Tochimoto E, S., Yokota, H. Niino, and W. Yanase, 2022: Ensemble experiments for a maritime meso-β-scale vortex that spawned tornado-like vortices causing shipwrecks. *J. Meteor. Soc. Japan*, **100**, 141-165.
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Plain Language Summary: A meso-β-scale vortex (MBV) that caused 5 shipwrecks as a result of sudden gusty winds in the southwestern part of the Sea of Japan on 1 September 2015. This study with ensemble forecasts with 101 members, including one ensemble mean, revealed that the near-surface cyclonic horizontal shear to the northeast and the south of the MBV was crucial for the development of the MBV. In addition, larger low-level water vapor and its horizontal flux result in stronger convection around the MBV.

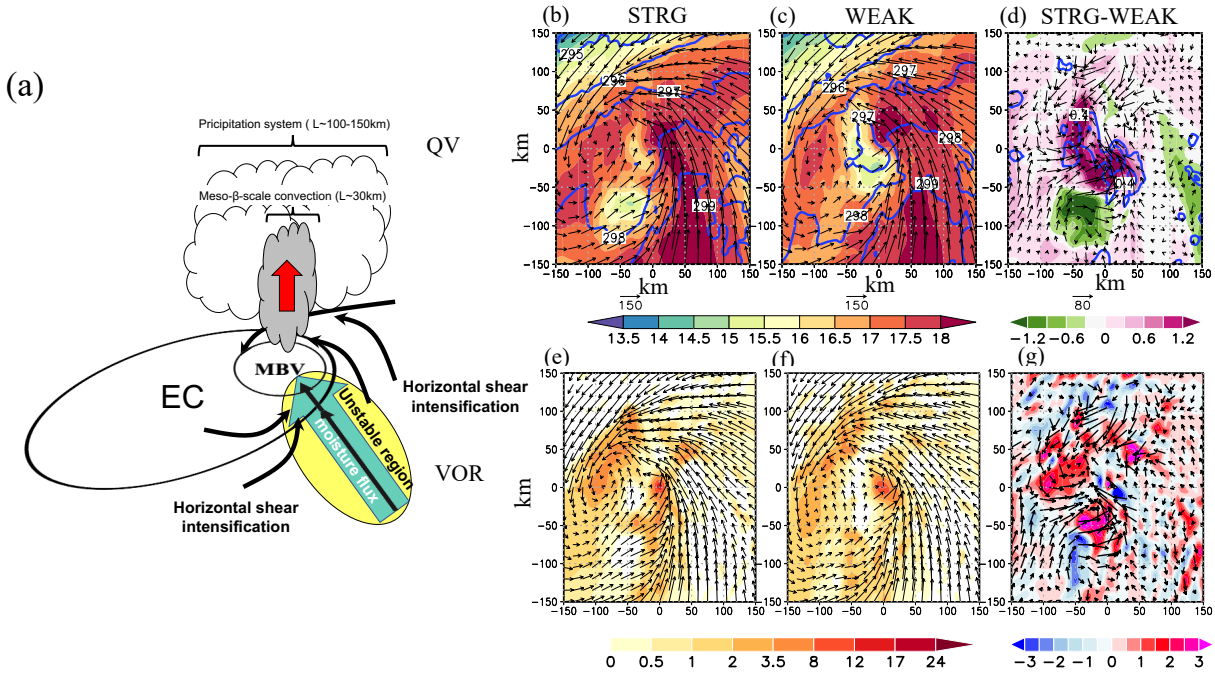

Figure 1. (a) 19 Schematic diagram of the MBV development. Composite fields of water vapor mixing ratio (color shading; g kg^{-1}), temperature (contour lines; K), and water vapor flux (vectors; g kg^{-1} m s^{-1}) at 100 m height at KT − 3 h for (b) STRG and (c) WEAK. (d) Difference in water vapor mixing ratio (color shading; g kg^{-1}) and water vapor flux (vectors; g kg^{-1} m s^{-1}) between STRG and WEAK. Composite fields of vertical vorticity (color shading; 10^{-4} s^{-1}) and horizontal wind vectors (m s^{-1}) at 20 m height at KT − 3h for (e) STRG and (f) WEAK. (g) Difference in vertical vorticity (color shading; 10^{-4} s^{-1}) and horizontal wind (vectors; m s^{-1}).

- A composite analysis and an ensemble-based sensitivity analysis were conducted to understand the atmospheric conditions favorable for the development of a meso-β-scale vortex (MBV).
- The near-surface cyclonic horizontal shear to the northeast and the south of the MBV was crucial for the development of the MBV
- In addition, larger low-level water vapor and its horizontal flux contribute to greater convective available potential energy to the southeast of the MBV, which results in stronger convection around the MBV.