

### “Stirred and shaken”

War destruction at sea is usually counted in sunken merchant tonnage or destroyed enemy naval ships. During autumn 1939 already the total loss of merchant ships was of about 380 with a tonnage of 1 million, out of which the British, Allied and Neutral forces counted 320 vessels and about 900,000 tons.

We are all aware of the attention paid today to the drama of only one ship that happens to sink in the sea. Well, imagine that during the autumn 1939 there were three sunken ships per day and that this terrible situation lasted for four months.

In addition, the Royal Navy lost: one battle ship, three destroyers, one aircraft carrier, one armed merchant cruiser, approx. 10 trawlers, two U-boats, and an important number of smaller units. The German Navy lost 9 U-boats and from its bigger units the pocket battleship *Graf Spee* at La Plata, in December 1939.

However, the sinking of about 500 ships of huge dimensions with several thousands of dead sailors and service men aboard may tell a lot about the human and material loss, but very little about the climatic repercussions which have violently shook the seas. Since the beginning of the war, many hundred vessels ploughed the seas day and night in a series of naval activities. A battleship at a cruising speed of 30 knots turns “upside down” a water column of about 12 meters over an area of 72 square km in only 24 hours. In only one month, 300 such ship manoeuvres can “stir” the complete North Sea surface layer.

Anthropogenic actions severely affected the seawater climatic structure. Seen from this perspective, the coming up of a cold winter was inevitable, as explained in the next section.

