

Local Minimum of Tropical Cyclogenesis in the Eastern Caribbean Sea

Owen H. Shieh and Stephen J. Colucci

Department of Earth and Atmospheric Sciences, Cornell University

ABSTRACT

The study has determined that a local, climatological minimum of tropical cyclogenesis exists in the eastern Caribbean Sea. This area, known colloquially by forecasters as the “hurricane graveyard,” is located within the belt of tropical easterlies during most of the Atlantic hurricane season, which lasts from June through November. Tropical easterly waves emerging from the African continent usually follow a path through the Lesser Antilles and into the eastern Caribbean. GOES-EAST infrared satellite imagery shows that easterly waves frequently exhibit warming cloud tops and decreasing convection in an area bounded by the islands to the north and east, Venezuela to the south, and 67 degrees longitude to the west. QUICKSCAT derived surface winds during clear-sky conditions frequently show the presence of accelerating easterlies in the central Caribbean. Analysis of the NCEP global reanalysis wind fields suggests the presence of an area of persistent surface mass divergence in the eastern Caribbean. This area extends up to the typical LCL in the tropical atmosphere, implying a weakly subsident regime that would weaken convection. Hypotheses are presented that suggest reasons for the presence of this area of surface divergence. Climatologically, this phenomenon intensifies and migrates westward in July, then shifts back towards the east and weakens in the latter half of the Atlantic hurricane season. This is reflected by the local minimum of tropical cyclogenesis points in the National Hurricane Center’s best track data in the early part of the season. The local minimum of tropical cyclogenesis in this region has important implications to operational forecasting, since the vast majority of tropical cyclones in the Caribbean eventually affect surrounding landmasses.