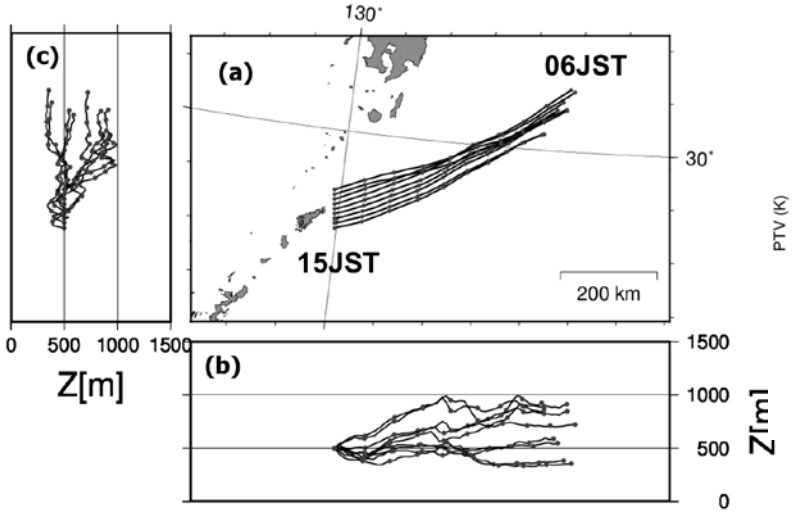
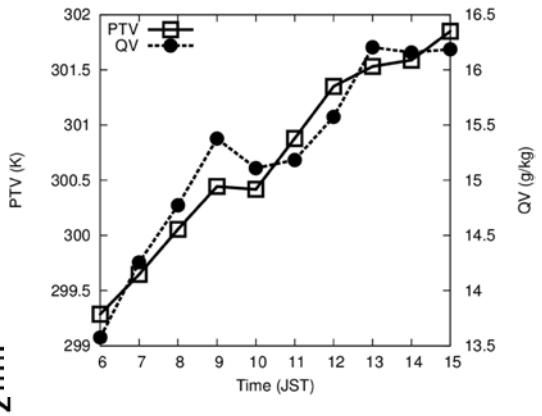
Tsuguti, H., and T. Kato, 2014: Contributing factors of the heavy rainfall event at Amami-Oshima Island, Japan, on 20 October 2010. *J. Meteor. Soc. Japan*, **92**, 163–183.
http://dx.doi.org/10.2151/jmsj.2014-202



↑

Figure 1. Backward trajectories of nine parcels from the east of Amami-Oshima Island from 1500 JST on 20 October using 10-minute objective analysis data. (a) Horizontal projections of three-dimensional backward trajectories of each parcel. The location of each parcel is marked with circles every 1 hour. Vertical projections in (b) and (c) are south–north and east–west directions, respectively.



↑

Figure 2. Time variations of virtual potential temperature (θ_v; PTV) and specific humidity (q_v; QV) of the central parcel in backward trajectory shown in Fig. 1.

- The low-level humid air, supplied to Amami-Oshima Island during the heavy rainfall event by strong east–northeasterly winds, originated more than 500 km to the east–northeast as low-level dry air on the northern side of a stationary front (Fig. 1).
- The dry air was transformed into humid air on the way to the island by receiving large latent heat flux from the sea surface (air-parcel transformation) (Fig. 2). Warm sea surface temperatures around Amami-Oshima Island, about 2°C higher than the annual mean, contributed to this air-parcel transformation.
- At Amami-Oshima Island, the collision of the humid air with a cold pool produced by pre-existed precipitation systems contributed significantly to the formation and maintenance of the precipitation systems causing the heavy rainfall event, supplemented by topographic effects of the island.