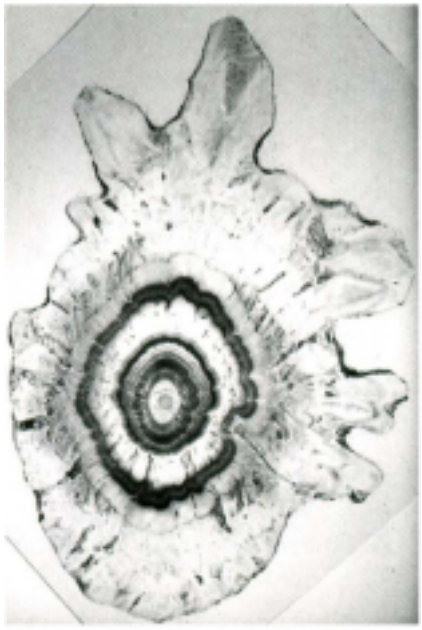
Review of "Automating the Analysis of Hailstone Layers", by Joshua Soderholm and Matthew Kumjian, egusphere-2022-675.

This article present a methodology for scanning a sectioned hailstone to their layered structure. The layered structures inside hailstones provide a direct indication of their shape and properties at various stages during their growth. As temperatures approach 0^0C, the density of the accreted ice (rime) increases (Macklin, 1962; Pflaum and Pruppacher, 1979). When in wet growth, the component frozen the structure becomes dark, and at the colder temperatures, the structure is lighter. These structures are identified using the scanned images. A total of 40 images were scanned in this study.

The "LAT" observations were compared with model runs which were used to simulate growth layers in a sample of hailstones for comparison with the observed data. As the authors note, the sample of simulated hailstones was selected to approximately match the number and sizes of observed hailstones from the Melbourne case.

The article is well written, and the figures are exceptionally presented. The figures look beautiful and portray the discussion of them. The hailstone scanning procedure is clearly illustrated in Figure 2.

I suggest having a schematic (it would be your Figure 1) from one of your sectioned hailstones (such as below) from your Figure 4, identifying the different regions that can be identified. The discussion you have now is good, but a figure would help.



Section 2.2. Very good discussion. About how long does it take to scan one image?

Regarding the model runs, are the cloud base temperatures, and the subcloud temperature and relative humidity distributions, similar between the model and the 19 January 2020 Melbourne

hailstorm? How are the hailstone densities calculated? Also, an interesting question. Using the model, can you get the density of the water accreted on the hailstones as a function of their diameter? Could you possibly show a figure that would show the radial distribution of the density and particle temperatures for some of your stones?

As noted, there is too much wet growth for the modeled hailstones relative to the observations. The most plausible explanation is that the thermal transfer coefficient (ventilation coefficient) is too low. Perhaps a sensitivity study in the model, increasing the size-dependent ventilation coefficient. Is it possible that if there is wet growth, a "layer" of the dry growth underneath it may become wet, expanding the wet growth thickness?

One other thought. Might it be possible to use the scanned imagery to determine to a first approximation the accreted density? (Search for density measurements using a camera-I found some in Google Chrome). That would be extremely valuable as it would facilitate the estimation of the temperature at which the accretion occurred through use of the Pflaum and Pruppacher (1979) relationship. These temperatures could be compared to those derived from an isotopic analysis of some of the hailstones.

Andy Heymsfield
NCAR
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