



The Salinity Effect on Ocean-Atmosphere Interaction in Global Tropical Cyclogenesis

The formation of tropical cyclones (TCs) is not fully understood. Six factors of tropical cyclogenesis are presented in modern scientific literature. However, TCs may occasionally form without all these factors being present. The authors therefore undertook further research using data from Copernicus Marine Service (Global Ocean 1/4° Physics Analysis and Forecast updated Daily). Specifically, salinity values from varying geographic locations were accurately obtained. Over the last years the authors of this paper have presented materials on the role of salinity in tropical cyclogenesis, likening its action to a valve. This can be demonstrated using the example of the Atlantic Ocean. The Atlantic Ocean (AO) has a unique feature - in the Northern and Southern Hemispheres there are completely different results of tropical cyclogenesis. For example, in the Northern Hemisphere, we see hurricanes of varying strength, often causing significant destruction, but in the Southern Hemisphere, these hurricanes are practically absent. As a first approximation, we concluded that under the conditions of possible tropical cyclogenesis, sea water salinity (really SSS – sea surface salinity) over 37 (37.2) ppt on a sufficiently large surface will block the formation and development of a TC. Another interesting case is that of the North Indian Ocean. There are serious differences in salinity in the Western and Eastern areas which are reflected in the tropical cyclogenesis. Given this starting point, we therefore examined the SSS values at the start of the tropical cyclone season. The aim of this paper is to demonstrate the role of salinity in TC formation at the start of each TC season for the last 50 years. For each year we found the geographical location of TCs in the different oceans or parts thereof. In all cases SSS was less than 37 ppt. If an ocean has medium or lightly salted water (< 37 ppt), TC can appear anywhere. If salinity varies across the ocean then tropical cyclogenesis is restricted to those areas where SSS is around or less than 37 ppt.

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