# Cyclones and shells - War at sea events (2_21)

## Introduction

### *The Theme*

This section considers factors involved in the initiation of a process that forces heat out of a water body, for example, the sea, a bathtub, or soup in a cup. The more a “hot soup” is stirred, the more steam goes up in the air and the quicker the soup cools down to convenient eating temperatures. In oceans and seas the most effective external force to ‘stir’ the water is wind. Internal forces are horizontal or vertical currents. War at sea can have a similar effect.

### *Formation of Cyclones*

In late 1939 oceans and seas in Northern Europe were treated exactly like any hot soup. Release of heat and vapour from the sea is the nucleus for the making of weather. Stirring the waters of the Atlantic and the formation of Atlantic cyclones might have influenced the weather. The fact is that the centre of low air pressure went from its statistically usual place south of Iceland in autumn 1939 (October-November) towards Scotland, 1,000 kilometres further east[1].

Stirring the sea area after a warm-up period in summer inevitably will increase evaporation. As the North Sea and waters around Britain saw most of the ‘war at sea’, a significant impact on the location of a low-pressure centre cannot be ignored. This statistical centre might be the result of cyclonic activities, which usually ‘squeeze’ heat out of the sea, and result in increased evaporation conditions in the North Sea, or wherever stir and shake of sea took place. Has the war at sea initiated, influenced, or supported this process? This section provides some examples for consideration. The weather produced some surprises during the first few months of war in late 1939.

### *Chain of causes – the butterfly effect*

The ‘stirring of the sea effect’ is vaguely reminiscent of the ‘butterfly effect’. This thesis suggests that if a butterfly flaps its wings in one part of the world,

[1]Rodewald, Winter

it can cause a storm in another part. More precisely, flapping of the wings produces a tiny change in the status of the atmosphere that, over time, can result in a much larger effect elsewhere. This effect is often used in connection with the "chaos theory", which assumes that the atmosphere is fundamentally chaotic. As such, it is said, it is inherently unpredictable[2]. There is no reason to question the 'endless chain of causes' for change in weather patterns. This investigation, however, is based on the assumption that oceans and seas dominate atmospheric processes. It defines climate as the continuation of oceans by other means'[3], [4]. As the war at sea in Europe's home waters and out in the North Atlantic turned over a lot of sea, it can be assumed that the war at sea may have set atmospheric processes in motion.

### *Sea-air interaction*

The case of the 'steaming hot soup' is mentioned as an example in an attempt to explain the 'practical' interaction between water surfaces and atmosphere. While full thermo-dynamical processes of heat (energy) exchange, radiation, conduction, and evaporation, are highly complex, the basics remain simple. Evaporation depends on the difference between the partial pressure of water vapour in the air and the vapour pressure of seawater. The greater the temperature difference between water and air, the greater energy exchange will take place. In the North Atlantic (between latitude 50-70°N) the exchange of energy, as compared to summer period (June – August), is 3-4 times higher during autumn, and 4-5 times higher in winter[5]. The difference will be greatest when the sea is warm and the air is cold and dry (period from autumn to end of winter). On the average, 100 grams of water are evaporated per year per square centimetre of ocean surface. It takes nearly 600 calories of heat (energy) to evaporate 1 gram of water[6].

Actually, water is an excellent isolator. Once stored, heat is 'safe and sound' as long as it does not come into immediate contact with the atmosphere at the sea surface. Though this can happen on numerous physical conditions, one of the most effective methods is the stirring, mixing, or 'turning upside-down' of upper seawater layers, as is particularly done by winds generated by cyclones and anti-cyclone systems. Within one or two days a forceful gale can 'squeeze' heat energy out of the surface water layer, which may have been retained by a smooth surface for many days or even weeks[7]. Analysing reasons for the two major climatic changes during the 20th century, both of them in closest proximity to two World Wars, the following two examples *e.g.* turning the bathtub water around to get the right temperature for bathing

[2] Palmer
[3] Bernaerts, Climate 1992, p.20
[4] Bernaerts, Nature
[5] Svendrup, p.231
[6] Parker, p.408
[7] Lumby

the baby, or stirring the soup to eatable temperatures, provide a basic explanation on the interaction between sea and atmosphere.

*Investigation period*

In this study, the first four months, until the winter of 1939/40 started in full, are considered particularly important. Before nature was on common course. During the initial period seas were still in their natural seasonal status in autumn 1939. After the war at sea had been going on for some time in various sea areas, these areas may have changed their 'climatology' quickly and nature 'accepted' the new situation. Cause and effect are difficult to match, especially when war goes on. However, the war in late 1939 marked the start of a global cooling period of four decades, in which the war at sea may have played an important role, especially from the moment naval warfare activities went global after the attack on Pearl Harbour in December 1941. (A)

Further details: (A) Ocean at war, 4_11; Sea system effected, 4_12.


**War activities and weather events**
(Five examples)

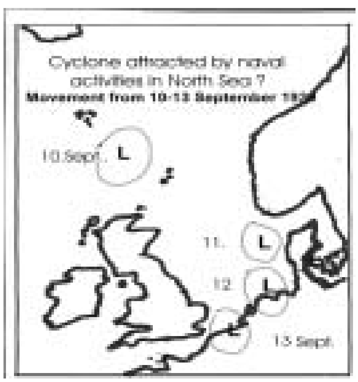
*Example 1 - North Sea – 10 to 13 September 1939*

On Sunday 10th September 1939, a low pressure with 1,000 mb originated north of Scotland. A move eastwards would have been the most likely course. But within the next 24 hours the seas were "hit" many thousand times of which a few number are given as example what kind of things happened:

- A mine sank a German destroyer near the entrance of the Kattegat in a mine field by a "detonation that was especially heavy as the destroyer was loaded with mines". (NYT, 12 September 1939). Only a day earlier the German government had revealed that three entrance zones to the Baltic had been mined. (NYT, 11 September 1939).
- Dutch freighter, 1,514 tons *Mark* was lost when it rammed against a mine in the North Sea 120 miles west of Vorupoer, Denmark, (NYT, 12 September 1939).
- Two British destroyers *Esk* and *Express* were laying sea mines in the German Bight.
- Submarines sank 7 ships in 2 days. (NYT, 11 September 1939).

On 11th September, the low pressure was close to the entrance to Skagerrak. How much have the above mentioned events influenced the formation/location of this low pressure? Later on, this low pressure (1,000mb) moved from west of Jutland, southwards to the Hoek van Holland area (12th), and then to Oostende/Belgium (13th). The movement of this low pressure through the North Sea may actually have something to do with activities along the “Westwall”, where a dozen or more German Naval vessels were laying many thousands of sea mines. On 15th, at 8 a.m., there was a small low-pressure centre (1,005 mb) north of Helgoland close to large sea mine fields.

*Example 2 – Skagerrak – 15 to 16 October 1939*




A low pressure (990 mb) moves from northwest of Ireland (12 October 1939) via the Irish Sea into the Southern North Sea at 985 mb (14th), and then, deepening further into 980 mb, moves via the German Bight to Jutland/Denmark (15 October). It generated gale winds and produced a wide rain front from the Eastern Baltic countries to Southern Norway. One can assume with certainty that the violent low took considerable heat and moisture out of seawater along its route. It is presumed that this ‘low’ may have been supported by a number of war related activities. As to what might have contributed to ‘atmospheric processes’ over Denmark’s waters is illustrated by reports of the following events:

- Off the Danish coast: “while pilot took US *Mormachawk* safely through (German) mines, with Danish and Greek merchant vessels tagging behind, American vessel’s helmsman grew increasingly jittery as five loose mines blew up 500 to 800 yards away from it. The motor ship heard later that a loose mine had struck the pilotless Greek steamer Kosti, going through the field behind it”. (NYT, 20 September 1939).
- Off Jutland coast: British cruisers hunting submarines in the North Sea (near Jutland) fought off German bombers. Bombers attacked repeatedly and anti-aircraft guns returned fire from decks of warships”. (NYT, 10 October 1939). Six bombs had hit the British cruisers, one bomber crashed into the sea, it has been claimed. (NYT, 11 October 1939). A bomb normally has a weight of either 500 or 1,000 pounds. “Nazi warships used decoys to lure the British fleet into position for air attacks off the Norwegian coast. Two 35,000 ton battleships, five heavy cruisers and a number of lighter

*Extract from „Climate Change & Naval War – A Scientific Assesment 2005*
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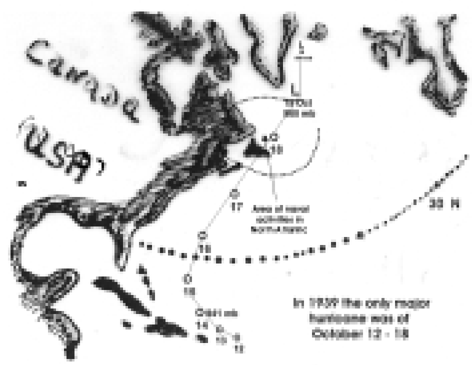
ships set out from their base in pursuit. A witness to this battle saw 150 planes. “There must have been at least 50 planes. More than 100 bombs were dropped”. (NYT, 13 October 1939). A German flotilla sailing to the Norwegian south coast (8-10 October) was headed by battleship *Gneisenau* and accompanied by cruiser *Koeln* and nine destroyers[8].

- Off Copenhagen shore: “Gales have loosened several hundred mines in the German mine field… drifting mines exploded on the coast near the suburbs (of Copenhagen), breaking windows and frightening citizens with terrific detonations. Marine crews have destroyed no fewer than forty-three mines from Koege Bay up to Amager Island, where about 100,000 Copenhagen residents live in a district comparable to Brooklyn. Along the whole southern coast, mine alarms often make it necessary to evacuate villages while experts empty or explode the mines. So many mines are floating around that it is impossible in the bad weather to destroy all of them.” (NYT, 6 November 1939).
- On 21 October and 25 November 1939, German mines sank two German Coast Guard ships south of the Great Belt (Denmark); one of the ships exploded. (NYT, 26 November 1939).

*Example – 3 ”Erratic Hurricane” joins fighting in the North Atlantic? 12-18 October 1939*




Main features of this story can be narrated briefly. On 10 October 1939, New York experienced the hottest October day on record. (NYT, 11 October 1939, p.26 – Commentary). Two days later a hurricane formed east of The Antilles. It took a north-north-easterly course on the 15th, intensifying rapidly. After passing the Bermudas at noon on 16th, the cyclone rushed with hurricane winds towards Cape Race/ Newfoundland[9], reaching a sea area in the North Atlantic on 17th that saw dozens of naval vessels in action. The hurricane was so fast and its course so erratic that the US Weather Bureau was unable to provide any warnings about the storm. (NYT, 19 October 1939). Another ‘surprise’ for the people of New York was the coldest weather on the 17th October, since the last winter, because steadily falling temperatures approached freezing point. (NYT, 18th October 1939). This was

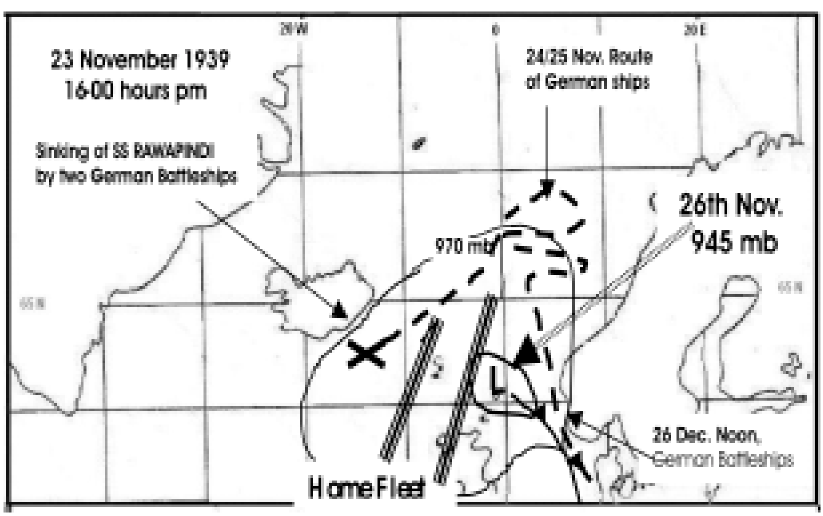
[8] Potter

a record low for this season in New York and also in many other parts of the United States. (NYT, 19 October 1939). How could this happen? 10 October 1939 was the hottest day on record, and only 8 days later on October 17 there were record low temperatures.

In 1939, there was only one major hurricane[10]. It travelled in just 3 days (16th to 19th October) from the Bermudas to an area south of Greenland at high speed and further up to an area in the North Atlantic where the British Northern Patrol was active, as was a German submarine group of six. They sank eight vessels between 9th and 16th October. The pocket battleship *Deutschland* was active, and first convoys eastward and westward were on their way along with naval escorts. The British were active in laying a mine barrage on Faroe ridge from Faroe Island to Iceland. There were certainly even more activities that may have contributed to the "stirring up" of the sea surface thus giving the Atlantic air some vapour 'to work with'.

*Example 4 – The 'Rawalpindi' and the Cyclone, 23 – 27 November 1939*

The first sea engagement of naval surface vessels in the North Atlantic occurred in late November 1939. This naval encounter was immediately followed by a rapid decrease in air pressure by more than 50 mb in 48 hours. Can a 15 minutes' shelling of 600-pound shells produce sufficient 'butterfly-effect' to turn a modest low air pressure into a violent cyclone?



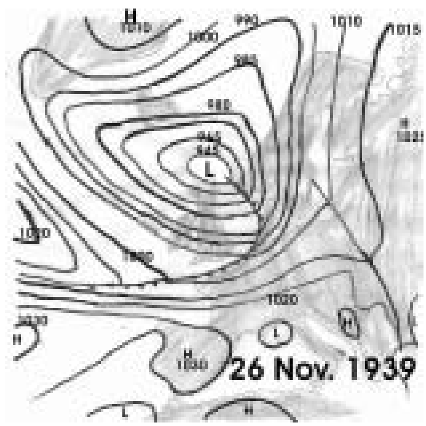

[9] Hurd, Tropical

[10] Hurd, North Atlantic

Weather was fair on Thursday the 23rd November 1939, Southeast of Iceland, about 200 miles west of the Faroe Island. The big and modern German battleships *Gneisenau* and *Scharnhorst* sailed in a flotilla of six naval vessels, when they saw HM Armed Merchant Cruiser *Rawalpindi* at some distance.

The sea was smooth in the late afternoon over a distance of about 7,500 metres, clear enough for the enemies to shell each other, when a tremendous explosion broke the merchant cruiser in two. A shell from one of *Scharnhorst's* 11-inch guns had hit the *Rawalpindi's* forward magazine. The Royal Navy ordered all of their Home Fleet (ca. 20 big naval vessels) to sail to the scene of action to hunt the German flotilla. But a squall arose and the German ships escaped in stormy weather.

The 16,697-ton *Rawalpindi* was no match for the 38,900-ton battleships each. The German battleship *Scharnhorst* fired the first salvo over a distance of 10,000 yards (NYT, 28 November 1939), but when the enemy loomed large *Rawalpindi* sought protection by dropping smoke floats into the sea and in her defence, replied with all her four starboard six-inch (100-pound) guns. (NYT, ditto). That was by far too little against the 11-inch (600-pound) shells German battleships could launch from their six guns in minute intervals. The battle was over at about 16-30 hours GMT. Germans took 28 survivors on board, from a total of only 39, and departed immediately before the first British cruiser (*HMS Newcastle)* arrived at the scene. "However, the other eleven crew members who had also escaped from the blazing ship were rescued by another British naval vessel. Those eleven who landed at Glasgow told the story of the battle. The *Rawalpindi* burnt until eight o'clock Thursday night, they said, when she capsized on starboard side with all remaining crew (238 men). The cruiser attempted to follow German ships but weather was on the German side. Heavy rain and night fall served as a shielding curtain between German raiders and the British warship". (NYT, 28 November 1939). Probably rain may have come down due to the shoot out and the squall that arose could have come from the Atlantic water that was 'stirred' and 'turned' at the scenes of action.




Actually, within 24 hours of this occurrence, a low pressure (975 mb) appeared south of Iceland. In the early morning hours of 25 November 1939, the air pressure over Iceland fell by more than 8 mb in three hours. The cyclone moved to the Orkney Islands and was down to 945 mb on 26 November. This was a weather development not everyone would have predicted. But in the late autumn the Northern Atlantic is extremely sensitive and the weather depends on conditions of the sea surface.

*Example 5 – Arctic Christmas cyclone* **-** *21-26 December, 1939 – connected to the war?*

A highly spectacular weather event took place on the longest night north of the Arctic Circle off Roest (Lofoten) near the Norwegian port of Narvik. On 20 December 1939 a cyclone developed suddenly, pushing the prevailing air pressure down by 54.6 mb in 24 hours[11]. The Swedish Weather Annual for December 1939 reported this event noting that the air pressure fell by 12mm within three hours[12]. This matches with hurricane conditions. In addition to this development, the course of the cyclone over the next few days, according to weather charts of "Deutsche Seewarte"[13] is quite interesting:

> Thursday, 21 December 8 a.m. , 975 mb, ca 100 miles west of Roest/Lofoten;
> Friday , 22 December, 8 a.m., 970 mb, Lula/Sweden ( north Baltic Sea);
> Saturday, 23 December, 8 a.m. 980 mb, Ladoga Lake;
> Sunday, 24 December, 8 a.m., 980 mb, ca. 100 miles south of Leningrad.

What triggered the development of this exceptional cyclone in the first place?

Heavy fighting between Finnish and Russian forces took place in the North-East and less than 300 miles away from where the new cyclone developed on 20 December1939. It covered a frontage of 1,000 kilometres, stretching from the Barents Sea to the Gulf of Finland in the Baltic Sea. How many or how intensive military manoeuvres does it take to initiate or reinforce atmospheric events?

- 19 December 1939 – "Clear skies over Finland for the first time in two weeks provided ideal conditions for air attacks today, ...two squadrons of bombers came thundering under an icy blue sky and bombs were rained on the vicinities of Helsinki, Abo, Borga, Viborg, Hangoe and other vital points.“ "A fierce air battle was fought over Borga between Finnish pursuit planes and Russian bombers, in which the bombers were forced to remain at an altitude

[11] Rodewald, Golfstrom [12] Statens [13] Seewarte

of 15,000 feet." "The Finns said the anti-aircraft fire against the Russian planes was so intense that most of the bombs, although aimed at military targets, fell wide off their mark". (NYT, 20 December 1939).

- 19 December – "The Finns are using improvised tank bombs like those devised in the Spanish civil war, a combination of hand grenades and small gasoline cans".

- 20 December – "The Russian drive was stalled in the far north by blizzards and temperatures 25 degrees below zero (minus 31° C)". (NYT, 21 December 1939).

- 20 December – "Fierce fighting surged across Karelish Isthmus in sub-zero temperatures (below minus 17.8° C) today as the Russians lost hundreds of tanks in savage fighting and directed 200 Red Air Force planes in widespread bombing attacks on the rest of Finland. The roar of artillery could be heard from one side of the 65-mile-wide Isthmus to the other. Finnish aviation rose to meet Red Army aviators in fierce dog-fights and battles in the winter sky. 'Much of the time I was unable to distinguish one plane from another. In zero cold the exhausts of the planes left comet-like streams, smoke trailing behind them for, as long as ten to fifteen miles occasionally'". (NYT, 21 December 1939).

- 21 December – "Russians Retreat in Arctic from Finns, Cold and Snow"; "By mid-afternoon the Finns fighting in heavy snowstorm and sub-zero cold (Fahrenheit) were reported." (NYT, 22 December 1939).

Further details: Russian-Finnish war, 2_41.

The list above presents only a very small number of events that actually took place in Finland, in the Barents Sea and in the Norwegian Sea where the new low-pressure centre originated from 19th to 21st December 1939.

U-boat bombed

**Conclusion**

From quite a number of cyclones, only features (development, strength, movement) of five lows in close context to military activities have been highlighted.

It seems difficult to categorically deny any impact of the war at sea on the composition of atmospheric air pressure; it certainly had. In September 1939 when Warsaw was in flames, exploding sea mines and the sinking of ocean liners forced cold water to the sea surface the air temperatures would have changed and subsequently the air pressure would have followed suit.

Although the examples given above in no way allow a final conclusion to be drawn on how each of these events contributed precisely to the forthcoming arctic winter in Northern Europe, the circumstances indicate that they should not be ignored. The sinking of the *Rawalpindi* was tragic, but in military terms it was "a small event". Nevertheless, circumstances indicate that 11-inch-salvoes by the *Scharnhorst* and the Home Fleet rushing to the scene, may have triggered the development of a cyclone, either by hastening it by a couple of hours, or by making it slightly more violent, or by letting it move a little further. After all, cannons of a battleship are obviously more effective than the flap of a butterfly's wing. At least, the impact of an 11-inch shell is easier to detect. An exploding 600-pound shell is not necessarily a 'fundamentally chaotic' event for the sea and subsequently the air temperature.