

# **Methodology and 2017 Results of using Radar Observations to Evaluate Hail Mitigation by the Alberta Hail Suppression Project**

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The Alberta Hail Suppression Project is an operational glaciogenic cloud seeding program designed to reduce hailstone-induced property damage in the metropolitan areas in the lee of the Rocky Mountains of southern Alberta, Canada. The operations area includes the cities of Calgary and Red Deer. This evaluation uses data from a project C-band radar located at the Olds-Didsbury Airport, approximately half-way between Calgary and Red Deer, and an Environment Canada radar at Strathmore, about 40 km east of Calgary. Effectiveness in hail reduction is evaluated using indicators of Maximum Vertically Integrated Liquid (MaxVIL) and storm area greater than or equal to 60 dBZ (Ar60) to relate observations before and during the project's cloud seeding operations. The MaxVIL indicator is more sensitive to the size of large hail, while the Ar60 indicator is more sensitive to the area of hail. Several different seeding effectiveness metrics are evaluated using 21 hail cases from 2017. The Increasing Hail Ratio metric is 0.12 (1.0 is highest possible value) for both MaxVIL and Ar60 indicators, which indicates a reduction in damaging hail. The number of cases could be increased using the project radar data recorded for other seasons between 2014 to 2021 to determine if the statistical significance changes appreciably. Automated data-processing scripts have been developed; therefore, it would be relatively straightforward to analyze additional storms once preliminary radar data review determines the suitable analysis times and locations for each season.