

Oceans and their functions

The oceans affected by naval and merchant ships operating and sailing the seas back and forth should have been the hottest topic in the debate on climate change since meteorology was established as a science in the late 19th century. Instead of that, oceans were ignored up to the late 20th century and not even today do they enjoy the significant position they deserve. Oceans are a decisive climatic force, the second after the sun.

a) The starting point is the fact that the oceans are huge and deep. If all continents were to be leveled, the globe would then be covered by one ocean all around the sphere, at a uniform depth of 3,000 meters. It is not only quite an impressive mass of water; water is also an excellent thermal reservoir. Heat capacity ratio between ocean and atmosphere is of 1:1000. The sea can store heat for hours, days, decades or even centuries. Atmospheric heat capacity is almost completely limited to the amount of water vapor available. If not sustained by sunrays or ocean heat, atmospheric heat is gone within 2 to 3 days. Humidity is particularly important for the winter seasons at higher latitudes where sunshine is rare, insufficient or even inexistent. Merchant and naval vessels, fishing and leisure boats plough and push warmer surface water to lower sea levels during summer time. During winter, the process is reversed. The more the ships turn the surface water layer around during the cold winter days, the more the warmer water from the lower levels will surface and contribute to rising the air temperature. However, heat capacity of shallow seas is grossly limited during winter season

b) A major climatic implication in the oceanic affairs started with the development and the use of screw-driven steam and motor vessels in the middle of the 19th century. For more than one hundred years, 10,000 vessels sailed the seas every day, covering more than 40,000,000 kilometres. Each ship sailing the seas will force more heat inside the sea than out of the sea. The more heat the oceans hold, the warmer the atmosphere gets. Thus, an area as large as the Atlantic (from the ice barrier of the Arctic to the ice barrier of the Antarctic) can be ploughed up in one year.

c) But there are not only merchantmen out in the sea. If all ships are to be counted (including fishing vessels, coast guard ships, tugs and millions of leisure boats during the summer season), we can easily double or triple the churning effect in the coastal waters and seas. And sailing is not the only contributor: let's not forget the dragging, seabed drilling, off shore wind energy farms, etc. which may also contribute to the turning upside down of the seas. Actually, every contribution, as little as it may be, makes a difference in the statistics, possibly resulting in the change of the climate data.

d) There are virtually no continuous series of measurements, which would lead to acceptable conclusions about the isotherm structure and its development of the upper layer of the ocean to a depth of at least 50 meters, over a long period of time. But the

temperature difference can be of several degrees within a few meters, during the summer as well as during the winter.