

Variability of Surface Air Temperature in Sri Lanka and Its Relation to El Nino Southern Oscillation and Indian Ocean Dipole

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Abstract : Understanding the air temperature variability is crucially important for disaster risk reduction and management. In this study, we used 15 synoptic meteorological stations to assess the spatiotemporal variability of air temperature over Sri Lanka during 1972–2021. The empirical orthogonal function (EOF), Principal component analysis (PCA), Mann-Kendall test, power spectrum analysis and correlation coefficient analysis were used to investigate the long-term trends of air temperature and their possible relation to sea surface temperature (SST) over the region. The results indicate that an increasing trend in air temperature was observed with the abrupt climate change noted in the year 1994. The spatial distribution of EOF1 (63.5%) shows the positive and negative loading dipole patterns from south to northeast, while EOF2 (23.4%) explains warmer (colder) in some parts of central (south and east) areas. The power spectrum of PC1 (PC2) indicates that there is a significant period of 3-4 years (quasi-2 years). Moreover, Indian Ocean Dipole (IOD) provides a strong positive correlation with the air temperature of Sri Lanka, while the EL Nino Southern Oscillation (ENSO) presents a weak negative correlation. Therefore, IOD events led to higher temperatures in the region. This study's findings can help disaster risk reduction and management in the country.

Keywords : air temperature, interannual variability, ENSO, IOD

Conference Title : ICSIDCC 2023 : International Conference on Sea Ice Dynamics and Climate Change

Conference Location : Barcelona, Spain

Conference Dates : May 22-23, 2023