

## **4.11 SHIPBORNE POLARIMETRIC RADAR OBSERVATION OF THE MODULATION OF THE DIURNAL VARIATION OF OROGRAPHIC PRECIPITATION ALONG THE WESTERN COAST OF SUMATRA ISLAND BY SYNOPTIC-SCALE DISTURBANCES**

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This study analysed the spatial and temporal variations of local precipitation along the western coast of Sumatra Island. The study utilized the data collected from the polarimetric radar on board the research vessel Mirai, which conducted an intensive observation at 4.067°S and 101.9°E from 23 November to 17 December 2015. Results show the dominance of the diurnal cycle of orographic precipitation, developing during the afternoon along the western coast of Sumatra Island, then propagating westward over the sea during the night. The topography-induced precipitation was significantly modulated by the passages of synoptic-scale disturbances, which could be associated with tropical mixed Rossby-gravity waves and induced the periodical changes of local circulations. Orographic precipitating systems triggered along the western coast of Sumatra Island became more intense and organized accompanying the passages of the troughs of synoptic-scale disturbances. In addition, the offshore enhancement and strong propagation of orographic precipitation over the sea at night occurred during disturbed periods. Furthermore, orographic precipitating systems during disturbed periods featured greater vertical development and more enhanced polarimetric radar signatures above the melting level than during nondisturbed times. It appears that the modification of local environmental conditions by synoptic-scale disturbances makes a great impact on the diurnal variability of orographic precipitation along the western coast of Sumatra Island, whose processes are discussed according to the observational results.