

Trends in rainfall and its extremes over Thailand during boreal winter monsoonSangchan Limjirakan[†]; Atsamon Limsakul[†] Environmental Research Institute, ThailandLeading author: lsangcha@chula.ac.th

The Asian winter monsoon (AWM) system is one of the most active components of the global climate. It strongly impacts winter climate over the Asia-Pacific region and exerts large social and economic influences on many Asian countries. Most conspicuous feature of the AWM is a cold surge which brings not only hazardous weather to East Asia but also monsoon rainfall to Southeast Asia. Thus the stability and variability of the AWM and its associated cold surge are of wide concern, especially because of the potential for the monsoon to change with global warming. In this study, high-quality daily rainfall data during December-January-February (DJF) months for the period of 1975-2009 from 70 stations distributed cross Thailand were examined through Empirical Orthogonal Function (EOF) and trend analyzes. The objectives are to identify spatio-temporal structure and long-term change of rainfall amount and its extremes, and to describe the possible link to variability of the AWM. Results revealed that the first EOF mode could explain 62% of the total variance and generally represented the dominant feature of DJF rainfall variability in the south especially on the Gulf of Thailand's coast. The spatial structure of EOF1 mode with very large regional loadings highlighted substantial influence of the AWM circulation on local and synoptic weather patterns of the south. The corresponding principal component of EOF1 mode showed a significant upward trend, indicating an increase in DJF monsoon rainfall amount in southern Thailand. Station-by station trend analysis provided additional evidence of significant increases in the winter monsoon rainfall amount, the number of rainy days, variance and rainfall extreme events in the south. These findings are consistent with variability of the AWM intensity and northward-southward shift in its axis tilt, suggesting that the AWM is an important remote driving force in regulating winter rainfall changes over Thailand. The massive flooding in southern Thailand that just occurred in March 2011 probably manifested as the recent example of the AWM-driven catastrophic impact. Key words: Trends, rainfall and its extremes, Thailand, boreal winter monsoon