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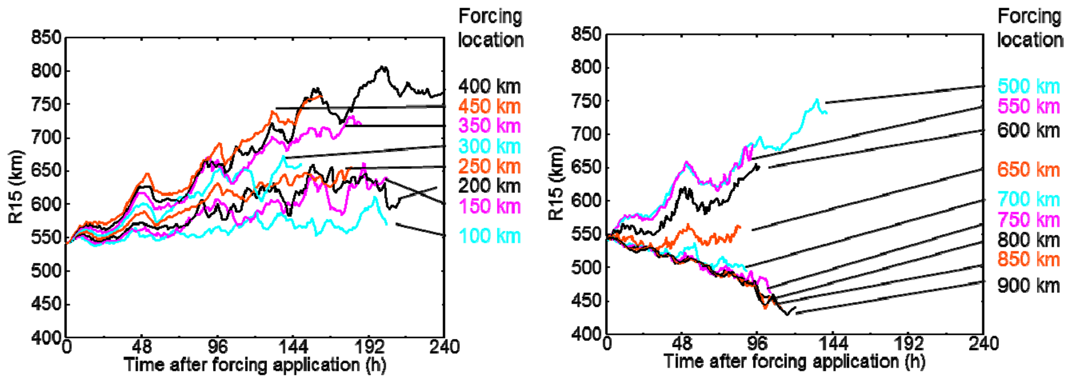

Figure 1. Time evolution of R15 in the experiments. The ordinate and the abscissa represent R15 (km) and time (hour) after forcing application, respectively.

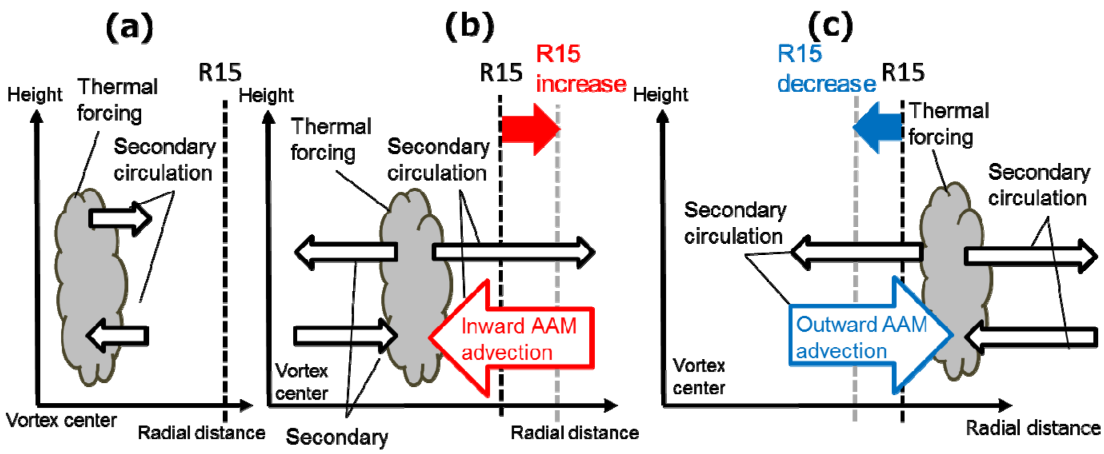

Figure 2. Schematics of explaining the secondary circulation induced by thermal forcing and the change of R15 in the cases that forcing is applied (a) near the center, (b) a relatively outer region inside R15, and (c) outside R15.

- We systematically perform numerical experiments using the primitive equation system on an f-plane. A simplified tropical cyclone-like vortex is initially given and an external forcing mimicking cumulus heating is applied in an annular region at a prescribed distance from the vortex center.
- The evolution of the vortex size defined by the radius of 15 m s^{-1} lowest level wind speed (R15) depends on the forcing location (Fig. 1).
- When forcing is applied near the center of the vortex where inertial stability is strong, R15 hardly changes. This is because the heat-induced secondary circulation is narrow, and the inflow near R15 is weak, so that little amount of AAM is carried inward (Fig. 2a).
- When forcing is located in a relatively outer region inside R15 where inertial stability is weak, R15 increases. The reason is that the secondary circulation is horizontally wide and strong inflow exists near R15, which causes strong inward AAM advection there (Fig. 2b).
- When the forcing location is outside R15, the vortex size decreases because the radial flow near R15 is outward, resulting in negative AAM advection (Fig. 2c).