

F. Any role of El Niño?

a. Asking the right question?

The claim that an El Niño may have played a significant role in the extreme winters early in WWII (Brönnimann, 2004; see: A2i) is not supported and is therefore discussed hereafter. Any investigation should be open to finding the best answer, which should include: Did winter conditions in Europe alter those observed or assumed in the Pacific? If it is possible to recognise an El Niño-southern-oscillation (ENSO) as a source for climate variability elsewhere, with the same logic one has to accept that any other ocean space with a comparable physical status, can be the source of global variability elsewhere as well. Here the discussion is limited to the El Niño thesis: Did an ENSO phenomenon play any decisive role in the extreme war winters in Europe 1939/40, 1940/41 and 1941/42? Evidently that requires not only establishing that there had been an El Niño long and strong enough to cover all three winters, but most important, that it was evidently a major cause for three extraordinary extreme war winters. All points are unproven speculations, and do in no way challenge the validity of the naval war thesis.

b. What are the facts?

Among these factors that influence the weather, there is the "El Niño Southern Oscillation" (ENSO) phenomenon, which rarely extends over a period of more than 12 months. It can affect the weather patterns over large distances in other regions, but "statistically" not in Europe, see next Figure. El Niño is an event in which the sea surface in the equatorial Pacific between Indonesia (the Philippines to Australia) and Latin American (Panama to Peru) warms temporarily up to 5° or 6°C above average, at intervals of two to seven years. The counterpart is a La Niña event, when the relevant sea areas have below average water temperatures.



Figure F-1

Deviating from the usual duration of such an event of up to about one year S. Brönnimann et al. (hereafter: Authors) believe that there had been a persistent El Niño, one from fall 1939 to spring 1942, and probably due to events in the Pacific, there had been three extreme war winters. Their article in the science journal Nature (Brönnimann et al 2004) asserts that:

—“A prolonged El Niño occurred in 1939-1942 raising the question of a possible relation between El Niño,

European climate, and the northern stratosphere”.

—“The El Niño event started in autumn 1939, reached full strength in January 1940 and lasted, with varying intensity, until spring 1942”.

—“The result suggests that the global climate anomaly in 1940 to 1942 –previously poorly understood- constitutes a key period for understanding of large-scale climate variability and global El Niño effects”.

Only for a notion that a climate anomaly 1940 to 1942 can serve as a key period for understanding ‘the climate’, I can fully agree but regarding the other claims I do not.

Actually the crux starts with the unproven claim that there had been a prolonged El Niño from autumn 1939 to spring 1942. The claim is superficial and not at all helpful. One needs only to go through the Nasa/Giss temperature series, which show many months with neutral or modestly higher temperatures in the equatorial Pacific, for example the months: Sept. to Nov. 1939 (see TM7, p. 93), and May to Nov. 1940 (TM6 & TM8, pp. 69, 109). The uncertainty already starts with a lack of precise identification of the events, as a few examples show:

- ___ *Fraedrich et al.* (1992): names 1939 & 1941 and as a period December to February
- ___ *Diaz et al.* (1992) assume an ENSO event in 1939, but not in winter 1939/40
- ___ *Brönniman et al* (2007) mention only the years 1940 and 1941, as less strong than during the years: 1889, 1973, 1983, 1998, 2003
- ___ *Pazo-Vazquez et al* (2005)¹ mention two El Niño winter events in 1941 & 1942, and one El Niño autumn event 1940.
- ___ NOAA identifies only the year 1941 with a positive event (El Niño) indicating that ‘ocean data anomalies’ with a duration of 15 months occurred². From the 10 leading events it would succeed the second longest event in 1997 by two months.

C. El Niño thesis is superficial

The El Niño thesis lacks facts, analysis and evidence. Some weak points will be mentioned below, without deepening the matter any further: The El Niño thesis has been prepared with such superficiality, that a fruitful discussion is hardly possible. Not the slightest consideration has been given to the numerous and very specific meteorological aspects, as they have been outlined in the previous Chapters.

The Authors do not consider one of the meteorological features shown in Section C concerning fall of 1939, neither the heavy rain, nor the west wind blocking, not the wind shift from SW to NE, and the development of the sea ice in North Sea and Baltic. That all happened despite of the fact that the equatorial Pacific showed –according to Nasa’s temperature map, TM7 (p. 93) – no higher temperature in autumn 1939. They neither took note of the essays by *Rodewald* (1948) and *Scherhag* (1951) which disused developments in the air pressure that preceded the cold winter and large circulation disorder in January 1940, which *Scherhag* addresses with the statement:

“In sharp contrast to the behavior of the 1928/29 winter, the cold winter 1939/40 was due to a general disturbance of the whole earth full of atmospheric circulation.”

Not any of the numerous meteorological characteristics of further two war winters in Europe are discussed. This makes it virtually impossible to discuss the matter using meteorological data and facts.

Even if a tele-connection might be not completely excluded, the effect is very small and insufficient for any significant contribution to the war winters. In particular, the relevance of the naval war thesis is not affected.

¹ *D.Pozo-Vazquez; S.R.Gamitz-Fortis; J.Tovar-Pescador; M.J. Esteban-Parra and Y.Castro-Diez* (2005), “El Niño-Southern Oscillation Events and Associated European Winter Precipitation Anomalies”; *Int. J. Climatology*. 25; p.17–31, Table I & II

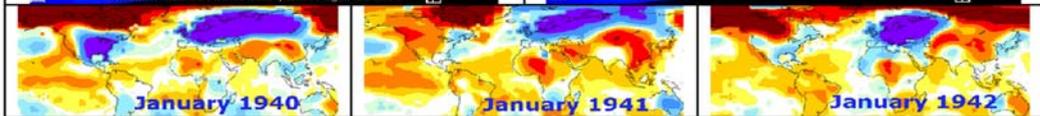
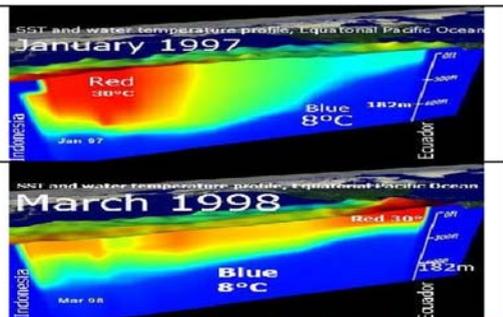
² NOAA (1998): “The Top 10 El Niño Events of the 20th Century”, with reference to: *Livezey et al.*, 1997: Teleconnective response of the Pacific-North American region atmosphere to large central equatorial Pacific SST anomalies, *J. Climate*, 10, 1787-1819.

The claim that the equatorial Pacific is the source of the extreme war winters 1939/40, 1940/41 & 1941/42 is mere speculation.
 There is not any proof that there was a prolonged El Niño event, and that the warmer periods had an influence on the winter conditions in Europe.
 From the useful tools NASA provides for assessing the matter,

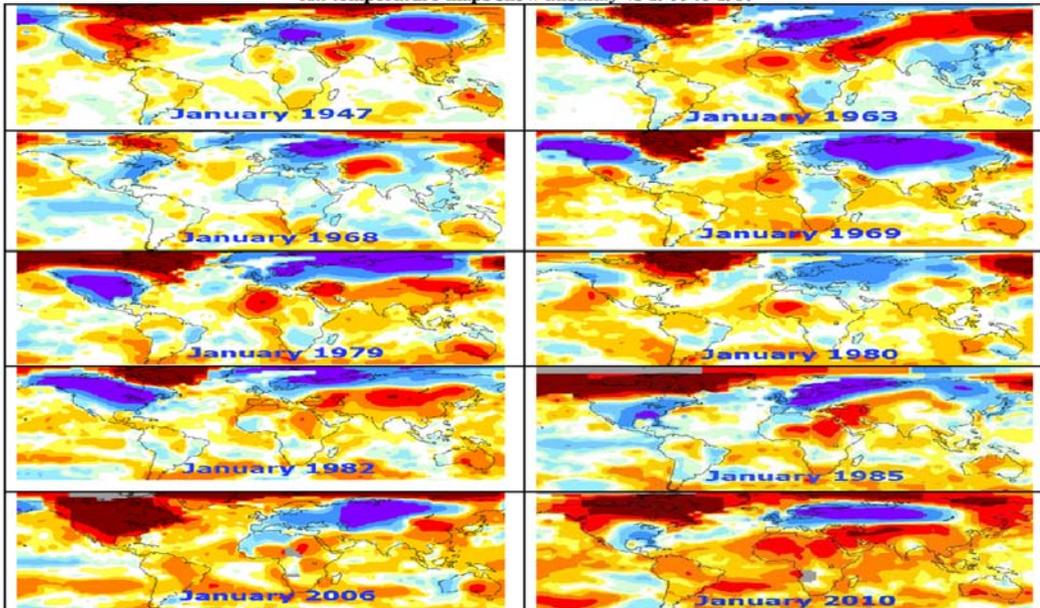
- The physical condition of an El Niño event in three images, which do not support 'prolonged events', and
- for a comparison a few temperature-maps of cold Januaries in Europe (randomly selected), together with the three Januaries 1940, 1941, and 1942 are presented, as provided by:

Goddard Space Flight Center - <http://data.giss.nasa.gov/gistemp/maps/>

The physical condition of an El Niño event:
 The sea temperature below the surface illustrates how the thermocline (the boundary between warm and cold sea water at 20°C) is flattened out by El Niño.
 The thermocline is the border between the dark blue at the bottom and the cyan. The thermocline exists at 20 degrees C. Red = 30°C; Blue = 8°C
 Images & text from [NASA Goddard Space Flight Center](http://www.nasa.gov)



All temperature maps show anomaly vs 1900 to 1939



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d. How reliable are temperature data to establish an El Niño?

It should be noted that the reliability of those data which have been used to identify an El Niño or La Niña event in and prior to WWII is not very high. Required are sea surface temperature data (SST), but usually one only gets air temperature data. In this respect it is to note that the ENSO conditions are caused by a change in the equatorial sea water conditions, as shown in TM11, which have an influence on the atmosphere and not vice versa (*Chen et al.*, 2004).

The events are calculated on unusual, non-cyclical changes in trends in oceanographic-meteorological system of the equatorial Pacific. Important determinants in the equatorial region are the measurements mainly of water temperatures that were collected for a long time by merchant ships. There were not very many before WW2, and very few came from the equatorial

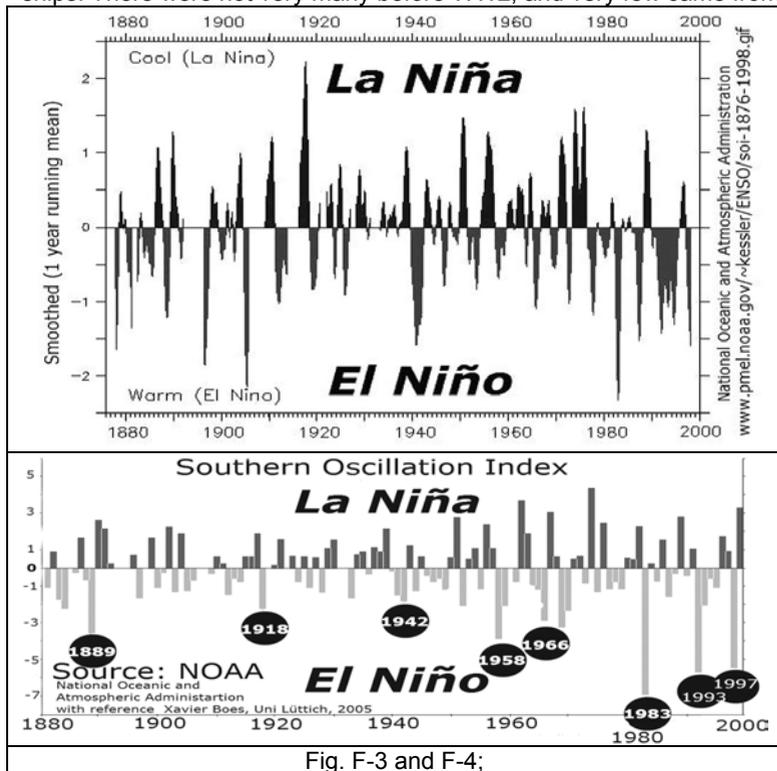


Fig. F-3 and F-4;

sufficient for climatic research. Drawing conclusions from air temperatures on assumed SST is likely to be mere speculation. With regard to the exact period of an El Niño event, a "prolonged El Niño" claim may require much more than a reference to air temperatures.

³ *Bernaerts, Arnd* (1997); 'Reliability of sea-surface temperature data taken during wartime in the Pacific', presented at the 'Symposium on Resource Development', August 8-9, 1997, Hong Kong, in: PACON 97 Proceedings, pp. 240-250. (Online in English: www.oceanclimate.de, Previous Essays).

e. Items to be considered

Often the data source is not mentioned at all, at least the *Pazo-Vazquez's* paper confirms to have used the Niño3 SST region (5 °S–5 °N, 90–150 °W) to monitor ENSO. SST data for the period 1900 to 1998, from the UK Meteorological Office GISST2.3, have been used.

However, if there is a lack of reliable data; the gaps can not just be closed with some gross analysis of "El Niño / ENSO pattern". If deviations in the structure in the Pacific Ocean can cause weather changes over long distances, so can other sea areas with strong deviations cause a distant influence as well. Those factors seem have gotten little attention by the authors, although they recognize:

___ *"Exceptional low surface temperature in Europe and the Pacific Ocean coincided with high temperature in Alaska. In the lower stratosphere, our reconstructions show high temperatures over northern Eurasia and the north Pacific Ocean, and a weak polar vortex⁴."*

___ *"Surface air temperatures were exceptionally high in Alaska, Canada and central Asia, but low in Siberia and extremely low in central and northeastern Europe, where the three severe winters in a row played an important role in the Second World War. A similar, large-scale temperature pattern also appeared in summer and autumn 1940 and 1941, though weaker in magnitude."* (Brönnimann et al., 2004)

That explains little. Nothing is said whether there had been similar situations during the last 150 years. According *Pazo-Vazquez et al* (2005) there have been a total of 18 years with winter temperatures in the "Niño3 SST" region that have been like those in 1941. None of these years seem to have shown up with similar weather conditions in Europe. For example, in Europe the winter of 1928/29 and 1946/47 also had been very cold, but these are not listed as El Niño winters. Comparing a series of very cold January months in Europe with the temperature situation in the Pacific, see TM11 (p. 157), it clearly shows that the correlation can be to a La Niña or El Niño event. Concerning temperature values there is no apparent interconnection. An undifferentiated evaluation of the sparse temperature data available from the Pacific many decades ago, may quickly lead to useless assumptions and wrong conclusions.

f. These observations and the Brönnimann thesis

aa. El Niño in 1939

The Authors seem not to have been aware of the fact that there were already special conditions in Peru in summer 1939, as expressed in an observation report from a ships trip along the Peruvian coast in August 1939, published in the "Annals of the Hydrographic and Marine Meteorology" in June 1941. From the Bay of Mala (12 ° 45'S, 76 ° 44'W) it is reported that: Such powerful and widely spread vegetation has not been observed here for 14 years, and the narrator (*Schwabe*, 1940) explains in a footnote:

"Even in Callao I have been told that such a wet winter season with such an unusual weather character has not been observed during the last 27 years. The Guanyans (guano birds) largely migrated to the Chilean coast this winter."

"At Callao, I could observe myself a number of cape pigeons which are usually only found further south"

⁴ A polar vortex is a persistent, large-scale cyclone located near the pole,

This is actually a classic El Niño situation. From the report it can be concluded that this was an El Niño in its final stage. As already mentioned *Díaz* (et al., 1992) who confirmed an El Niño in 1939, but not in winter 1939/40.

The temperature maps for the months of September, October and November 1939 (TM7, p. 93) do not confirm the assertion that an El Niño commenced in fall 1939. It rather looks like a La Niña situation prevailed, even in December 1939. The indicated temperature rise covers a small area and it is modest. While the Pacific in the fourth Quarter 1939 represents average (TM6, p. 69), in Europe September, November and December are below average conditions (TK6, p. 69). At the time an El Niño event shows up in the TM7 for January 1940 the weather parameters that shaped the extreme winter weather had already been in place for several weeks, as for example the weakening of the west wind drift (C5), and the forming of early sea ice in the German Bight (C7).

bb. El Niño in 1940

The early months of 1940 are documented in TM4 (p. 45) that indicate an El Niño event until about April 1940. As these maps only indicate the deviation of the air temperatures, the higher values over the equatorial Pacific, could have been due to the excessive inflow of arctic air to Europe, and not due to warmer air over the Central Pacific. The months June to December 1940 are documented in TM8 (p. 109). For most of the time since May 1940 the conditions did not really meet El Niño conditions but indicate a strengthening in December 1940, which may have lasted until approximately May 1941 (TM8).

cc. El Niño in 1941, and January & February 1942

The slightly above mean temperature values in spring 1941 (TK8), continue from June until October 1941, only to rise sharply since November and December 1941 (TK10, p. 143). The rise is restricted to these two months. However, during the first three months of 1942, which were among the hardest of the last 200 years in northern Europe, the temperatures in the equatorial Pacific are almost neutral (see TK10). The air temperature in the equatorial Pacific is modest in January 1942 (TM9, p. 125, while February and March 1942 indicate La Niña conditions (TM10), although the temperatures in Europe are extremely low.

dd. There may be a correlation, but only a tiny bit.

Reliable statistics about a significant correlation between high temperatures in the equatorial Pacific and the very cold temperatures in Europe do not exist, see Fig. F-1 (p.155). To illustrate this, the temperature maps of eight very cold January months since WW2 are reproduced (TK11, p. 157). This selective and inclusive example indicates for the month of January that a preference can not easily be derived from these maps. An interesting comparison may be the recent January 2010 (TM11), the coldest in Europe for about 30 years, which correlates with a strong El Niño. This is a big exception, and although very interesting, is not a matter to be discussed here.

g. Conclusion

It is explicitly acknowledgeable that *Brönnimann et al* discussed the severity of the first three war winters and their importance for climate research. It seems that they were the only ones who did it. Unfortunately, their contribution is limited to very general statements, and due to the lack of facts and analysis there is little room for discussion. Neither is the assertion of a persistent El Niño event being justified, nor have any weather conditions during the three winter seasons in question been addressed. The Authors fail, to contribute to a better understanding of the causes for the three exceptional winters of 1939/40, 1949/41 and 1941/42.