

## Modulation of Seasonal Rainfall in Sri Lanka by ENSO Extremes

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### ABSTRACT

Influences of El Niño Southern Oscillation (ENSO) extremes such as El Niño and La Niña events on the seasonal rainfall for four climatic seasons in Sri Lanka are examined by using monthly rainfall data from 90 rainfall stations for the period from 1950-2011.

El Niño and La Niña events such as North-East monsoon (NEM), First Inter monsoon (FIM), South-West Monsoon (SWM) and Second Inter monsoon (SIM) for four seasons were separately considered. El Niño and La Niña events are categorized, according to the Ocean Niño Index (ONI) provided by NOAA Climate Prediction Center.

Out of four climatic seasons, strongest impact can be seen during the SIM season with probability of receiving above - median rainfall over most parts of the Island is high (low) on El Niño (La Niña) events. Western slope of the central hills has a considerable influence during ENSO extremes with suppressed seasonal rainfall during El Niño events and enhanced seasonal rainfall during La Niña events in SWM season. Enhanced and suppressed rainfall activity is evident in Northwestern parts of the island during La Niña and El Niño events respectively during NEM season. Weakest impact of ENSO extremes can be seen during the FIM season.

The analysis provides a useful reference of when and where the ENSO extremes have significant impacts on seasonal rainfall during four climatic seasons that can be used to enhance the skills of seasonal forecasting in Sri Lanka.

**Key words:** *El Niño Southern Oscillation (ENSO), El Niño (La Niña), Monsoon, Inter-monsoon, Seasonal forecasting*

### 1. Introduction

Interannual variations in seasonal rainfall can have a profound socio-economic impact. Deficit of seasonal rainfall is associated with droughts and crop failure whereas excess of seasonal rainfall is associated with devastating flood, damage to properties and crops. Seasonal prediction provides important information to a great variety of practical applications, such as water resource management, food security, disaster prevention, agriculture management, and energy supply. Seasonal predictions significantly depend on slowly varying components of the climate system, most significantly sea surface temperatures (SST) across tropical ocean basins. SST can impart a 'memory' to the atmosphere and that 'memory' can be transmitted to parts of the globe remote from the originating sea surface temperature anomalies. This phenomenon is referred as "Teleconnections" by Meteorologists (Troccoli, 2008). The most important component of ocean atmospheric system is the ENSO (El Niño Southern Oscillation) cycle, which refers to the coherent, large-scale fluctuation of ocean temperatures, rainfall, atmospheric circulation, vertical motion and air pressure across the tropical Pacific.