Seiki, T., 2021: Near-global three-dimensional hail signals detected by using GPM-DPR observations. *J. Meteor. Soc. Japan*, **99**, 379-402. https://doi.org/10.2151/jmsj.2021-018

Plain Language Summary: Hail is a large dense ice particle and its particle size often reaches more than 1 cm. Hail is known to be associated with intense storms and causes severe damage to cars, buildings, and croplands. In general, hail has been observed by weather radar systems or reported from visual check on the ground. Such the observations are limited to developed countries and populated regions and, hence, global three-dimensional structure of hail has not been analyzed yet. This study proposed a method to detect hail signals using space-borne radar observations and successfully illustrated a near-global three-dimensional hail map. This new dataset for hail is to be utilized for improving weather forecasting and risk management of hail disasters in the global scale.

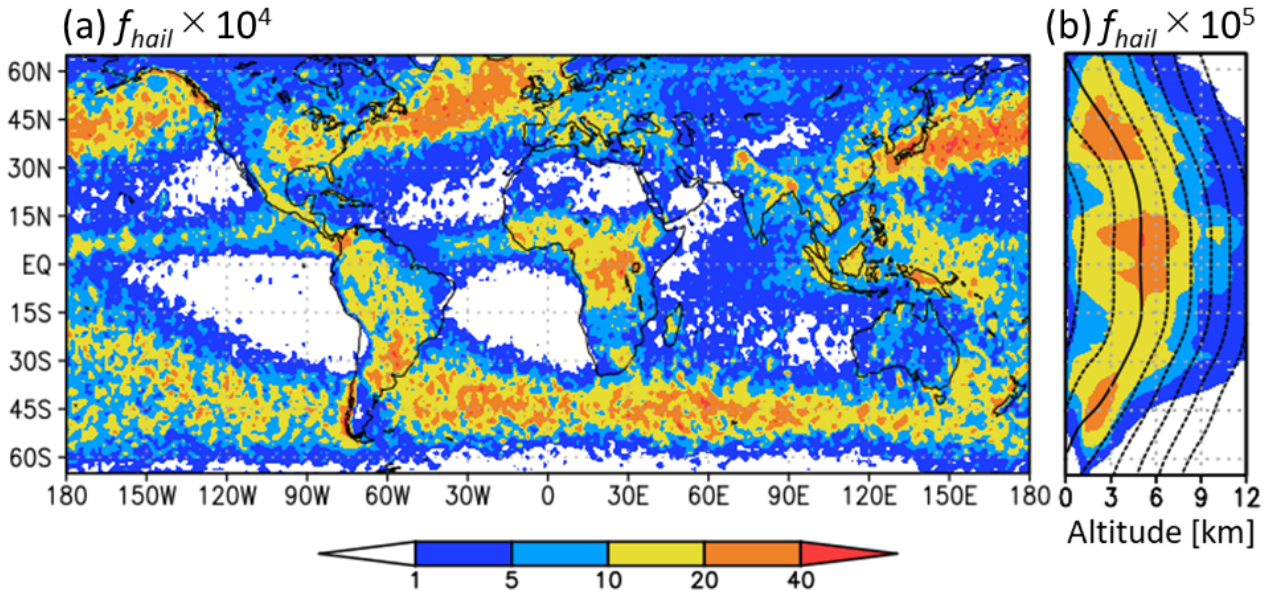

Figure 1. (a) The five-year climatology of the near-global distribution of the DPR profiles that contain at least one hail layer in a column. Hail frequency f_{hail} is normalized by the GPM-DPR observations at each 1.25° × 1.25° grid and is scaled just for visualization. Here, hail signals are processed with the melting snow filter and heavy rain filter. (b) Zonal mean values of the vertical distributions of the hail signals. The freezing level is shown by a black solid line, and the isotherms are shown by black dashed lines with 10 K intervals.

- Near-global three-dimensional distribution of hail is obtained by using a dual-frequency precipitation radar.
- Hail signals lie along collisional growth curves on the scatter diagram of the radar reflectivity factors.
- Hail is widely distributed over the ocean and is frequently observed near the freezing level.