written in the Edo period. This year, we analyzed the Hirosaki domain diary.

The purpose of the research

- (1) We will make a database together with the historical documents we examined in previous years.
- (2) We will explore the effects of climate change that caused famines in the Edo period.

The research method

We defined the weather of days which were cloudy more than 90% of the day (more than 21.6 hours) as cloudy, and the weather of those cloudy for less than 90% of the days as sunny.

Words that gave information on meteorological conditions other than the weather- “Thunder” , “Wind” , “Chilly · Cool” - were also counted. The data about the weather for 164 years (58, 781 days) has been gathered.

Data#1

We research the appearance rate of sunny days in the period of the Houreki famine suddenly fell.

It is said that the harm caused by the cold occurred in the Tohoku region as famine.

Also, the rate of rainy days in the Tenpoh famine period exceeded the appearance rate of fine weather. It is said that the cause of the Tenpoh famine was heavy rains, floods, and the accompanying cool summer. As shown in the graph, it is thought that the rain appearance rate was high and the amount of sunshine decreased, leading to famine.

The appearance rate of snow was at least 9.3% in 1768 and 29.9% in 1706. Mount Asama erupted in 1706.

The Kyoho famine and the Horeki famine are said to be famines caused by cool summers in western Japan, and the appearance rates of fine weather support it.

Data#2

Since the influence of the “Yamase” - the cold, wet, east wind - was seen in the year of the Tenmei famine, 1787, it is considered to be a year when the impact of the Okhotsk Sea High Pressure was strong.

Data#3

If we look at the proportion of thunder in each season, “Heat thunder” occurs in the summers during the 30-year-period when the appearance rate of sunny weather was high. Because the proportion of thunder in winter was high in the 30 years of the Tenpoh famine, it is thought that thunder occurred because cold air flowed from the Siberian air masses.

Data#4

Between 1776 and 1789, when there was the Tenmei famine, the wind from the east, that is, the number of days of winds considered to be “yamase” , were many. Yamase is a cold, wet, east wind, that blows in summers mainly in the Tohoku region's Pacific side.

Date#5

We examined the record of “chilly” and “cool” days during the summers from June to August recorded in the Hirosaki domain diary.

There were 459 days in the summers from 1701 to 1864 that were reported as “chilly” or “cool” . The word “cold” was not written in the records.

Discussion

(1)It is said that the Kyoho famine was due to the occurrence of delphacidae insects and a long period of rain in west Japan, but this influence was not seen in Aomori, where the appearance rate of fine weather was high.

However, from data#1, it is considered that famine only occurred in the period of the Houreki famine as the appearance rate of sunny weather declined.

(2)From the data #2, #4, the background of the Tenmei famine is that the Okhotsk Sea High Pressure was strong, the “Yamase” wind blew, and the Okhotsk Sea air mass influenced the number of thunder occurrences.

(3)From the data #1,#3,the 30 years including the Tenpoh famine period are considered to have the highest rate of rain, and low temperatures.Especially in the winter, it was affected by the Siberian Air Masses.

Summary of the study

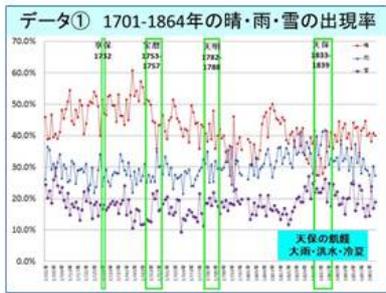
(1)It is said that the Kyoho famine was a famine mainly of western Japan, and considered that the fluctuation of weather in Aomori was small, as the appearance rate of sunny days in the 30 years was high.

(2)In addition to the high occurrence rate of sunshine, the five years of the Horeki famine were linked to frequent thunder as the cold air flowing in the upper regions of the sky caused an unstable atmosphere. This caused famine in addition to declining sunshine hours.

(3)During the period including the Tenmei famine, the high pressure of the Sea of Okhotsk developed and "Yamase “wind occurred. It is considered that the cause of the famine was that the summer temperatures did not rise.

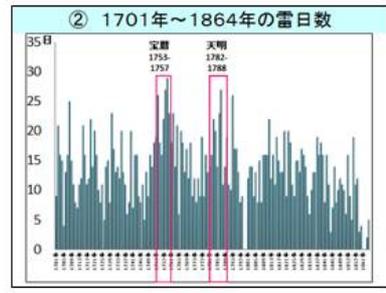
(4)The rainfall rate of 30 years including the Tenpo famine exceeds the appearance rate of sunny days. Due to the decline in sunshine hours, temperature drops also resulted in famine.

Keywords: The Hirosaki domain diary, famine, yamase



①-2 天気の出現率の古文書間比較

天候動向	徳川幕府初期 (1701-1751)				徳川幕府中期 (1752-1802)				徳川幕府後期 (1803-1853)			
	晴	雨	雪	曇	晴	雨	雪	曇	晴	雨	雪	曇
1701-1726	43	43	20	20	64	26	10	0	27	71	11	18
1727-1756	43	53	23	16	60	39	0	1	27	68	11	18
1757-1786	40	53	23	16	74	47	20	0	48	48	14	12
1787-1816	32	55	27	24	20	68	7	5	10	72	11	13
1817-1846	37	74	20	14	25	71	11	1	21	71	11	13
1847-1867	42	25	15	18	12	73	11	1	9	72	11	13



データ③ 雷の季節ごとの割合と回数

	春	夏	秋	冬	合計
1701～1726	17.5%	38.7%	34.1%	9.7%	349
1727～1756	14.5%	42.4%	34.2%	8.9%	415
1757～1786	11.7%	41.4%	37.6%	9.3%	497
1787～1816	21.6%	41.4%	40.2%	6.9%	403
1817～1846	14.6%	36.5%	41.1%	15.4%	397
1847～1867	18.9%	37.1%	35.0%	9.1%	143

