

ABSTRACT

An important part of the hydrologic cycle is moisture evaporating from the ocean surface that gets transported and precipitates on land. Sea surface salinity (SSS) is the measure of saltiness or dissolved salt content in a body of water and is a signature of net precipitation-evaporation, a natural “rain gauge” that has been shown to be a good predictor of rain in areas like Africa and China. This study aims to determine whether terrestrial rainfall over the mainland western Luzon responds to the changes and patterns of SSS in surrounding ocean basins when the Southwest Monsoon (SWM) or *Habagat* affects the western portion of the country from June to August. We aim to understand how SSS anomalies influence atmospheric moisture transport and rainfall patterns by utilizing 36 years of data (1980-2015) from the APHRODITE Monsoon Asia precipitation and the EN4 SSS datasets.

The analysis incorporated multiple seasons—March-April-May (MAM), April-May-June (AMJ), May-June-July (MJJ), and June-July-August (JJA)—and integrated climate indices such as ENSO, DMI, and Asian Monsoon indices, alongside atmospheric variables from ERA5. SSS in the southern portion of the Bay of Bengal (BB_{SOUTH}) showed significant spatiotemporal variations and positively correlated with rainfall patterns in western Luzon (+0.40). Additionally, high BB_{SOUTH} SSS anomalies are associated with cyclonic circulation patterns that enhance moisture convergence and precipitation over Luzon, while low SSS anomalies are linked to anticyclonic circulation resulting in drier conditions. We also find a decreasing trend in SSS, possibly influenced by increased precipitation in the Maritime Continent and intensified Walker Circulation on a decadal scale.

KEYWORDS: Atmosphere-ocean interaction, Salinity, Precipitation, Southwest Monsoon, Moisture Transport