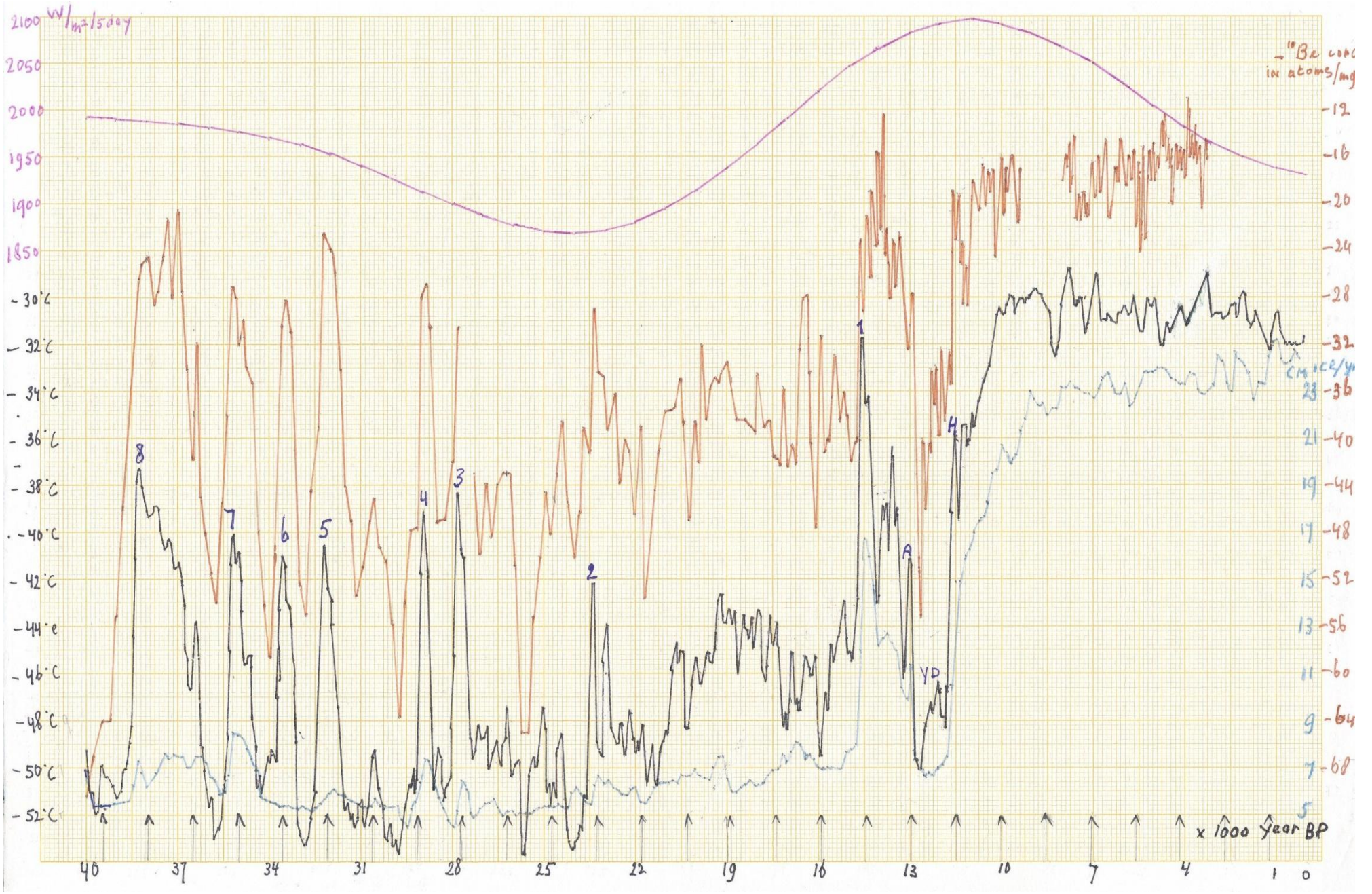
So it is plausible a priori that cause → result connections at the climate change are irregular and that there is competition between the primary, mostly external causal factors. Indeed also a posteriori, so from the observations as shown in **FIG 7**, is evidence for this. The **purple curve** at the top of **FIG 7** is the climate forcing by orbit. In the purple curve has been plotted out the sum of the average daily irradiation in the 5 months April – August for the last 40000 years at the 70^{o} North latitude[1] [Litt1]. The difference between the minimum and maximum values in the daily irradiation in the summer is as large as 12,25%. A more important measure, however, for the orbital forcing of the temperature is the total summer irradiation and the curve of this parameter must be a bit more flattened than the purple one of **FIG 7**. Yet the numbers of the summer days between the equinoxes are getting less if the average daily irradiation becomes more in the time that the perihelion falls in the summer. But substantial differences remain anyway in the total summer irradiation, because of the obliquity and because according to the second or sector law of Kepler, the velocity of the Earth in her orbit around the Sun is about inversely proportional to the **right** distance to the Sun, while the irradiation is directly proportional to the **square** distance to the Sun. So the paradox is here that to the evident physical differences in irradiation by orbit the temperature on the black curve only has minor connections. The only connection you can see here is that the long period with high temperature, the Holocene, begins at the maximal irradiation by orbit and at which that maximum comes after an increase during some 12000 year. Because the 8 other high but shorter lasting temperature increases are not to be connected with the orbital forcing this one connection may be accidental and so there is here no evidence for a statistical connection between the orbit forcing and the temperature in Central Greenland. A conclusion which also is taken, but more generally by prof C.Wunsch[2] [Litt 2]. So, following the data of only **FIG 7** it seems improbable that the impressive climate change of the last deglaciation should be influenced by orbit forcing, but this is also not excluded by this. Yet, the total deglaciation, thus the transition from the glacial era to the Holocene is on **FIG 7** an event that differs from the here numbered interstadials by: (1st) the long duration of this warm period, the Holocene, (2nd) the further warming after the point 'H' at 11500 BP is not connected with the curve of the solar proxy -^{10}Be and this is better to be seen on **FIG 8,** (3rd) the curve of the temperature around the point 'H' is connected to the purple curve of the irradiation by orbit. For more evidence whether exists connection between the differences in irradiation by orbit and this climate transition or not, more transitions glacial – interglacial should be examined on this connection.

[1] The data are taken from the internet published tables of prof A.Berger from Louvain, Belgium, ftp://ftp.ncdc.noaa.gov/pub/data/paleo/insolation/bein1.dat See also A. Berger and L.F. Loutre, 1991, Insolation values for the climate of the last 10 millions of years, Quaternary sciences review, Vol 10, number 4, pp 297-317.

[2] See prof Carl Wunsch: Quantitative estimates of the Milankovitch forced contribution to observed quaternary climate change, http://ocean.mit.edu/~cwunsch/papersonline/milankovitchqsr2004.pdf

FIG 7


2100 W/m²/500y
2050
2000
1950
1900
1850
- 30°C
- 32°C
- 34°C
- 36°C
- 38°C
- 40°C
- 42°C
- 44°C
- 46°C
- 48°C
- 50°C
- 52°C
10Be conc in atoms/mg
12
16
20
24
28
32
36
40
44
48
52
56
60
64
68
CH4 ice/y
23
21
19
17
15
13
11
9
7
5
1
2
3
4
5
6
7
8
A
YD
40
37
34
31
28
25
22
19
16
13
10
7
4
1
0
x 1000 Year BP

The **black curve** of **FIG 7** is the same as **FIG 2b** It is the plot from the temperature reconstruction of Central Greenland on 72^{o} 36' N, 38^{o} 30' W. The temperature interpretation is based on analysis of the stable isotopes, so the δD and the $\delta^{18}O$, from the GISP 2 ice core and has been made by Alley P.B. from the Pennsylvania University, USA [3]. As described already at **FIG 2b** the temperature in the later quaternary comes out to be very changeable. Showed are here the large but relative short warm periods during the glacial, the D-O events or interstadials, of which the numbers are given. After the Younger Dryas (YD) the Holocene (H) sets in. It appears moreover to be some periodic regularity in the occurrence of the interstadials throughout the whole quaternary as is pointed out by prof S. Ramstorf from Potsdam, Germany. This is described here further at **FIG 2b.** In fact he noticed a rhythm of 1470 year in the typical interstadials and some periods of minor temperature increase. This 1470 year rhythm is indicated on **FIG 7** by the arrows.

Below the temperature is the **blue curve** of ice accumulation, also taken from the same table of Alley P.B. The accumulation or thickness of the ice layers from the periods is a good measure for the precipitation at the location and the near environment, but there must have been also some evaporation and movements in the ice, after the snowfall.
The **red curve** on **FIG 7** gives the negative ^{10}Be concentration in the GISP 2 ice core. The data are taken from the table published by Finkel, R.C. from California [4]. The negative ^{10}Be conc. or -1 x the ^{10}Be concentration is taken for more convenient examination to a connection with the temperature. It comes true than that the connection between the temperature and the -^{10}Be concentration is very good. Because the -^{10}Be concentration is a proxy for solar magnetic activity this makes the premise attractive that variation in the activity of **the Sun is in this period an important and very dominant external cause for climate change on Earth**, because the solar forcing must then still overwhelm the physically substantial orbit forcing. So it comes to another paradox: This seems impossible, because there is no physical evidence for variations in solar activity that may change the climate and only does exist some uncertain indication that the cyclic variation of the Sun may influence cloud formation. Thus either is the connection between the red and the black curve fake and is based on bias, or there is substantial lack of scientific knowledge about the physical interaction between the Sun and the Earth and so more generally probable lack of knowledge about the astrophysics and some essential processes in solar systems.

As for the reliability of the ^{10}Be concentration as a negative proxy for solar magnetic activity are indeed some uncertainties and difficulties. Many points about the physics of this radio nuclide are described in this publication of Finkel [Litt 5] ea and by I.G. Usoskin, Finland[5] [Litt 6]. The most important problem is that atmospheric factors may influence the ^{10}Be precipitation. There is

[3] These date also are taken from the site of NOAA, ftp://ftp.ncdc.noaa.gov/pub/data/paleo/icecore/greenland/summit/gisp2/isotopes/gisp2_temp_accum_alley2000.txt See also: Alley, R.B, 2000, The younger dryas cold interval as viewed from Central Greenland. Quaternary Science Reviews 19: 213-266.

[4] The data from the NOAA site, ftp://ftp.ncdc.noaa.gov/pub/data/paleo/icecore/greenland/summit/gisp2/cosmoiso/ber10.txt See also their outstanding publication: Finkel, R.C. and K. Nishiizumi, 1997, Beryllium 10 concentrations in the Greenland Ice Sheet Project 2, ice core from 3-40 ka. Journal of geophysical research 102: 26699 – 26706.

[5] I.G. Usoskin, A history of solar activity over millennia, see http://cc.oulu.fi/~usoskin/personal/lrsp-2008-3Color.pdf

wet and dry ^{10}Be precipitation. The concentration in the ice gives only some good information about the concentration in the atmosphere and the production of the ^{10}Be for the wet precipitation, but for the dry precipitation the total amount of ^{10}Be in the ice accumilation, the flux, is a measure for the production. So Finkel ea did calculate also the ^{10}Be flux from the estimated snowfall and the concentration. The curve of the flux gives the same short term movements as the concentration but the amplitudes are different. Also the very low ^{10}Be precipitation during the Holocene in the flux curve is ascribed to more dilution by more snowfall and not to more solar activity. So if all the ^{10}Be felt down as dry aerosol the solar magnetic activity in the Holocene is so not high within this total 40 ky period as the red curve in FIG 7 suggests, but I think it is very difficult to fall down for the tiny dry and electrical loaded aerosol particles with ^{10}Be. So I gave the ice accumulation curve for comparison in FIG 7 and 9b. Also is given in FIG 8a and 8b the ^{10}Be concentration in comparison with ^{14}C, another sun proxy with a total different physical fate and with the ^{10}Be concentrations in Antarctica. With more proxies that are examined over very long periods I hope to make more comparisons. I think it is possible to make many comparisons and corrections for non solar variations in the ^{10}Be concentrations. By improving so the 'radar' on the Sun you will get a somewhat other picture, but without washing away the fingerprints of the Sun as already here showed in FIG 7. With this information it already is very likely that the interstadials anyway are to be connected with solar activity. It would be nice if all the steps in the fate of the ^{10}Be from production to concentration in the ice would be total obvious, but this is not the case. Also is not familiar how the sun can change the climate. I think however it is not reasonable to require that all the pieces are placed in the puzzle for making conclusions. In the past as well is in our time often only some essential facts are sufficient for evidence so that indeed 'nescio, sed ignorantia non est argumentum', Spinoza learned his opponents. So on behave of ignorance you can never have an argument.

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