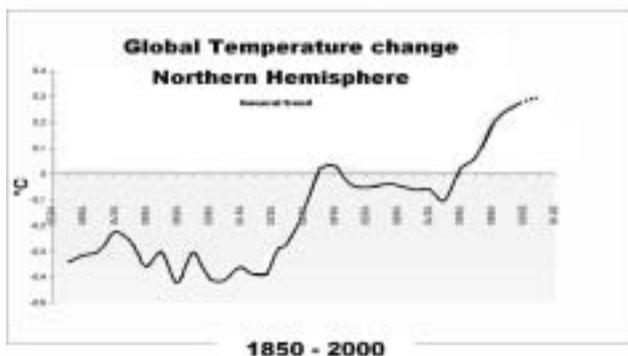


F. Climate changes twice

Two wars at sea – Two climate shifts (6_11)

The basic assumption

This study is based on the assumption that the driving force behind climate is the ocean, explained as follows: The oceans generate a master plan for the atmosphere, like a blueprint¹. The atmosphere will implement the plan within a short period of time. Subsequent ‘atmospheric conditions’ lead to the climate, being nothing more than “the continuation of the oceans by other means”, viz. ‘gaseous water’, named water vapour or humidity.



On the assumption that the climate is ocean driven, this study assumes that significant climatic changes during the last century have had their origin in the two World Wars, viz.

1914-18 and 1939-45. During the wars military forces were so intensive and so mighty that they changed regional seas or ocean areas to such an extent that the oceans altered the blueprint, which subsequently changed the climate data series.

While any significant climate change is quickly reflected in the weather data observed, particularly in temperature records, the detection of the source of climatic changes is somewhat more difficult, simply because there is no comparable data available on ocean observation as for the atmosphere, i.e., when, how, and why the oceans’ blueprint changed has rarely been observed and recorded comprehensively. Hence the responsibility of the war at sea for most significant climatic changes during the last 150 years cannot be proved by ocean data alone, but must primarily be drawn from meteorological data.

¹ Preface, page 5-6; see previous chapters: Cyclones and shells, 2_21; Oceans at war 1942-1945, 4_11; Bernaerts, Climate 1992; Bernaerts, Nature Extract from „Climate Change & Naval War – A Scientific Assessment 2005 Trafford on demand publishing, Canada/UK © Arnd Bernaerts

The relevance of the war at sea concerning a number of significant weather conditions and climatic changes observed in the last 100 years is subject to a number of explanations. These workouts are the basis for the following considerations without necessarily referring to all of them individually.

Overview of climatic changes since 1880

End of the Little Ice Age – 1880

The second phase of the Little Ice Age lasted from about the late eighteenth to mid-nineteenth century. While the exact decade in which this period ended is debatable, it is undisputed that global temperatures started to rise about 1880 at the latest. This fact was observed and widely acknowledged well before WWII. This trend is often explained as a recovery from the cold days of the Little Ice Age. The rise was more pronounced in the Northern Hemisphere. The Intergovernmental Panel on Climate Change, and others, have presented figures and data that indicate the rise.

The temperature rise between 1880 and 2000 is interrupted only twice. If one chooses to ignore these two interruptions, there is a constant increase in temperatures at an almost equal pace during the last 150 years, particularly since 1918. One of the main reasons for this lasting trend is presumably the fact that the earth has been spared a major volcano eruption since Krakatoa in 1883.

Warming of Europe – 1918 to 1939

The general warming trend met with its first major change in 1918. Suddenly the moderate increase received a major push. The rise accelerated in the North, particularly in Europe, for two decades. This change was due to a sudden and Severe Warming at Spitsbergen in the second half of 1918. This change can be dated very precisely to a time frame of six months. This very short period of time is closely related to the most destructive phase of naval warfare in the North Sea and around Britain from the end of 1916 to 1918.

Further details: War at sea 1914-18, 5_13; and Spitsbergen heats up, 5_12.

Four decades of cooling – 1940 and after

The ‘accelerated’ warming trend observed since 1918 ended in the middle of December 1939. The war at sea in the North Sea had blocked the Westerlies from passing through Western Europe. The region where the halt came can be located as the coastal corridor from the Helgoland Bight in the North Sea and in the Baltic Sea from Kiel to Koenigsberg (Kaliningrad). Only 100 days earlier Hitler had started the Second World War, and the coastal waters

mentioned were particularly affected by naval activities and had succumbed to arctic winter conditions.

Further details: Lost West Drift, 2_12; Sea mines 1939, 2_14; and North Sea cooling 2_16.

Although two very big events with a strong impact on weather occurred in December 1939, they did not change the 'general climatic course' generated and sustained in the North- and Baltic Sea. One event took place high in the North under the Arctic Circle; the other event was a major earthquake in Turkey on December 27th, 1939.

Further details: Russian-Finnish war 1939, 2_41; Turkey earthquake, 2_51.

A 'land based' military aspect also could have played a side role on influencing the weather in late 1939. While it rained excessively around the region where the French and German Army met at the Western Front, the United States was deprived of rain in November 1939. This constellation may have contributed to China's and the USA's cold January 1940.

Further details: Rain-Making, 2_31; USA dried out, 2_32; and War in China, 2_33.

The end of a continuous rise in temperature in December 1939 was definitely a full halt to the rising trend for four decades. The temporarily 'halt' of temperatures occurred during certain time periods or in some regions where even a clear cooling down was witnessed. Viewing the general trend in the Northern Hemisphere not too narrowly, the period from 1939 to the late 1970s could be described as modest cooling

Global Warming – 1980 and after

Somewhere between 1975 and 1980 the 'modest cooling' trend disappeared and the warming trend restarted which had been halted in 1939. From 1980 on, the pace of the increase was as high as during the period between 1918 and 1939, or even higher.

Concerning the pace of the temperature increase since 1980, the chapter: 'Sea system affected' (A), raised the issue whether the forcing down of warm surface water to lower levels during WWII could be a contributory cause to the warming of the atmosphere ever since. This cannot be excluded. Heat, which is stored in the ocean, needs a long time to get out in due course. As long as the war lasted the 'forcing in' saw at least some 'forcing out' as well. But once the fighting ceased, any 'excessive heat' may need years or decades for getting to the 'platform' for evaporation.

Further details: (A) Sea system affected, 4_12.

Special feature of the war periods 1939/42 and 1942/45

Special features of the three war winters 1939-42

The overriding aspect of these three winters is that their severity in climatic and military terms is related to Northern Europe and that they lasted for three successive years.

The severity in climatic and military terms related to Northern Europe means that the main and the most severe naval activities and the great deviation from average weather conditions coincided by time and region perfectly. Massive naval activities match the arctic winter conditions.

This ‘perfect match’ was achieved in Northern Europe. It were not the North Atlantic, the Barents Sea or the Mediterranean Sea, but the North and Baltic Sea. Both of them lost too much of their summer heat too early due to naval activities. An ‘axis of cold’ from Stockholm to London was established because continental conditions prevailed.

Further details: Cold axis, 3_22; Baltic Sea Cooling 1939/40, 2_17

A very significant feature of the three war winters is their appearance during three successive winters. This is unusual. It had never before occurred since weather observations had first started being recorded.

Further details: Three-years-winter-package, 3_31.

In summary it can be said that the first three war winters were ‘made and felt’ in North Europe. The relevant climatic sources were the North and Baltic Sea. The war at sea was the ultimate cause.

The three war winters changed the climate, at least the annual mean temperatures decreased.

Speciality of the war period 1942/45

When the United States entered WWII after the attack on Pearl Harbour in December 1941, the war at sea left its principal confinement to European waters and became global. Going global did not mean that the fighting became less intense and severe around the European continent but that the fighting was stretched over whole oceans, with more men, more ships and more equipment.

Going global means in particular that the impact of the war at sea on the weather (in the widest sense) no longer primarily originated in Europe (North and Baltic Sea) but also from the ocean space of the North Pacific and Atlantic. While the global war at sea continued, its impact dominated over the impact felt in European waters.

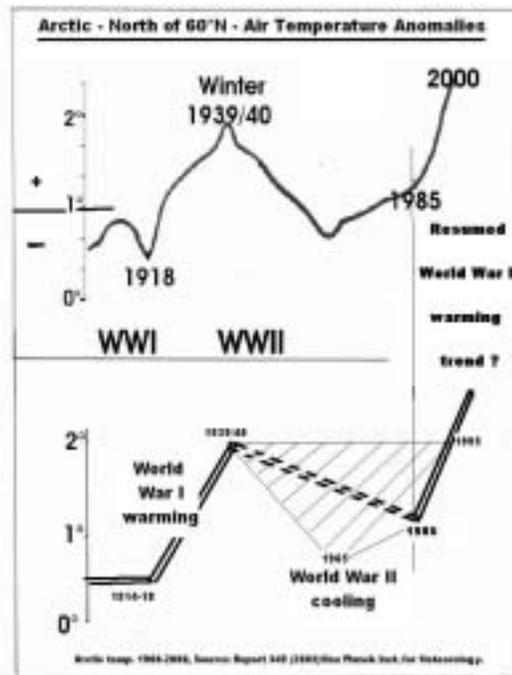
The North European war winters of 1942/43, 1943/44 and 1944/45 being regarded as 'normal' presumably has a lot to do with the fact that tremendous naval activities along the width of the oceans increased the evaporation, thereby strengthening cyclonic activities that brought maritime air to Europe.

Further details: Oceans at war – WWII in the North Atlantic and Pacific, 4_11.

Climatic relevance of major temperature periods

1900 to 1918: A generally moderate warming trend that started around 1880 and lasted until 1918.

1919 to 1939: At the end of WWI a severe warming occurred at Spitsbergen. The pre-1918 trend increased. A massive naval warfare had taken place in close proximity. Water from battlefields from around Britain travelled northwards and reached the seas at Spitsbergen after a few months time. The severe warming influenced the climate of the Northern North Atlantic and initiated a warming process in Europe, which lasted two decades.



The Severe Warming at Spitsbergen was the first of two outstanding climate changes during the last century.

1940 to 1942: Northern Europe experienced three winters with Little Ice Age characteristics. The winters were ‘war-made’ (see above). They were climatically relevant in so far as they are significant milestones in the statistics. They are significant climatic events due to their lengths (each about four winter months) and severity. However, as their appearance and impact was largely confined to Northern Europe, one could also categorise these three winters as major weather-modifying events.

Whether these three war winters would have had a long-lasting impact if the war had ended before Pearl Harbour is impossible to assume, not even in the most general terms.

The war winter of 1939/40 marks the second outstanding climate change during the last century, which lasted for four decades until the end of the 1970s and includes the following period from 1942-1945.

1942 to 1945: This period is not particularly ‘visible’ in global temperature records, although a differentiation of data such as ‘before and after’ Pearl Harbour should be made. The global war at sea after Pearl Harbour presumably had a number of short-term and long-term impacts.

As an example of the short-term impact it is possible to cite the forcing of cold water to the sea surface, forming or influencing water turbulences, or increasing evaporation. A main long-term impact is the forcing of warm surface water into deeper layers where it remained over a longer period of time.

The impact of the global war at sea falls definitely in the category of climatic change, including the second major change in the 20th century in winter of 1939/40.

1945 to 1979: Whether the period saw a small drop in global temperatures or only the halt of the pre-WWII increase is of little interest here. What matters is that the cause for the halt for several decades is still unexplained. The war at sea from 1939-1945 is a highly probable cause for this halt.

1980 – present: As nothing more happened in the late 1970s than the “disappearance” of the 1939/40 halt to ‘the rising trend’, one could ask whether the warming trend after 1980 was actually a climatic change event, or only a resumption of the pre-1940 warming trend. Although this event does not have any practical impact, as a reliable explanation it would help to understand better the four-decade halt to the warming trend.

Whether there still remains the lasting impact of WWII is not only a theoretical probability. As the oceans are capable of storing heat for an unlimited period of time and retain it over long time periods, it is quite possible that some of the heat forced into lower ocean water levels during WWII half a century ago, has resurfaced since the 1980s.

What conclusion can be drawn?

Human impact by the two wars at sea 1914/18 and 1939/45 on regional and global climate has been explained in a number of chapters. The anthropogenic climatic forcing occurs primarily through changes and modifications to the 'natural' status of ocean and seas. They transform this to short-term weather modification, or long-term climatic changes.

If the thesis on climatic changes by war at sea activities has its merits, some explanations on the general warming trend since 1880 may have to be reviewed. Like the anthropogenic impact over two short periods within just a few years, which accelerated the warming trend in 1918, and halted it in 1939, the industrialized world uses global oceans and seas excessively, by installations in tidal waters or floating means, particularly by naval, merchant and fishing vessels. Hardly any of the numerous uses is neutral in the way that the temperature and salinity structure is not 'affected'. While there is 'input' and 'output', the overall balance sheet will show higher figures on the 'input' side, due to the high insulating capacity of water. However, on the 'output' side it eventually results in warming the atmosphere.

With the end of the Little Ice Age, the use of the oceans no longer remained 'neutral'. Day by day huge water masses are 'turned about'. What it means in climatic terms could be demonstrated by explaining the climatic impact of the war at sea. Understanding the global warming trend since 1880 primarily means understanding the structure, conditions and changes of the oceans and seas.

Epilogue

Article from 1994

Following article by the book author was published 1994 in 'L.O.S. Lieder' of the Law of the Sea Institute, William S. Richardson School of Law; University of Hawaii¹.

BACK TO WATER - CHEERS

The most fascinating thing about the day on which the 1982 Law of the Sea Convention comes into force in a few months' time will presumably be the fact that hardly anyone will be fascinated. While the Earth Summit forced 170 countries to fly their leaders and delegates to Rio in order to plan the planet's preservation, not even two heads of state will meet on 16th November 1994 to pay tribute to the 1982 Convention, although this paper will pave the way for rediscovering that water matters and that its source is the oceans.

The 1982 Law of the Sea is to further understanding on the natural commons buried since the industrial revolution 200 years ago. To the ancient Greeks, Mother Earth was Gaia. Once she and her fellow planets had found their place in orbit they lived as fire spitting rocks. Only Gaia had a son, who is still alive, Prontus, the oceans. Thales of Miletus (640-546 B.C.), the earliest philosopher and considered to be one of the Seven Wise Men of Greece, called water the fundamental element of all things. As this thesis was only preserved for several hundred years by oral tradition before being written down by Aristotle, Thales' thoughts fit well into the picture of Gaia and Prontus. A mother born in the depths of the universe, aged, wrinkled but still alive, as shown by volcanic activities, and a son in his best years, strong, dominant and the source of life on earth.

More than 2000 years later the poet Johann-Wolfgang v. Goethe (1749-1832) gave Thales a voice in his drama, Faust II:

*Everything comes from water!!
Everything is maintained through water!
Ocean, give us your eternal power.*

Goethe, known for his interest in the young discipline of modern science, never lived by the sea. The Mediterranean was the only sea he ever saw. While 20,000 people from all over the world flew across the oceans to the Earth Summit in Rio, Goethe only crossed the sea from Neales to Palermo in 1787. A bit seasick, he stayed in bed enjoying the unfamiliar environment as he felt relaxed and wrote in his diary "Italian Voyage":

Until one has experienced the sea around one, one has no idea of world and its relation to the world.

He himself was delighted by this 'simple but great' line and mentions that it changed his thinking. The foundations for the dramatic figure Thales in Faust II, finished 40 years later, were laid. At the same time, global average temperatures fell dramatically, something which Goethe called the Cold Epoche. While this expression is still used in science, the Epoch after Goethe lost touch with basic principles. They strived to understand the natural commons by means of mathematical and statistical tools, most visible in the field of weather and climate (Warming Up, LOS 5/93, P.6)*.

The rule of the oceans was forgotten and buried for two centuries. Now the 1982 Law of the Sea provides a chance to rediscover the lost common understanding of how nature works. In addition, Prontus still offers politicians and other interested people the sea for personal experience, either now, or while traveling by sea to the next Earth Summit. A lesson which he was able to teach Goethe and the Greeks, should still be possible today. Even though only few will probably have taken the opportunity to relearn the basics by 16th November 1994, welcome the 1982 Law of the Sea anyhow.

A nip from the ocean, a glass of water will be just fine. Cheers!

¹ Arnd Bernaerts, "BACK TO WATER - CHEERS", L.O.S. Lieder#33 Vol. 6, No. 1, April. 1994, Professional correspondence from the Law of the Sea Institute, William S. Richardson School of Law, University of Hawaii.

*) see: Preface in section Introduction