The Baltic Sea

In terms of size, the Baltic Sea is a mere ‘drop’ of water in the world’s oceans, but thanks to its strategic location and specific features it represents a ‘significant’ force and influences the weather in the countries surrounding it. It is an excellent location for the climatology study.

The total area of the Baltic Sea is of 400,000 square kilometres, with an average depth of 55m (including the Gulf of Bothnia, 55-294m and the Gulf of Finland, 30m). Except for the eastern part (Gdynia Bight with a maximum of 114m), the southern Baltic Sea is less than 50m deep. An important climatic feature of this sea is a 2,500m high mountain ridge going from the north to the south of Norway and drawing a sharp line between maritime and continental areas. Continental and polar air has much easier access behind this barrier than it has in areas where the Atlantic air travels east at a lower level. This mainly guarantees warm summers to Baltic countries by significantly delaying the arrival of continental winter conditions. There is hardly any other sea in the northern hemisphere which can convincingly illustrate the importance of the heat storage and release process throughout all seasons the way the Baltic Sea does.

Actually, very cold conditions cannot last long on sea and nearby coastal areas as long as the sea is open and not iced. Icing is regarded as a critical point in the regional climatology. Every sea area covered with ice loses ten times less energy to the atmosphere than an open sea area. The importance of the heat flux can be clearly illustrated by the records of temperature data which show that winter average temperatures at the seaside are considerably higher than inland temperatures which sometimes decrease in great leaps, i.e. by 1°C per 50 km or even more (depending on their distance from the coast).

Between mid-September and the end of February, when the air is colder than the seawater, water temperature decreases between 13°C and 15°C, which is significantly more than that of the North Sea (9.5-11.5°C). This actually means that the surface temperatures, with an average ranging from 0°C (north) to 3°C (south) in January, quickly come close to zero. Deeper waters (80 metres and below) have just 4-5°C, while the water column above varies according to the seasons. These changes of temperature during various seasons are effective only from the surface to about 80m depths. While surface water reaches its peak temperature by the end of August, lower levels may reach their peak later on (e.g. 10°C at 40m, in late October). Therefore, all activities that took place at sea during the autumn 1939 could have had three principal effects:

- *The churning of the upper sea water layer and the increase of evaporation cause a soup cup effect.*

- *The turning about of the seawater masses will force warm water masses to greater depths. Later on, these warm masses will 'resurface' thus bringing about milder air (as usual) or delaying the icing processes by days or weeks.*
- *Any increased evaporation in autumn will cause the inevitable cool down of the sea water body. The less warm water is available, the colder the air above.*