Wine, vacherin and volcanoes: impacts of the 17th century large volcanic eruptions

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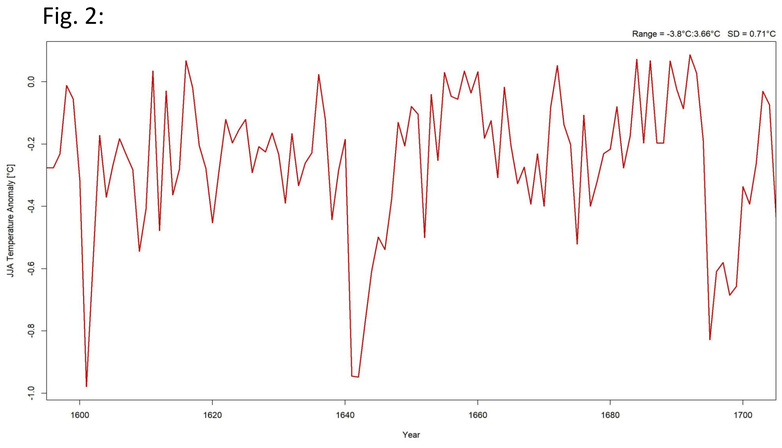
INTRODUCTION

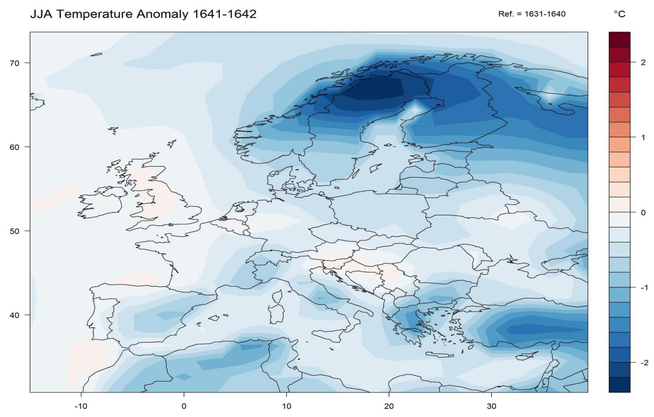
On December 26, 1640, ***Mount Parker*** in the Philippines started erupting, with a ***major eruption on January 4, 1641***. Volcanic sulfate is detectable in Greenland ice cores from February 1641 on, peaking in March 1642.[1] According to Stoffel et al.[1], the years 1641 and 1643 stand out as the 13th and 17th ***coldest years of the last 1500 years*** in the Northern Hemisphere (Fig. 1 and Fig. 2). In Europe, a summer cooling occurs over Fennoscandia and to a lesser degree also over other regions, such as Switzerland. As one of the three main eruptions in the 17th century it is vital to analyze what an impact the eruption of 1641 had.

Fig. 2:



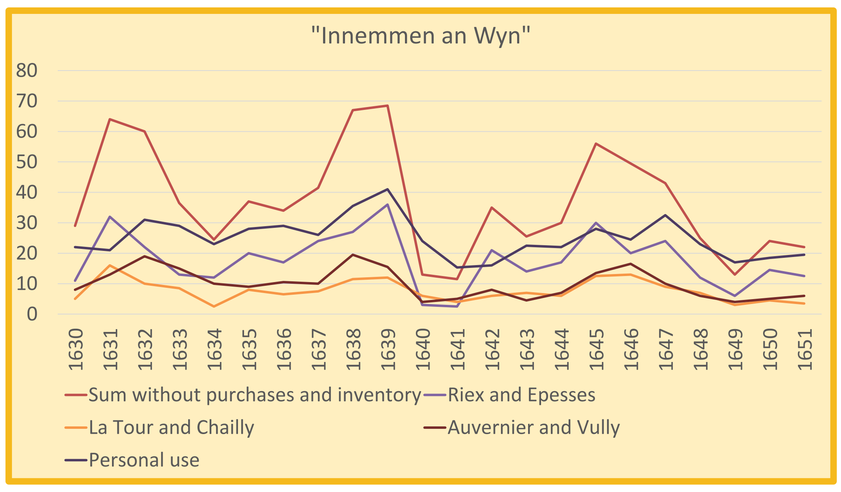
Data for fig. 1 and 2 are taken from global climate reconstruction ModE-RA. ModE-RA is an updated version of the assimilated data set EKF400v2 (Valler et la., 2022).[5]

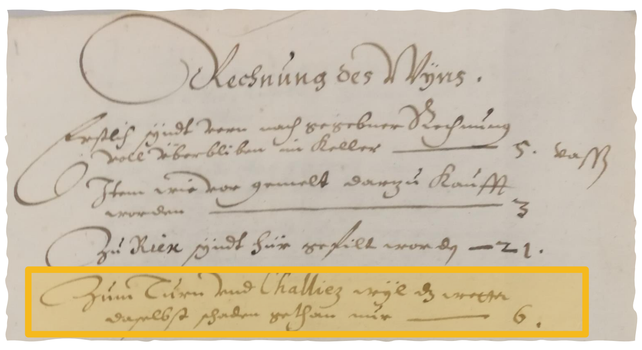
Fig. 1:



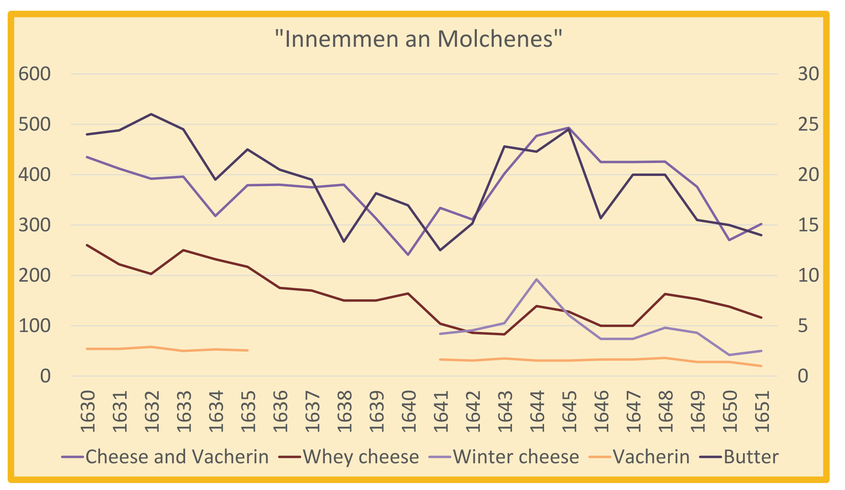
SOURCES: HÔPITAL DES BOURGEOIS DE FRIBOURG

The municipal ***Hôpital des Bourgeois de Fribourg*** is first mentioned in 1249. Not only the sick were cared for in the hospital, but also the weak, abandoned children, orphans, old people and beggars, the needy and travelers; the ***entire public welfare system*** was thus centralized in the hospital. Leading up to the 16th century the hospital was included in many testaments and accumulated by a big amount of land and revenue; already in 1445, the institution was the ***richest taxpayer in the city of Fribourg*** with 40,000 pounds. [3] Their ***account books*** range from 1423 to 1789. In addition to monetary data, they contain ***four types of documentary proxy data*** on the harvest and yield of ***wine, grain, dairy products and livestock***. They are thus valuable sources for determining direct or indirect local or regional climate anomalies. Colloquially and suiting to its composition, this series of staple food data is called the ***Apéro-proxies***.



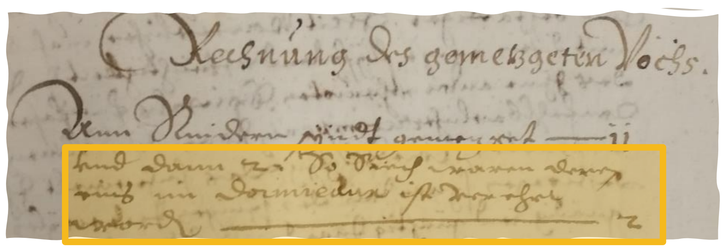


Account for the wine harvest of 1641-1642, lake Geneva:
"La Tour and Chailly; because the weather did damages only 6 [barrels]" (AEF HB A3 213)

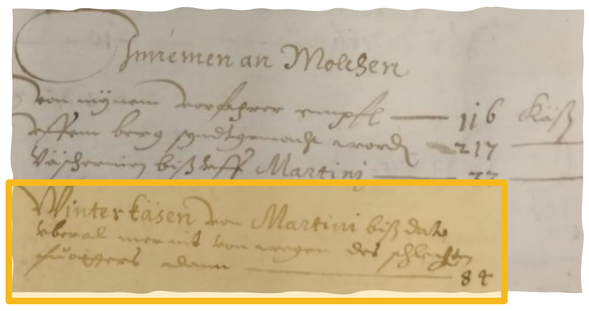


WINE

CHEESE



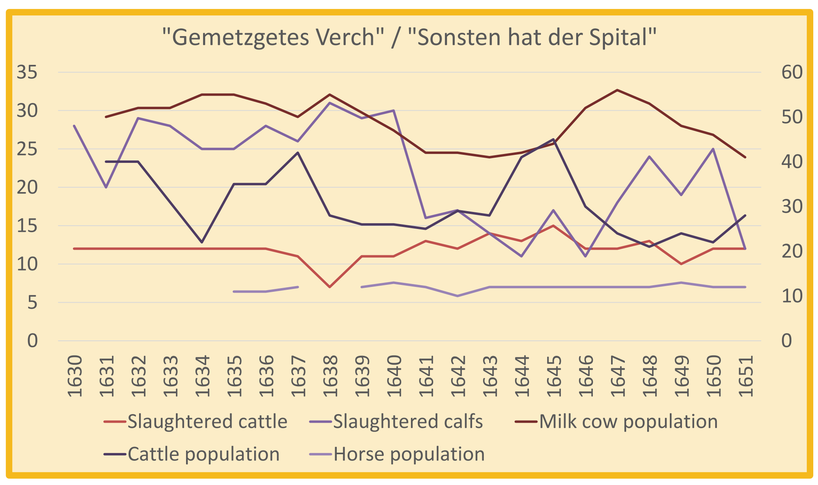
Account for livestock of 1640-1641, Fribourg:
"Cattle slaughtered were … and then 2 were so sick of which one was eaten (?) in the hospital" (AEF HB A3 212)

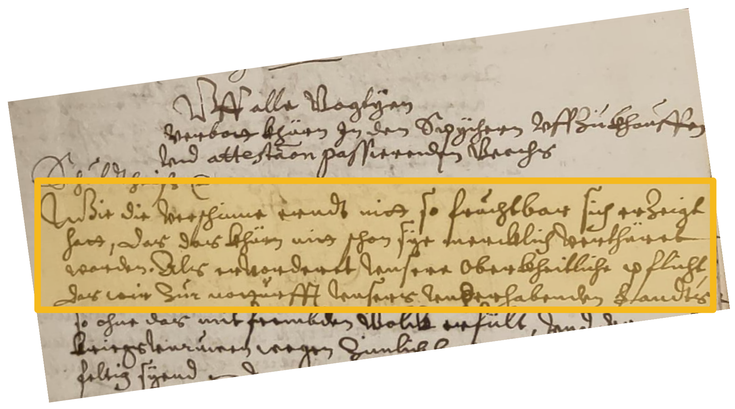


Account for cheese of 1640-1641, Fribourg:
"Winter cheese from November 11 up to today everywhere not much because of the bad fodder" (AEF HB A3 212)

MEAT

GRAIN





Book of mandates, 26. August 1641, Fribourg:
"As the latemost harvest didn't prove so fruitful and the the grain already increased in price, our duty bound by authority we have to [act] …" (AEF Mandatenbuch 4)

CONCLUSION

Whereas ***severe global impacts*** have been linked to the Parker eruption in 1641, such as the Late Ming Dynasty Megadrought in China,[2] the rebellion of October 1641 in Ireland, or the grave hunger period in Fennoscandia,[4] possible impacts in Switzerland are less defined. In a comparative approach using both a qualitative and quantitative analysis, it could be depicted that the years of ***1641 to 1642*** were affected by ***bad weather and harvests***; less wine was produced due to weather damages, "sick" cattle had to be slaughtered and other livestock produced less cheese in winter. ***However***, these anomalies have to be put into a ***broader socio-economic and political context***. Local authorities tried mitigating a bad grain harvest, when the grain price was already high due to non climatic impacts, such as the Thirty Years' War. In Fribourg the bad harvests of 1641/1642 were perceived in the accounting books of the ***Hôpital des Bourgeois de Fribourg*** even though they didn't lead to famine or social unrest.

REFERENCES

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[5] Valler, V, Franke, J, Brugnara, Y, Brönnimann, S. An updated global atmospheric paleo-reanalysis covering the last 400 years. Geosci Data J. 2022; 9: 89– 107. https://doi.org/10.1002/gdj3.121.

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