

ANALYZING TERRESTRIAL RAINFALL OVER THE NORTHWESTERN PHILIPPINES IN RESPONSE TO THE OCEAN SALINITY CHANGES IN THE SOUTH CHINA SEA

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ABSTRACT

The ocean is a major source of moisture and helps sustain precipitation on land through evaporation and atmospheric transport. The resulting net loss of freshwater on the ocean surface generates a high sea surface salinity (SSS) such that ocean basins like the subtropical North Atlantic and tropical western North Pacific have marked high salinities, as they serve as moisture sources for the Sahel region of Africa and Southern China, respectively. In the Philippines, the South China Sea (SCS) is an important moisture source especially during the summer monsoon season (June-September). Understanding the connection between SSS and rainfall may provide value for operational climate prediction and disaster early warning systems, particularly in the Philippines which suffers from socioeconomic instability being heavily reliant on monsoonal rain for crop production but is frequently damaged by the associated hydrometeorological hazards. Thus, the goal of this study is to address whether terrestrial rainfall over the northwestern (NW) Philippines responds to the changes and patterns of SSS in the South China Sea (SCS) and to examine the underlying physical processes associated with the SSS-rainfall link. Integrated reanalysis and in situ SSS data from 1980-2015 will be obtained from the United Kingdom Meteorological Office (UKMO) while satellite-based SSS data will be obtained from the Physical Oceanography Distributed Active Archive Center (PO.DAAC). Meanwhile, precipitation data for the same 35 years from the Asian Precipitation–Highly Resolved Observational Data Integration Toward Evaluation of the Water Resources (APHRODITE) project will be used for the study. The relationship between SSS and rainfall will be analyzed using Pearson correlation, with high and low SSS years to be identified thereafter. Finally, composite analysis will be utilized to examine the seasonal water vapor transport, divergence/convergence of water vapor fluxes, and geopotential height at 850 hPa during anomalously low- and anomalously high-SSS years.

Keywords: sea surface salinity, rainfall, SSS-rainfall link, Northwest Philippines