



ENSO influences on Indonesian rainfall variability: Role of atmosphere–ocean interaction in tropical Pacific sector

Rahmat Hidayat (1), Murni Ngestu Nur’utami (2), and Givo Alsepan (3)

(1) Department of Geophysics and Meteorology, IPB University, Bogor, Indonesia (rahmath@apps.ipb.ac.id), (2) Department of Geophysics, Graduate School of Science, Tohoku University, Japan, (3) Department of Natural History Sciences, Graduate School of Science, Hokkaido University, Japan

As a part of the Indo-Pacific warm pool, Indonesia maritime continent is the most active convective system region over the globe. The number of previous studies (e.g. Hendon, 2003) showed that during the dry season anomalous surface easterlies driven by warm SSTs in the central Pacific during El Niño increase the local wind speed, cooling the ocean surrounding the maritime continent and thus increasing the SST gradient along the Pacific. Consequently, the Walker circulation is reduced consistent with decreased rainfall over the Indonesian region. The strong El Niño in 1997/98 caused land drought and harvest failure, reduced the coffee and sugar productions, and triggered the forest fires in Indonesia. This research aims to investigate the influences of El Niño El–Southern Oscillation (ENSO) on Indonesian rainfall variability. Simple correlation analysis is used to indicate the deviation of rainfall, 850 hPa wind field, and sea surface temperature anomalies (SSTs) during the ENSO events. Composite of SSTs, Walker Circulation and Indonesia rainfall anomalies show detailed features in the phases of ENSO. During El Niño event, the maximum SSTs lasts until December in the eastern Pacific Ocean while wind anomaly is dominated by westerlies and its velocity is increased simultaneously. It is shown that the impact of El Niño on Indonesian rainfall is more significant in October until December over eastern Indonesia, west Java, and part of Sumatera and Borneo. Moreover, the decreased Indonesian rainfall during El Niño is related to the weakened Walker circulation over the maritime continent. This study highlights the atmosphere–ocean interaction in the tropical Pacific sector plays an important role on Indonesian rainfall variability.