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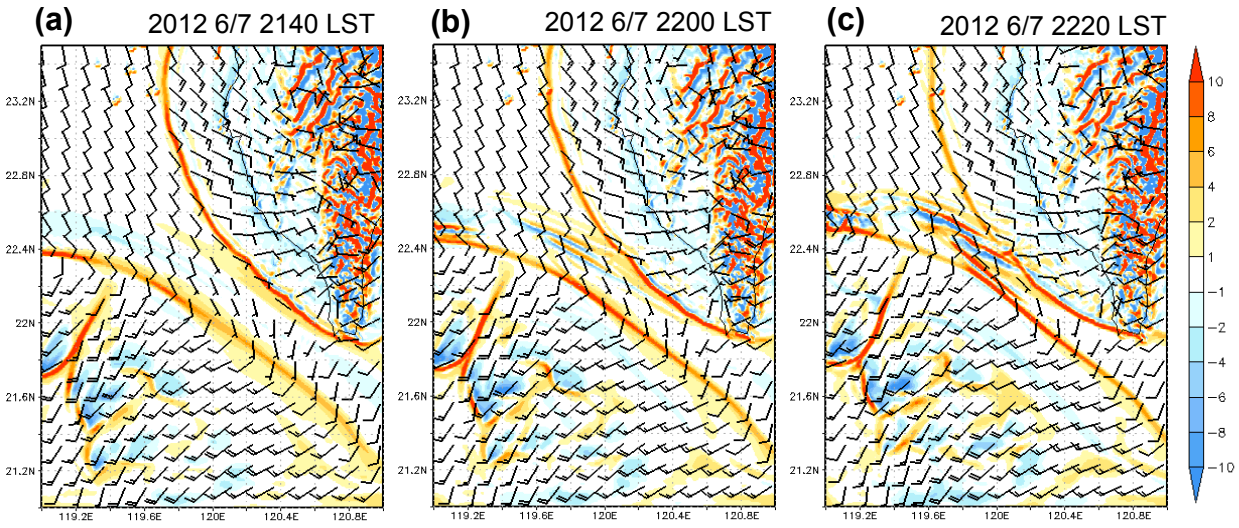

Fig. 1. Cloud-resolving model simulation of surface wind (kts; at 10 m height) and convergence (10^{-4} s^{-1}; color; positive for convergence; scale on the right) every 20 min from (a) 21:40 LST to (c) 22:20 LST on Jun 7, 2012. The initiation of deep convection near 22:20 LST between the two approaching boundaries, one at the leading edge of a moderate low-level environmental southwesterly wind surge and the other associated with the land breeze front, is successfully captured.

- A morning rainfall event in the coastal region over southwestern Taiwan on June 8, 2012 under weak synoptic conditions in the mei-yu season was investigated, with focus on its detailed initiation mechanism by means of mesoscale analysis and model simulations.
- Consistent with the observations, the model simulation successfully reproduced the initiation of deep convection offshore from Taiwan when two arc-shaped boundaries with convergence, one located at the leading edge of a moderate low-level southwesterly wind surge and the other associated with the westward-moving land breeze front, approach each other to about 40 km apart, between the two boundaries rather than along either one of them (Fig. 1).
- Both the above-mentioned approaching boundaries are required for a successful simulation of convective initiation, since neither the test with late arrival of the surge nor the one without Taiwan terrain can reproduce the convection responsible for the coastal morning rainfall.
- The offshore flow behind the land breeze front is a combination of land and mountain breezes and the steep topography of Taiwan is found to be crucial in its formation, as it becomes very weak in the test with the terrain removed.