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An intense wind event associated with a convective system in west Sumatra observed during the HARIMAU2006 campaign

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The Hydrometeorological ARay for Isv-Monsoon AUtomonitoring(HARIMAU), a 5-year project under the Japan EOS Promotion Program(JEPP)has been running since 2005 to set up a radar-profiler network over the Indonesian maritime continent. The project carried out an intensive observation campaign in west Sumatra during 26 October and 27 November 2006 (HARIMAU2006), using two X-band Doppler radars (XDRs) that cover the sea area off the west coast of Sumatra Island, rawin sondes, and operational Equatorial Atmospheric Radar (EAR). On 19 November 2006, strong winds exceeding 17m/s and a sudden temperature drop of 5K was observed associated with a passage of a band-shaped convective system, and some houses were destroyed. In this study, processes responsible for the strong wind are investigated using HARIMAU2006 observation data.

The analysis of the XDR data revealed that low-level easterly wind directed toward the convective system was accelerated significantly as it passes through a relatively low topography area between high mountainous areas, forming a jet-like strong wind exceeding 20m/s. The leading portion of the strong wind descended as it reached the strong precipitation region of the convective system. The upper air sounding data indicate that a dry southerly air intruded over the observation area in the afternoon of that day. Analysis of NCEP objective analysis indicates that the southerly was associated with the westward-propagating mixed Rossby-gravity waves with period of about 5 days. It is suggested that the dry air enhanced evaporative cooling and caused large temperature drop and effective downward transport of strong easterly wind momentum.

Keywords: convective system, intense wind, Doppler radar, maritime continent