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Natural Hazards and Earth System Sciences Discussions
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NHESSD
2, C1870–C1876, 2014

Interactive Comment

Interactive comment on "Assessment of heavy rainfall-induced disaster potential based on an ensemble simulation of Typhoon Talas (2011) with controlled track and intensity" *by* Y. Oku et al.

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The author thanks the referee for attention to the the work and for the expressed opinion, which we have answered point-by-point.

Major comments of anonymous referee #1

[1] We added the divergent horizontal wind component with the vertical wind component as Ishikawa et al. (2013). We will replace "Since the vortex is extracted and put it back in the same place again, the result should ideally be identical." in L.24, P.4401 by "The vortex in NOPVM is extracted and put it back in the same location again. The

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meteorological fields of u, v, w, \theta is replaced by the fields that are retrieved from PVI method. So there exist difference between NOPVM and NOPVI which is caused by the numerical truncation error."

[2] We will insert the following sentences after L.9, P.4401. "When the typhoon made landfall again at the Chugoku region of western Japan, in the simulation the convective systems accompanying typhoon center neighborhood approached southwestern slopes in Kii Peninsula which face a prevailing southwesterly low-level flow (Fig. 0a). On the other hand, in the observation the strong convective systems approached southeastern slopes which face a prevailing south low-level flow (Fig. 0b). The distance between typhoon center and convective systems in the simulation is less than that of observation. This difference partially leads to the difference rainfall pattern between Fig 6a and b."

Figure 0: (a) Simulated hourly rainfall amount and wind field on 950 hPa level at 23:00 UTC on 2 September from D2 of NOPVI, (b) observed RAP and analyzed wind field produced by the JMA/MSM (Meso Scale Model) at 15:00. These are when the typhoon made landfall again at the Chugoku region of western Japan, the location is depicted by the star symbol.

[3] We will insert the following sentences after L.13, P.4405. "There is one of the most strong convective systems which brought heavy rainfall in the northeast quadrant of the Typhoon Talas (2011). When the convective systems come across southeastern slopes of the Kii Peninsula, as a consequence R becomes high. In NOPVI case, the convective systems come across southwestern slopes, so TCs with slightly eastward shifted tracks have higher R."

[4] The TC location when maximum rainfall occurs is added to Fig. 7. The maximum rainfall occurs when the TC is approaching or just after it makes landfall. The maximum SWI occurs when the TC moves over the Sea of Japan.

Minor comments of anonymous referee #1

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(1) Fig. 1 has been modified.

(2) We will insert "m and n are increment counters." in L.21, P.4400.

(3) We will insert "To assess heavy rainfall-induced disaster potential, this area includes landslide spots." in L.18, P.4400.

(4) To avoid overlapping TC positions, we did not select northward latitude as a reference.

Comments of anonymous referee #2

(1) In L.24, P.4405, we have already cited Oouchi et al. (2006) which supports the notion that global warming and TC strengthening are related.

(2) We do NOT change TC intensity when TC is relocated, but change when TC is not relocated.

(3) Unfortunately, PVI method we use in the presented paper is not able to control TC translation speed. PVI method does not modify any boundary conditions except at the initial time. TC translation speed is controlled by model physics.

(4) The higher potential vorticity causes the warmer vortex core of TC, TC can hold much more water vapor from sea surface. Consequently, it brings more accumulated rainfall amount but could not always lead severer rainfall intensity. For example, the rainfall intensity depends on the geographical location, steepness and complexity of slope.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 4393, 2014.

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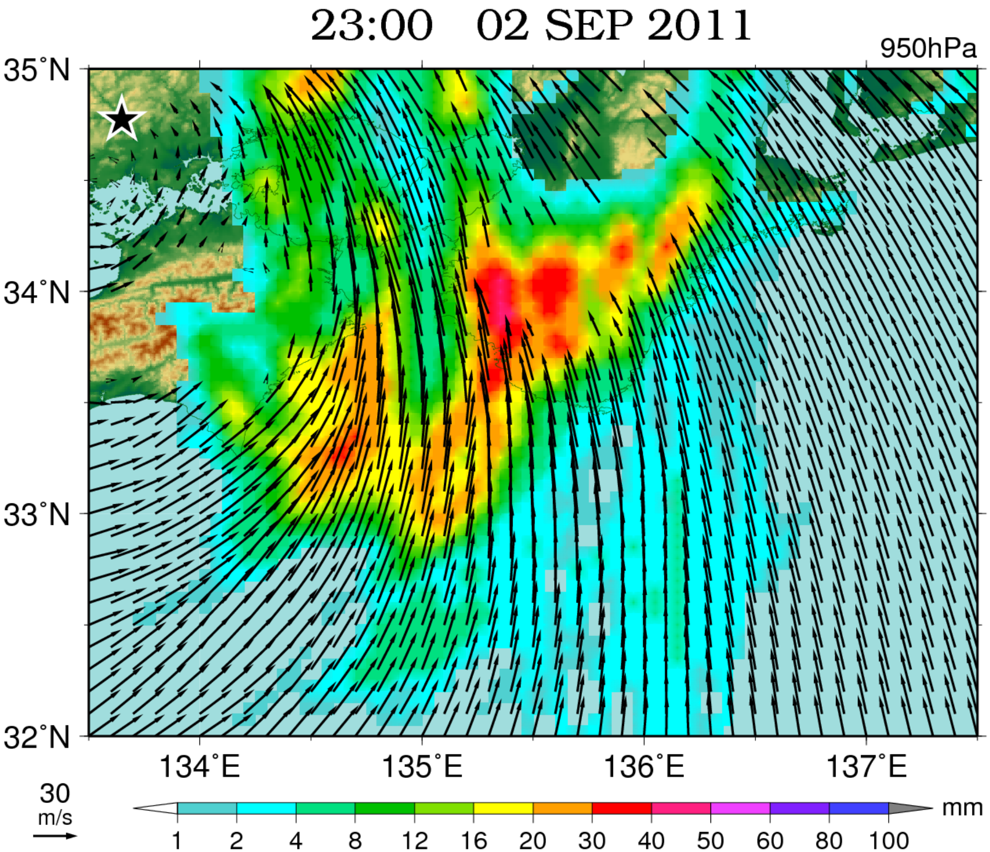

Fig. 1. Figure 0(a)

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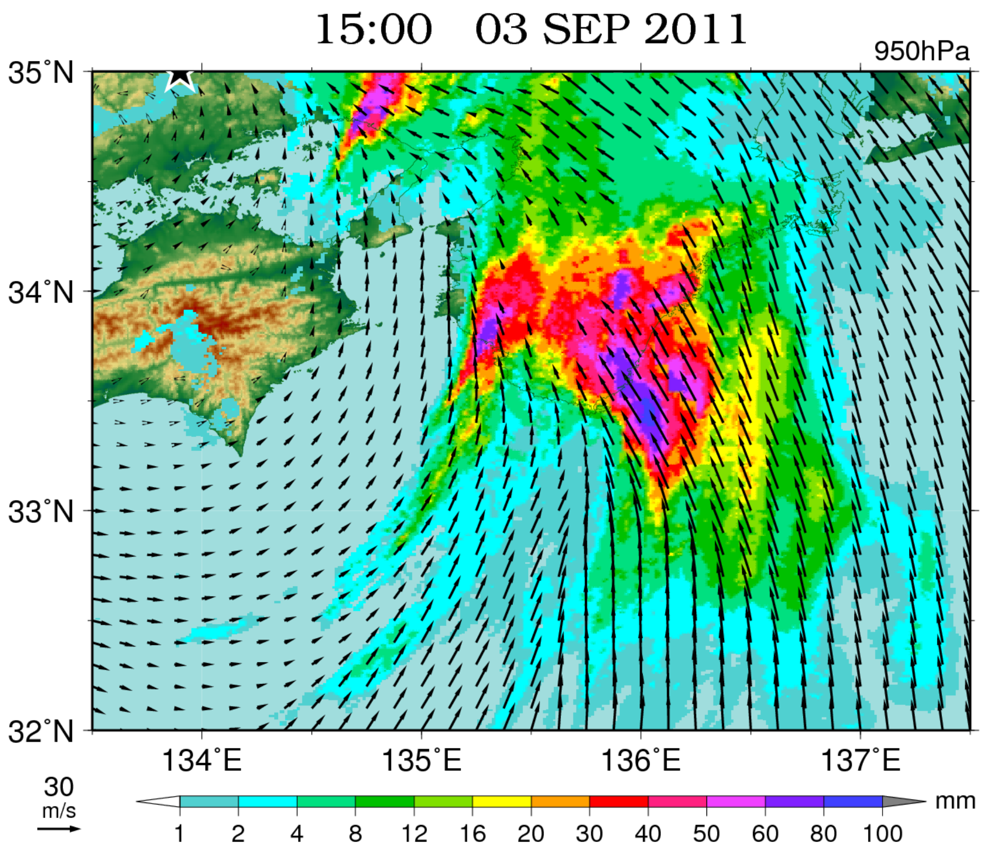

Fig. 2. Figure 0(b)

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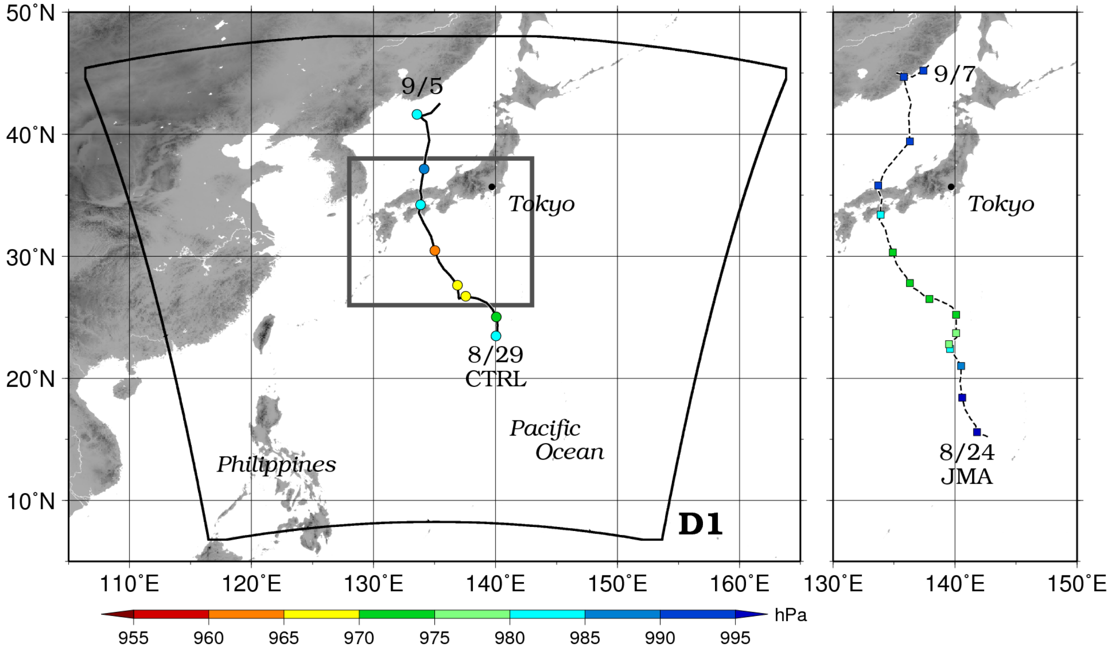

Fig. 3. Figure 1

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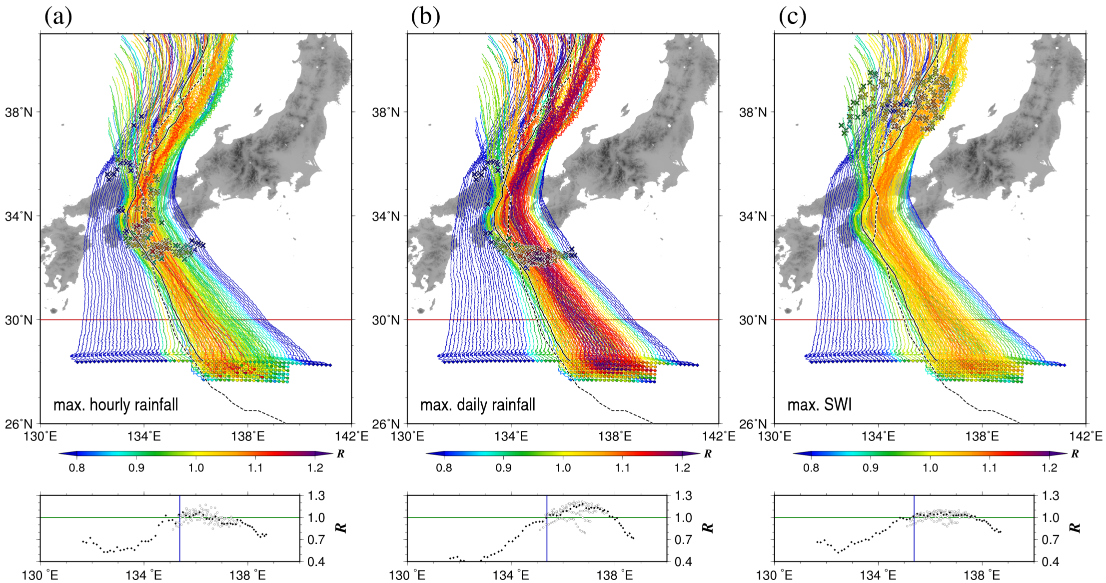

Fig. 4. Figure 7

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