

Local dbz core height thresholds for 1 inch vs. $\frac{3}{4}$ inch hail

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Old thresholds for $\frac{3}{4}$ inch hail

- 50 dbz above -20 degrees C
- 60 dbz above the freezing level
- 65 dbz above the freezing level
- Warnings were often issued when core heights exceeded these thresholds by a small amount
- Needed more than one or two pixels above these thresholds for a warning

The threshold has changed to 1 inch for large hail

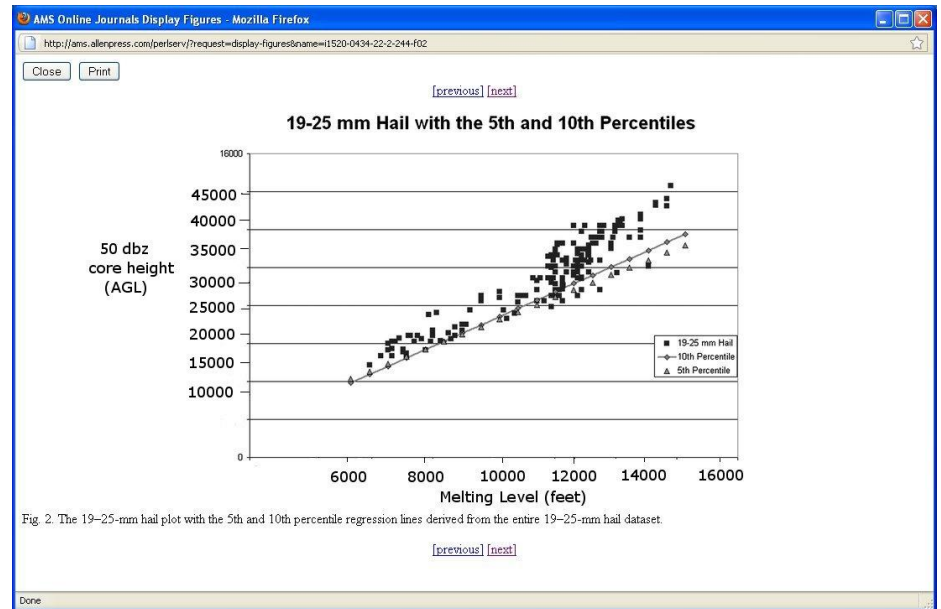
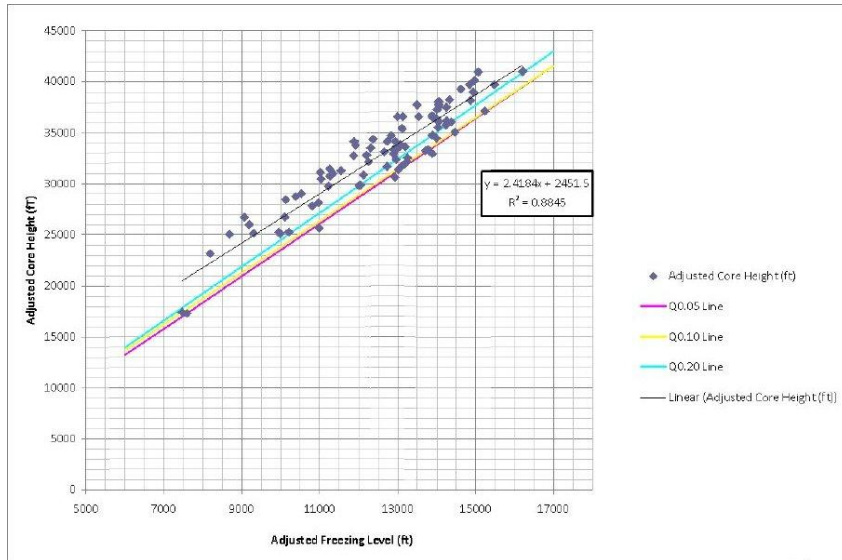


Fig. 2. The 19–25-mm hail plot with the 5th and 10th percentile regression lines derived from the entire 19–25-mm hail dataset.

A local study

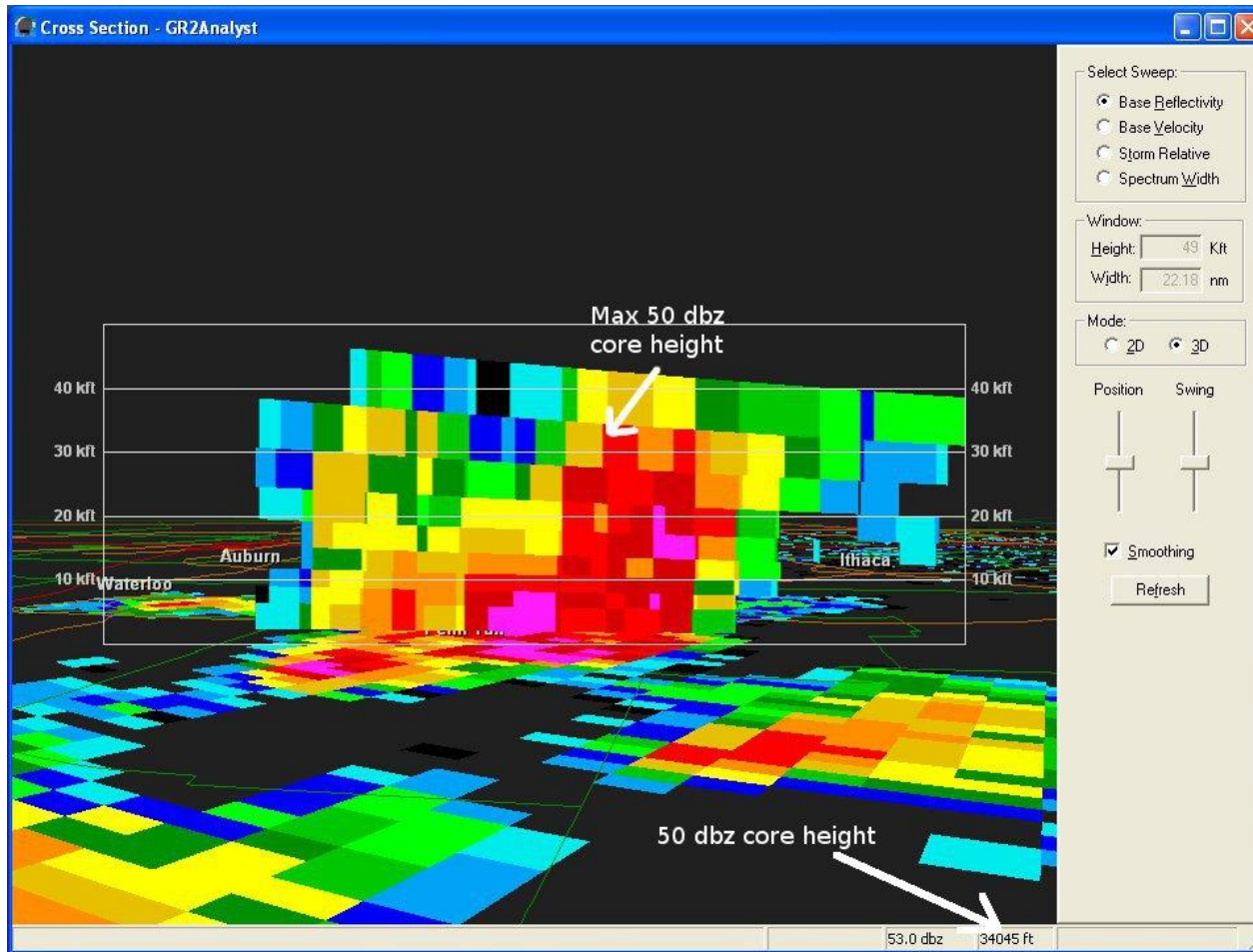
- Examine data from 13 days with numerous hail reports (2007 – 2009)
- For each discreet storm, identify the largest hail report
- Assign 50 and 60 dbz core heights to the report (details on next slide)...

Local study continued:

Using cross-sections from GR2 analyst (data unsmoothed)...

- Find the highest 50 dbz core associated with the largest hail report.
- Find the highest 60 dbz core associated with the largest hail report.
- The max 50 and 60 dbz core height did not have to occur at the same volume scan.
- The max core heights must have occurred during the period from 20 minutes before the report to 5 minutes after the report.
- Relate to temperature data from RUC analyses

Example

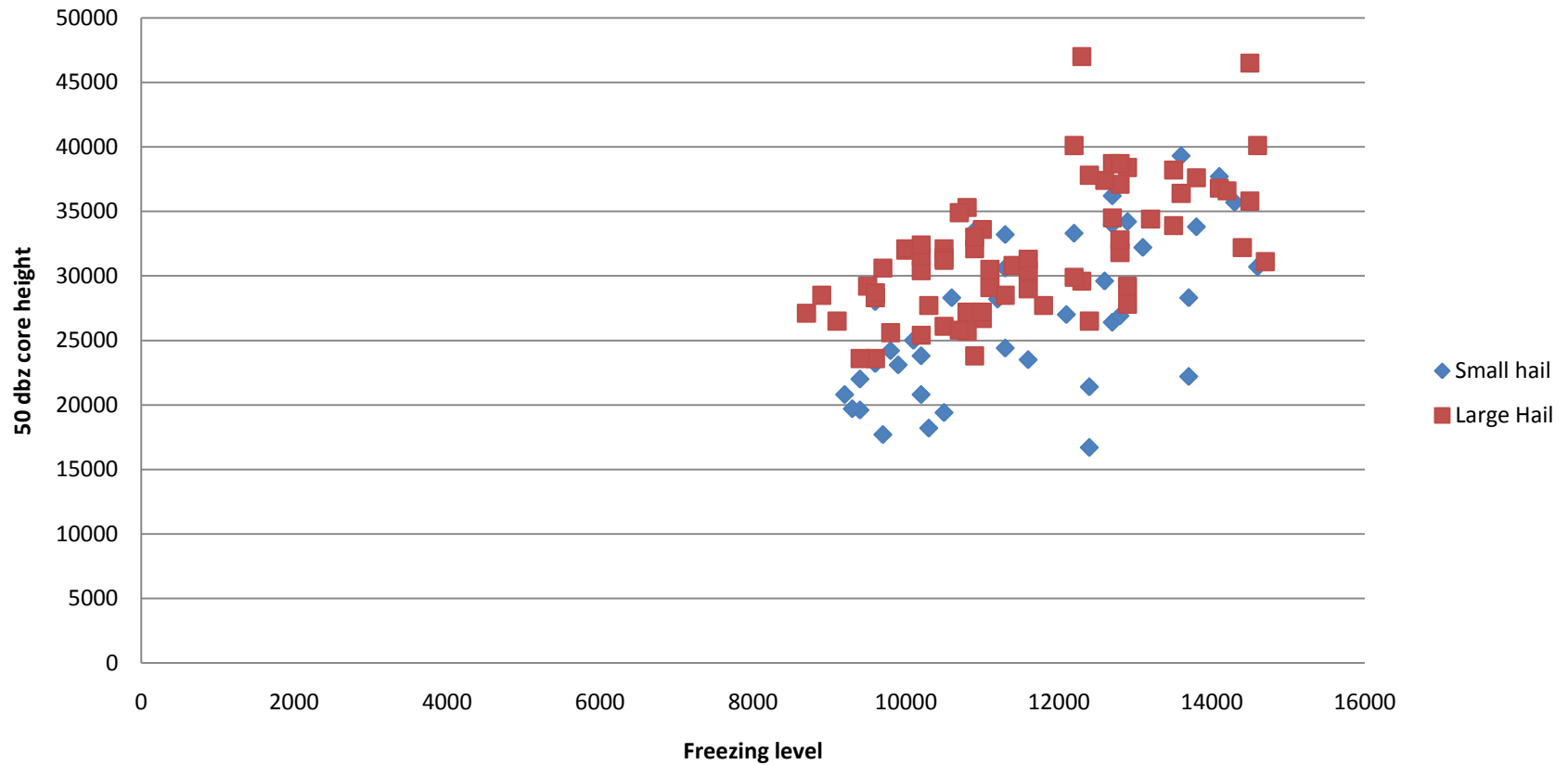


Results

- 110 storms examined
- 42 storms produced hail from 0.75 to 0.88 inches in diameter
- 68 storms produced hail greater than or equal to 1 inch in diameter
- Largest hail was 2.5 inches in diameter near Delhi on June 9, 2009.

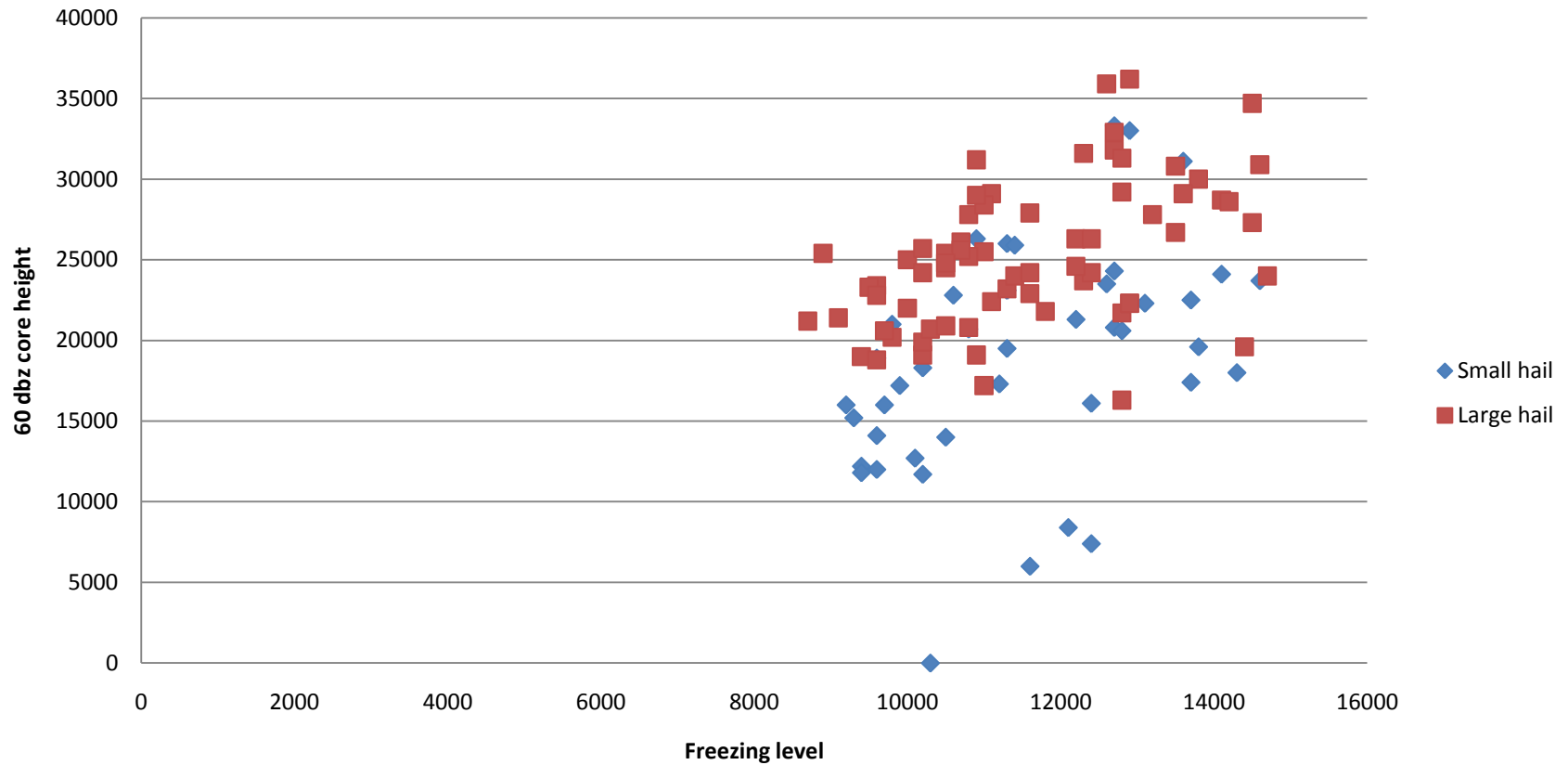
50 dbz core height vs. the freezing level

Freezing level vs. 50 dbz core height



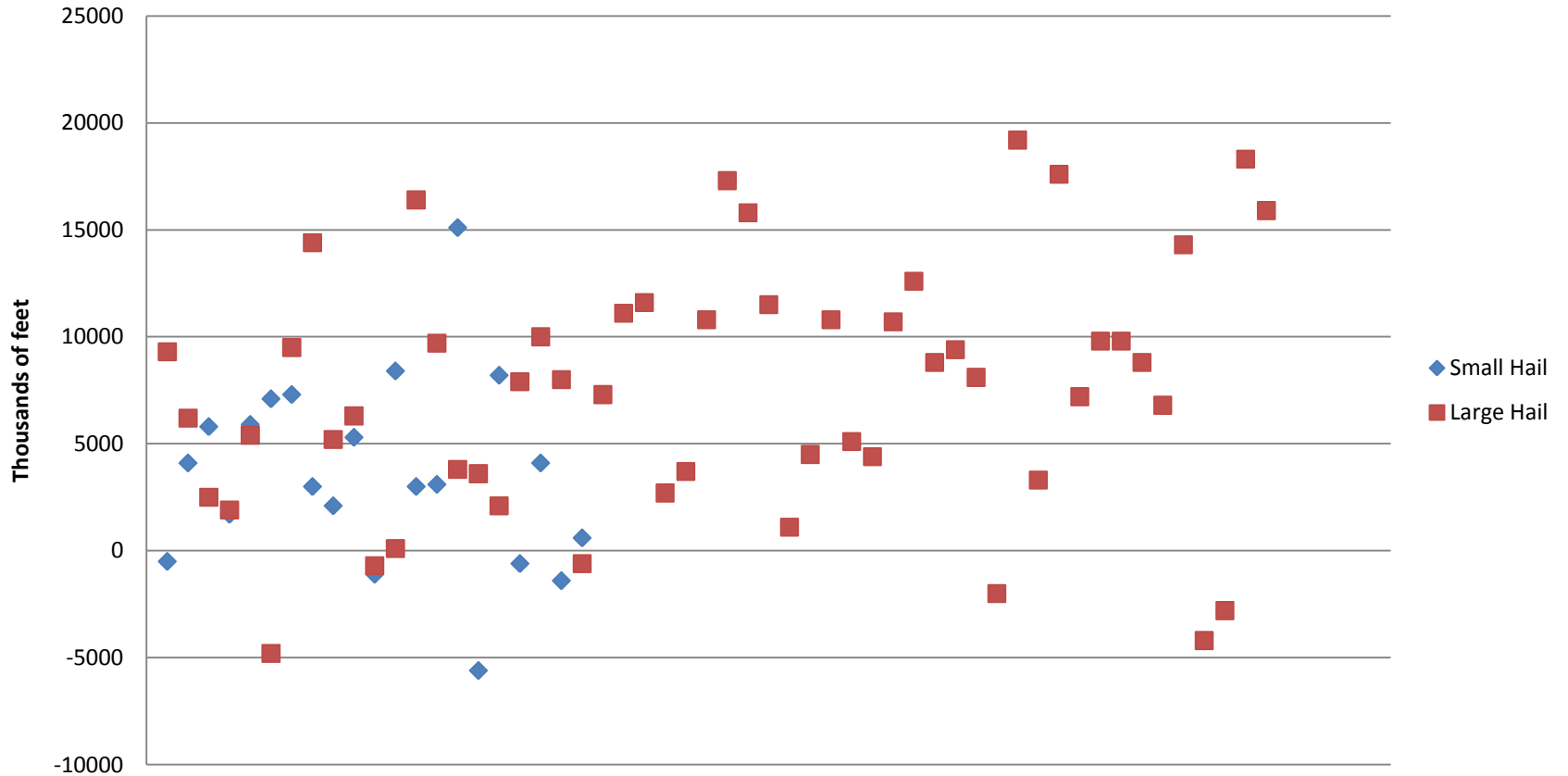
60 dbz core height vs. the freezing level

Freezing level vs. 60 dbz core height



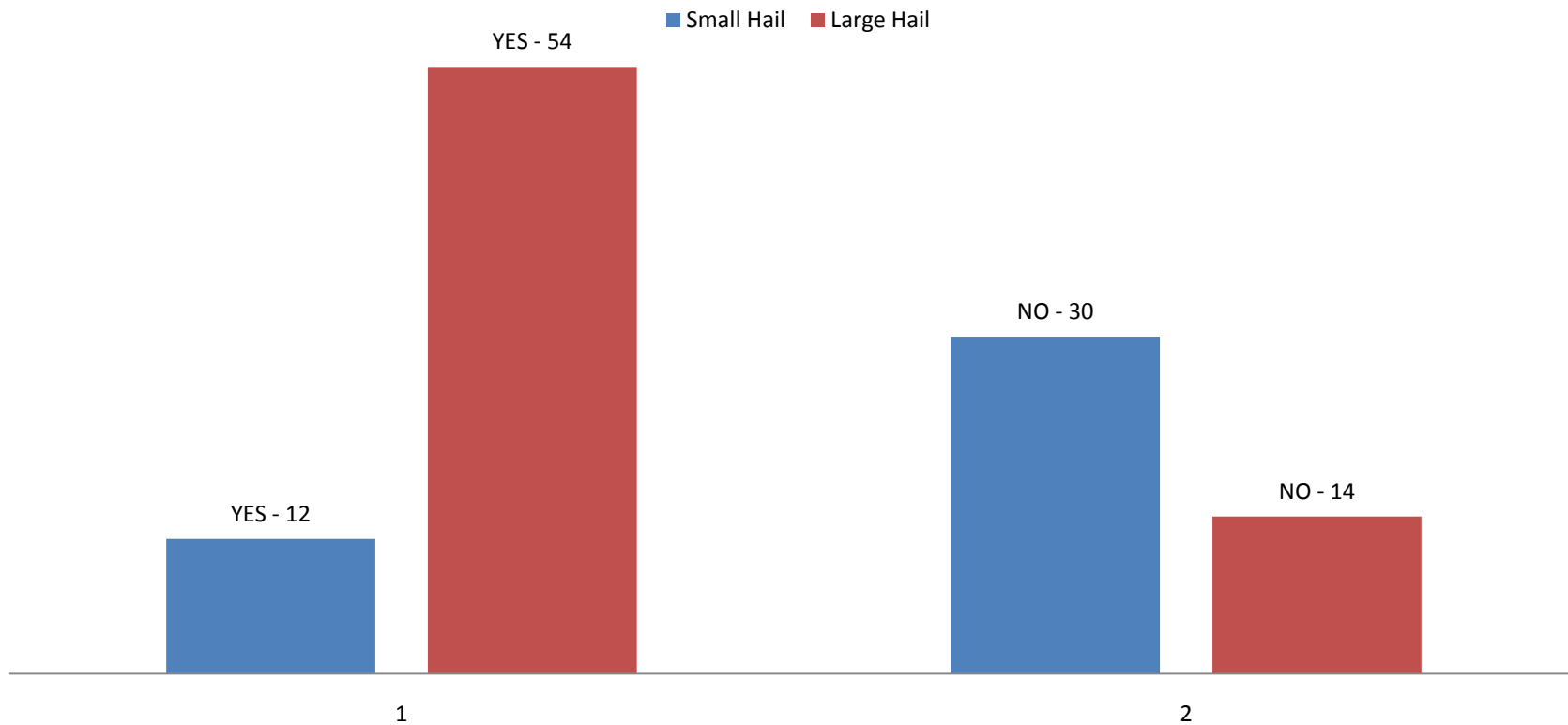
65 dbz core – feet above the freezing level

65 dbz core - height above the freezing level



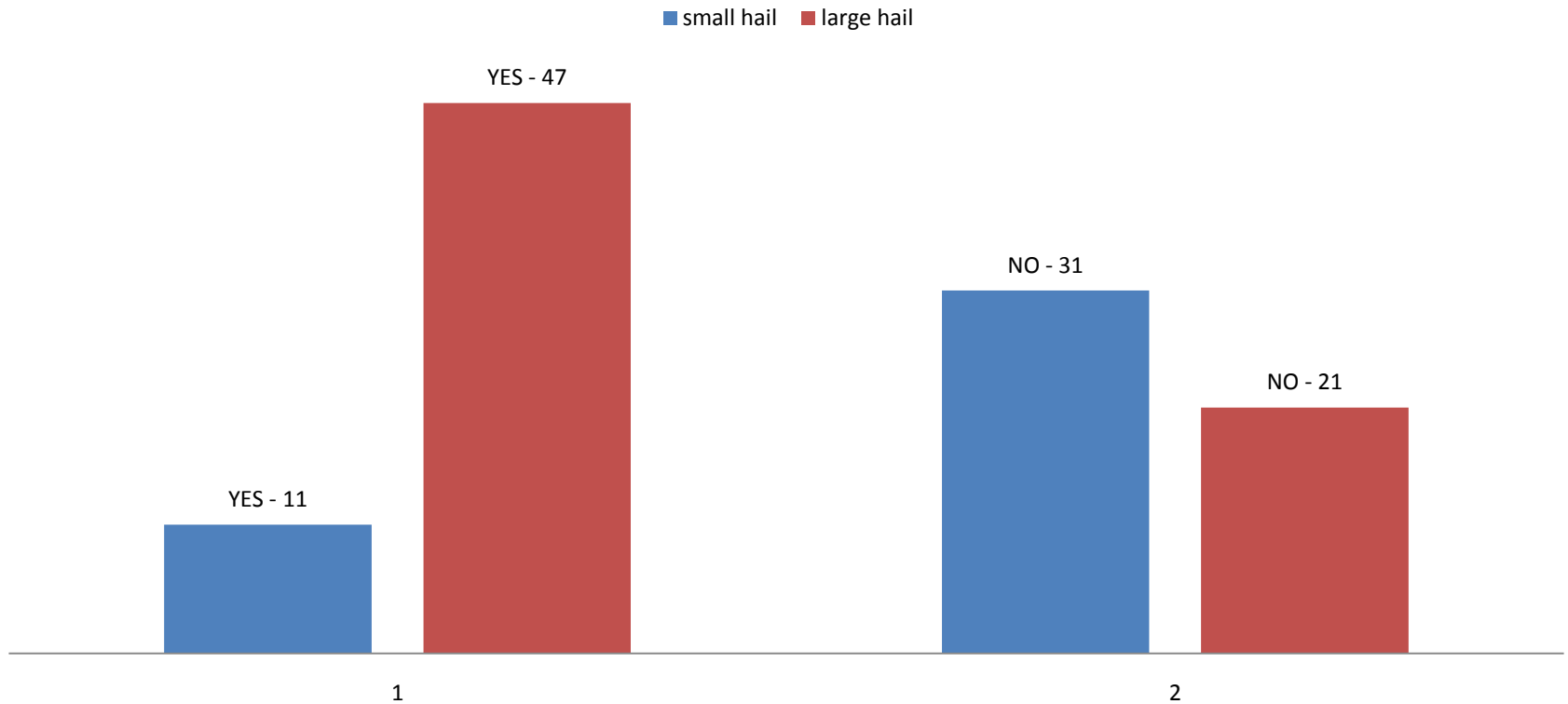
60 dbz above -20 and 50 dbz at least 5000 feet above -20

Number of events - 60 dbz above -20 and 50 dbz at least 5000 feet above -20



50 dbz at least 5000 ft above -20, 60 dbz above -20, 65 dbz above the freezing level

Number of events - 50 dbz at least 5000 ft above -20, 60 dbz above -20, 65 dbz above the freezing level



Conclusions

- Local study indicates that we may have some skill at discriminating between $\frac{3}{4}$ inch hail and 1 inch or greater diameter hail.
- For 1 inch or greater hail, look for 50 dbz at least 5000 feet above the -20 degree C level.
- For 1 inch or greater hail, look for 60 dbz above the -20 degree C level.
- For 1 inch or greater hail, look for 65 dbz above the freezing level.
- Highest confidence when the first two of these thresholds are satisfied.