Weather in Fukuoka Prefecture in the Edo period from the Nakamura Heizaemon diary

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Motivation for research

We have been restoring the climate data for the Edo period in Japan from historical documents which were written before the official weather observation records were started in the 16th year of the Meiji period. This year, we analyzed the historical document called the "Nakamura Heizaemon diary" from Kitakyushu.The diary contains information about the actual conditions of people's lives and daily events and was written in the 55 years from 1812 to 1866.

The purpose of the research

1.To create a database in conjunction with the historical documents that we examined in the last few years.

2.Therefore, based on the previous research,we examined the relationship between the “weather appearance rate” and the “detail rate" which measures the accuracy of the records.

The research method

We classified the weather in the historical documents to make the classifications closer to the definitions currently used by Japan Meteorological Agency and the weather was classified as snowy, rainy, cloudy, or sunny.

Data#1 Weather appearance rate(graph1)

The annual trend of the weather appearance rate is as shown in the graph. The sunny appearance rate was the highest at 64.1% in 1828, and the lowest was 39.3% in 1860.The rainy appearance rate was highest at 41.2% in 1860 and lowest at 20.9% in 1813.

Data#2 The weather appearance rate according to the season(graph2)

Looking at the seasonal weather appearance rate , in 1836, when severe damage to crops caused the Tenpo famine, the rainy appearance rate in the summer was 45.7% and the sunny appearance rate was 32.6%. In fact, the usual sunny and rainy appearance rate was reversed.In 1860, the sunny appearance rate fell in the period from spring to autumn, and the sunny and rainy appearance rate in spring and summer were reversed.

Data#3 Annual composition ratio of descriptions of rain(graph3)

The Nakamura Heizaemon diary was written by one person who focused on recording rain .In the all of descriptions, weather described as only “rain” was 79.9%, and other records described the weather as “rainy weather”, “white rain”, “light rain”, “sprinkles of rain”, “light showers”, “drizzle”. The description of “heavy rain” or “strong rain” in 1836 was 10.2%.

Data#4 Summer rain by description / annual composition ratio(graph4)

Looking at the ratio of summer rain, 1836,which is considered to have been a year when heavy rain fell all through the summer, 20.9% of the rain was recorded as “heavy rain” combined with “strong rain”.In the summer of 1831, the record of “strong rain” was remarkable at 23.5%.

detail rate(reference)

Here, we decided to examine the accuracy of recording using the “detail rate” we found in a paper by Professor Sho Kenjiro of Nagoya Institute of Technology.

Data#5 The “detail rate” 1811 to 1866(graph5)

The average for the entire period was 29.9%, the highest rate was 46.2% in 1865 and the lowest rate was 3.6% in 1814.From 1812 to 1866 at the end of the Tokugawa shogunate, the weather records became

more detailed and correlated with the rainy appearance rate .The line of dashes shows the trend of the graph.

Data#6 The “detail rate” for four seasons(graph6)

The “detail rate” for all the four seasons increased towards the end of the Edo period.The “detail rate” of the Nakamura Heizaemon diary for the entire period was 29.9%, which was the same as the Joubu diary, which we had researched previously. The trend of the rainy appearance rate and the trend of the “detail rate” for 55 years are in agreement.

Data#6 Comparison of weather appearance rate every 30 years between the historical documents(graph7)

Comparing the historical documents, "Nijoke diary" and "Myohoin diary" are records of the same place, Kyoto. The "Nijōke diary" is uncomplicated and the rainy appearance rate during the same period is low.

Discussion1

(1)The “detail rate” of the Nakamura Heizaemon diary for the entire period was 29.9%, which was the same as the Joubu diary, which we had researched previously. The trend of the rain appearance rate and the trend of the “detail rate” for 55 years are in agreement.

It is suggested that "rain appearance rate" can be corrected by "detail rate".

Discussion2

In 1836, when the annual composition ratio of heavy rain was 10.2%, it was described as “heavy rain” only in the summer, and the composition ratio of heavy rain was 20.9%.

Summary of the study

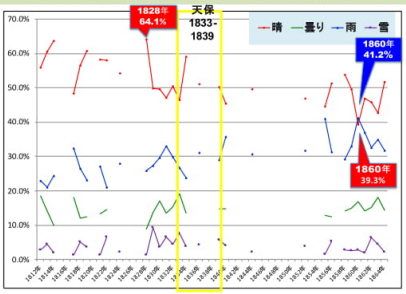
1.The composition ratio of “heavy rain” in 1836 was 10.2%, and it is considered that it was the summer when heavy rain fell.

2.The “detail rate” for the entire period is 29.9%, which is higher than the previous research.It is said that the higher the detail rate, the higher than the rainy appearance rate ,and the Nakamura Heizaemon diary also shows a correlation as in previous studies.

Keywords: Nakamura Heizaemon diary, detail rate

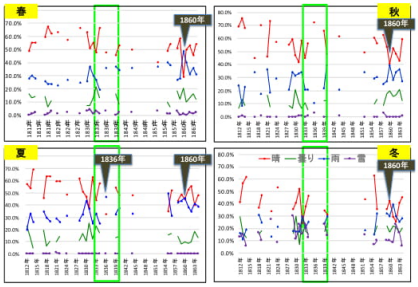
天気の出現率　1812年～1864年(全期間)

Graph1



四季の天気の出現率　1812～1866年

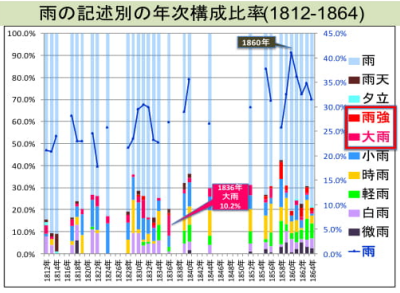
Graph2



天気の出現率の年次推移は左上の graph1 のとおりで、1828 年の晴れの出現率が 64.1%で最高で、最低は 1860 年の 39.3%であった。右上の graph2 のように四季の天気の出現率は「天保の飢饉」で一番被害が苛烈であった 1836 年は雨の出現率が晴れの出現率を逆転している。

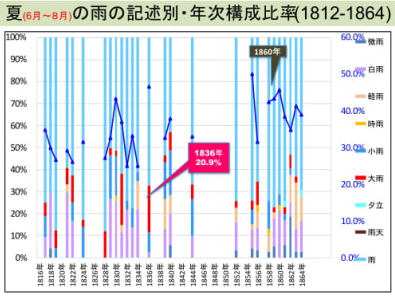
雨の記述別の年次構成比率(1812-1864)

Graph3



夏(6月～8月)の雨の記述別・年次構成比率(1812-1864)

Graph4

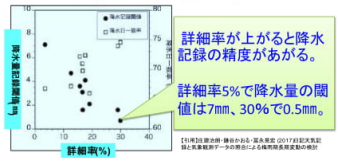


雨の記述別の年次構成比率をみると、1836 年は大雨の比率が高く、さらに、季節ごとの構成比率をみると 1831 年と 1836 年は夏季に大雨の降った年だったとわかった。

詳細率

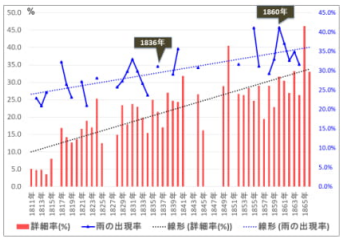
reference

【定義】天気記録で「晴れ」や「雨」と1語の記録されているのではなく、複数種類の天気が併記されたり、時間変化に関する記述や「大雨」などの降水規模の記述がある日数の比率



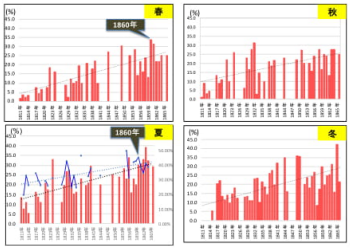
詳細率　1811年~1866年

Graph5



四季の詳細率

Graph6



Graph7

古文書の30年ごとの天気の出現率の比較

中村平左衛門日記の全期間の「詳細率」の平均は 29.9%で、最高は 1865 年の 46.2%で、最低は 1814 年で 3.6%であった。1812 年から幕末の 1866 年に行くに従い天気記録が詳細になり、雨の出現率の傾向と一致する。

graph7 のように、過年度に調べた古文書間で比較すると、「二條家内々御番所日次記」「妙法院日次記」は同じ京都の記録であるが、「二條家内々御番所日次記」は記述が単純で、同一期間の雨の出現率は低くなっている。一方「妙法院日次記」は記録が詳細で雨の出現率が高い結果となっている。詳細率と雨の出現率が関係することを示唆している。

このことから、詳細率で雨の出現率が補正できると考える。