Comments on “The Collection and Analysis of Freshly Fallen Hailstones”

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Browning et al. (1968) have recently described techniques for solving the practical problem of intercepting a hailstorm in order to obtain samples of freshly fallen hailstones. The techniques presented should not be construed to be the state of the art in hailstorm interception by mobile ground units.

Since 1964, the authors have been routinely vectoring mobile units for hailstorm precipitation interception within a 185-km radius of the radar site. An FM transmitter-receiver radio system was used to relay pertinent storm information from the radar to the mobile units. Qualitative methods of hail detection from radar returns were sufficient to insure high probability of hail occurrence. The desirability of having constant two-way radio communication between mobile units and radar site is paramount. This allows rapid updating of information and a change in direction of the mobile units if needed. Typically, the mobile units would be dispersed to the general storm area at a time well in advance of the storm’s maximum intensity. The methods of Browning et al. of waiting until 10-cm wavelength radar reflectivities exceed certain threshold values before moving the mobile units to the general storm area and of relying only on roadside telephones as a communication link certainly are not sufficient for frequent hail interception, as their data of two storms in one month’s time indicates.

In addition, the mobile observer should be aware of certain tell-tale cloud formations along the leading edge of the severe storms which consistently indicate the regions of strong updraft into the storm. Browning et al. present such a cloud formation (referred to as a low-level lenticular) in their Fig. 1 without apparent recognition as to its importance. Auer and Sand (1966) cited the presence of the “scud cloud” as a region of strong updrafts. The authors advise the mobile observer to update his current radar information with visual observations of the scud cloud along the leading edge of the thunderstorm. The observer should use the radar information concerning direction of motion and speed of the storm and position himself in a line with the precipitation core and the scud cloud. This scud cloud, if present, is visible even when back-lighted by lightning at night. The passage of the scud cloud overhead usually precedes by 10–15 min the onset of the most intense precipitation.

During the summer of 1965, the procedure outlined above was able to provide Gitlin et al. (1966) with their desired number of freshly fallen hailstones on three consecutive hail days over a one-week period in northeastern Colorado. Similar techniques were applied during Project Hailswatch in 1965 and 1966 in South Dakota.

Since 1966, the use of aircraft in both mapping the updraft field at cloud base and spotting hailshafts within the precipitation curtain has proven considerably more reliable in updating radar information in efforts to vector ground units. The authors were able to apply these expanded techniques in 1966 to provide additional fresh hail samples to Gitlin et al. (1968) in northeastern Colorado.

In addition, these expanded techniques were applied to obtain precipitation samples within a specified 20–30 min interval following the release of tracer material in
thunderstorm updrafts during 1967 and 1968 in
Oklahoma and Alberta, respectively.

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beneath the base of cumulus and cumulonimbus clouds.

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