**Climate
of the Past**
Discussions

Interactive comment on "Synthetic Weather
Diaries: Concept and Application to Swiss
Weather in 1816" *by* Stefan Brönnimann

Anonymous Referee #1

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To reliably estimate the natural range of changes and variability of climate in the pre-industrial period, early-instrumental meteorological data and weather descriptions are needed, in particular for the last millennium. In recent years a significant growth in this kind of activity (called "data rescue") is observed, including a rising number of publications. Data rescue is important, but equally important are the methods used to conduct weather and climate reconstructions based on gathered information of different categories. The reviewed paper seems very important in improving methods of weather and climate reconstructions using historical data. In the paper the author presents methods to translate numerical reconstructions and derived indices into text describing daily weather and the state of vegetation, which was called a "synthetic weather diary". The analogue method was used for this purpose. All procedure stages leading to con-

struction of the "synthetic weather diary" at daily and monthly resolution are precisely described. In the paper, the application of the proposed method is documented based on available daily weather reconstructions for Switzerland for the year 1816, known as a "Year Without a Summer". Independent man-made documentary data were used to check how good the presented new concept for weather and climate reconstructions is. For temperature comparison it showed quite good agreement, while for precipitation and other study variables it was significantly less so. It seems to me that the proposed method will give significantly better results for areas with less variability in relief than occurs in Switzerland. This is a first, pilot paper that presents some initial results of the proposed new concept for climate reconstruction. The main advantage of this method, which may in future bring revolutionary progress for climate reconstructions, is its possibility to be used to train artificial intelligence (machine learning). As a result, it will be a possibility to reconstruct weather numerically and objectively, based on descriptive data. In the paper, the author gives an extensive and complete, as well as scientifically and methodically correct, analysis of data elaboration and climate reconstructions. The paper is clearly written, well-structured and well documented. Generally I have only a few small suggestions, listed below:

Line 106 – there is: "2.2. Data for comparison: Non-instrumental observations" change to: 2.2. Data for comparison: Man-made documentary evidence For comparison purposes you have used both instrumental measurements and non-instrumental observations available for the Aarau and St. Gall stations. Thus, according to Pfister's nomenclature we should call them "man-made documentary evidence". Line 247 – there is: "4.1 Non-instrumental observations for Aarau and St. Gall" change to: Man-made documentary evidence for Aarau and St. Gall. Lines 382-383 – change ". . .a good agreement with independent non-instrumental daily weather observations from Aarau and St. Gall" to ". . .a good agreement with independent early-instrumental measurements and non-instrumental daily weather observations from Aarau and St. Gall"

In conclusion, I have to say that the paper is very interesting and presents a new con-

cept that may significantly help historians of climate to more efficiently and reliably use the available documentary evidence for reconstruction of climate. I strongly recommend publication of this paper in the journal Climate of the Past. Only minor changes need correcting.

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