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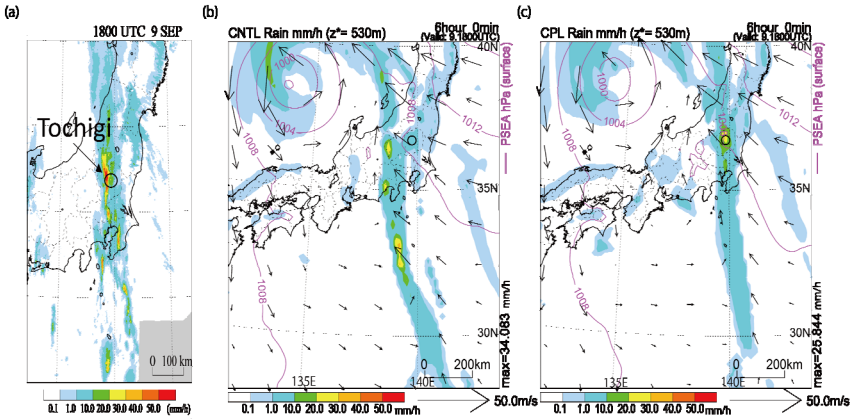
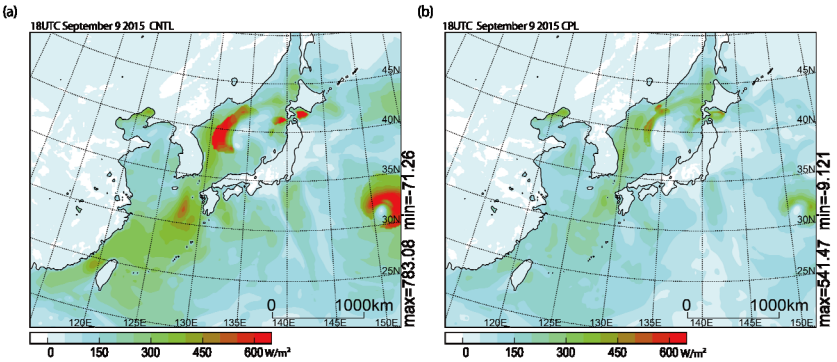
**Plain Language Summary:** This study investigated the influence of sea surface temperature (SST) on the September 2015 Kanto-Tohoku heavy rainfall event using a regional air-sea strongly coupled data assimilation system. The air-sea coupled system improved the analysis of SST, air-sea latent heat fluxes, lower-atmospheric components and the stationary linear convective system including local torrential rain occurred around 37˚N in the Tochigi prefecture.




← Figure 1. Horizontal distributions of (a) the radar-raingauge analyzed hourly precipitation amount and (b-c) winds at 530-m height (vectors), sea level pressure (contours at the interval of 4 hPa) and hourly precipitation amount (colors) (b) in the CNTL experiment and (c) in the CPL experiment. The valid time is 1800 UTC on 9 September 2015. Open black circle in each panel shows the location of the Tochigi prefecture.




↑ Figure 2. Horizontal distributions of air-sea latent heat flux (colors) (a) in the CNTL experiment and (b) in the CPL experiment. The valid time is 1800 UTC on 9 September 2015.

- The analysis of sea surface temperature (SST) is improved by air-sea strongly coupled data assimilation system with the Advanced Microwave Scanning Radiometer 2 (AMSR2) Level 2 (L2) SST for Typhoons Kilo, Etau and the September 2015 Kanto-Tohoku heavy rainfall.
- The coupled data assimilation system with AMSR2 L2 SST led to improvement of the analysis of air-sea latent heat flux and the atmospheric components in the lower troposphere.
- The coupled data assimilation system with AMSR2 L2 SST successfully reproduced a stationary linear convective system extending north to south between Typhoon Kilo and the extratropical cyclone transited from Typhoon Etau in 2015.
- Changes in the synoptic-scale SST field did affect the location of the stationary linear convective system with embedded local torrential rain through a change of the location of lower-tropospheric convergence area between the cyclonic circulation associated with Etau and easterly lower-tropospheric winds.