

ZDR vs diameter for single sizes of drops

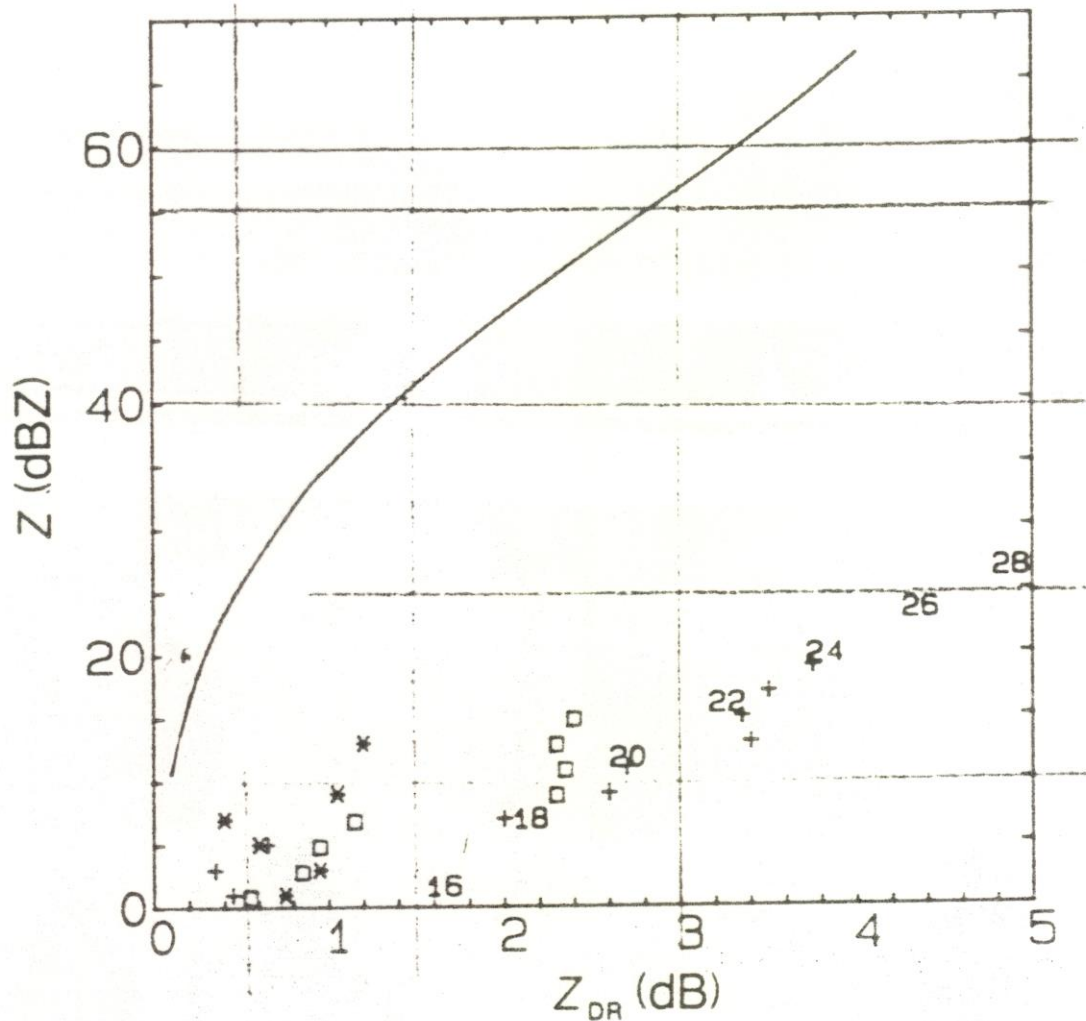
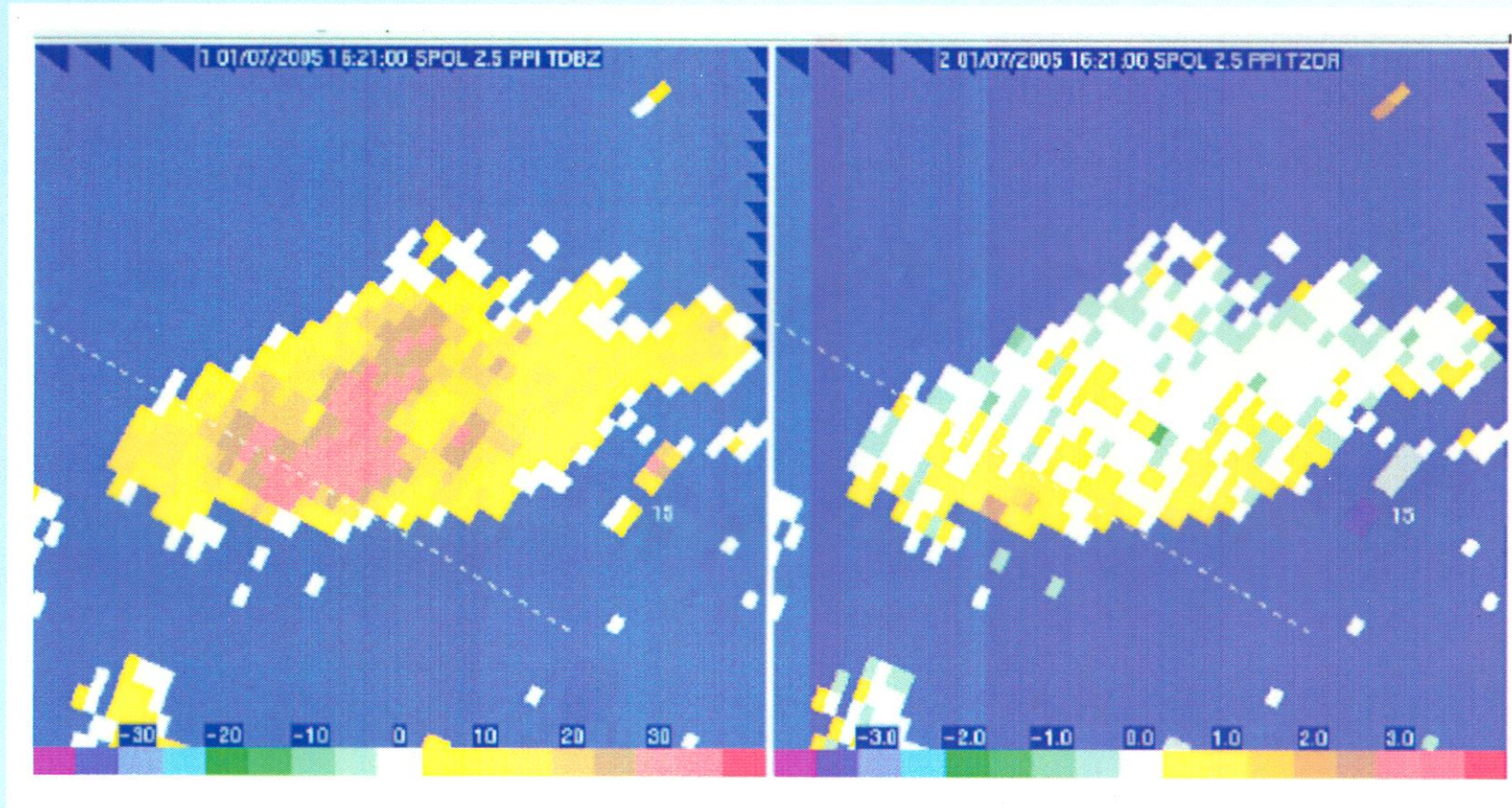


Figure from Illingworth's paper in Nature, showing some high values of ZDR along with low values of dBZ from smallish, cumulus in Alabama. The curve, which will reappear later, represents "average rainfall."

Characterizing the cloud echoes

- Individual values of Z_e and Z_{DR} are not useful: size sorting



Point: in RICO cumulus the maximum in ZDR often is nowhere near the maximum in dBZ, so comparing maxima is meaningless.

$$Z_H = \sum V_H^6 \quad (\text{m}^{-3})$$

$$\text{dBZ}_H = 10 \log Z_H$$

$$T \text{dBZ}_H = 10 \log \left[\left(\sum Z_H \right) \div \# \right]$$

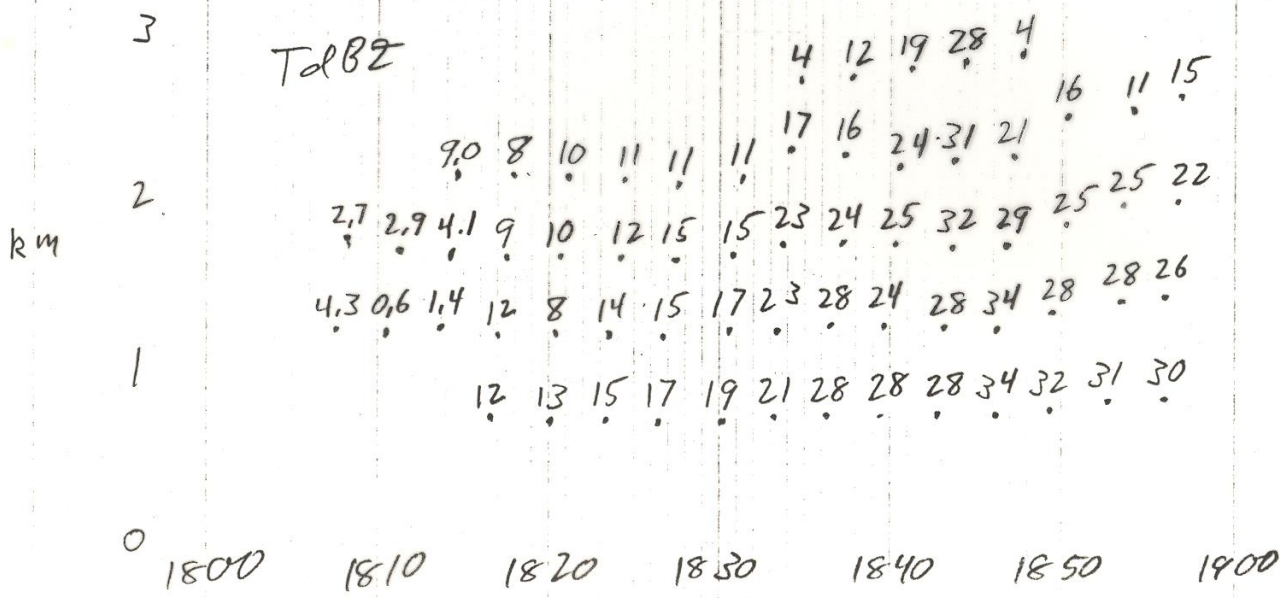
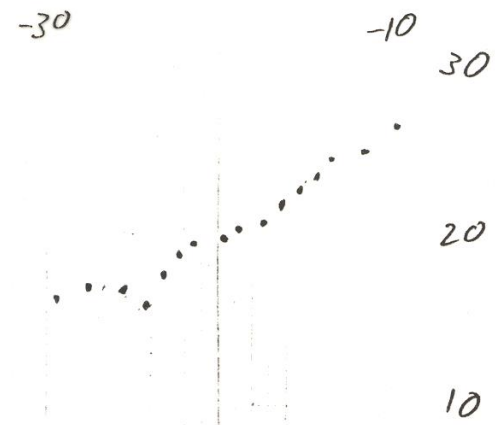
$$T ZDR = 10 \log \left(\sum Z_H / \sum Z_V \right)$$

of pulse volumes
summed over whole sweep
or whole cloud

Need to calculate "total" values of dBZ and ZDR, from whole PPI sweeps or whole volume scans to get meaningful numbers in terms of how the clouds produce precipitation.

050105 new version, as of 1/16/06

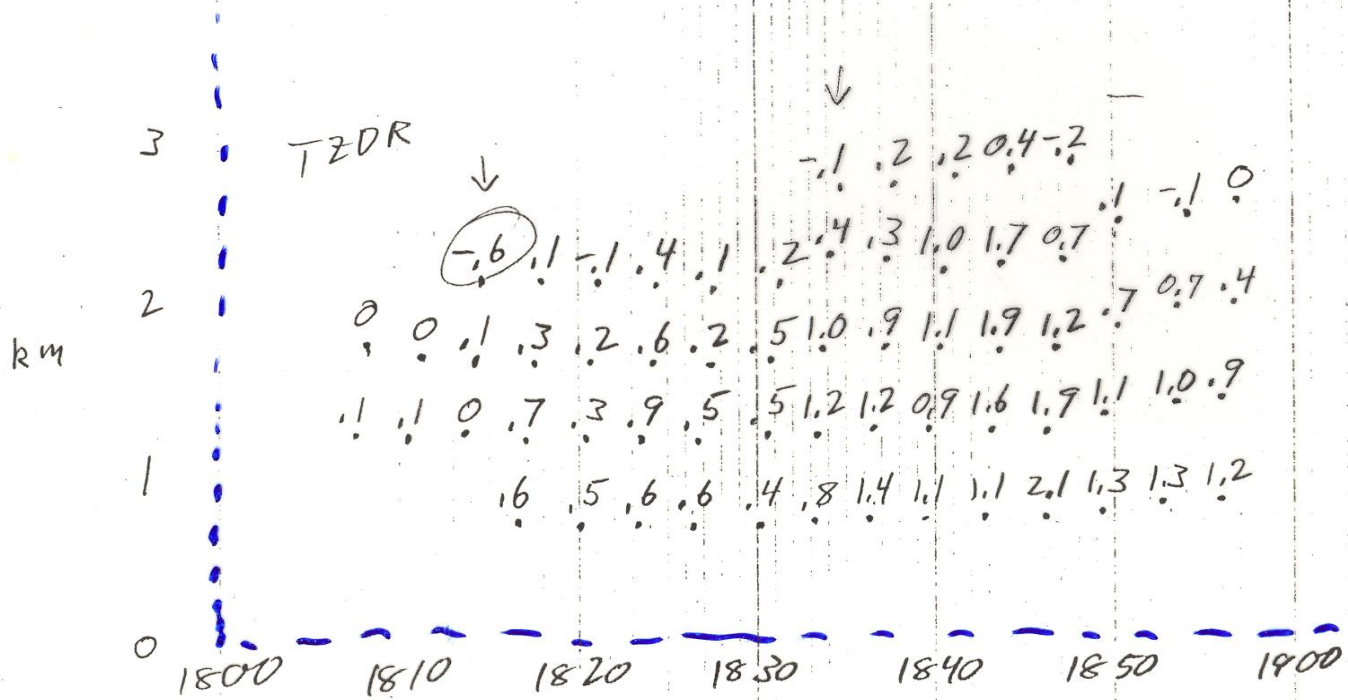
1807 at (-10, +26)
+0 1856 at (-30, +16)



Time-height diagram of sweep-total dBZ and...

050105 new version, as of 1/16/06

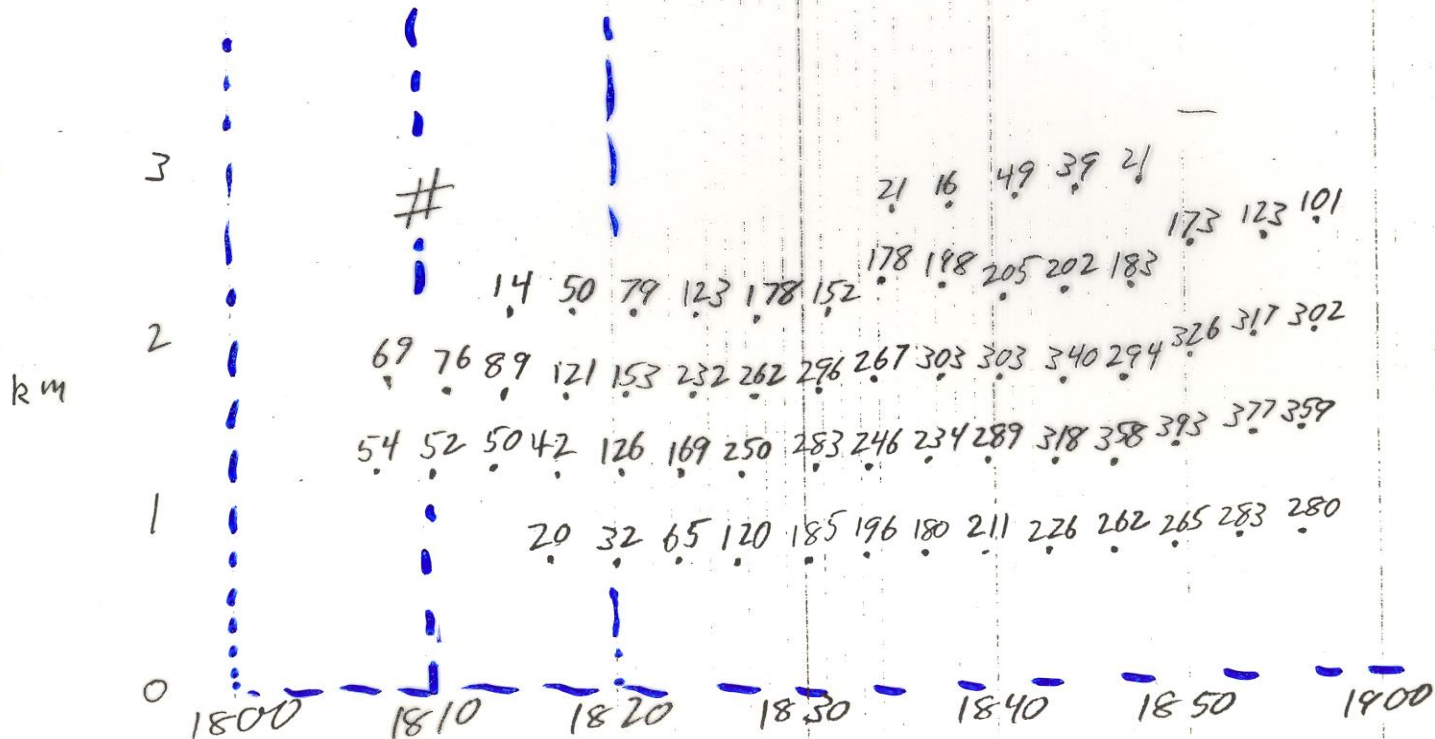
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ZDR for a single RICO case, an example of the kind of data I'm accumulating for many cases over the RICO period.

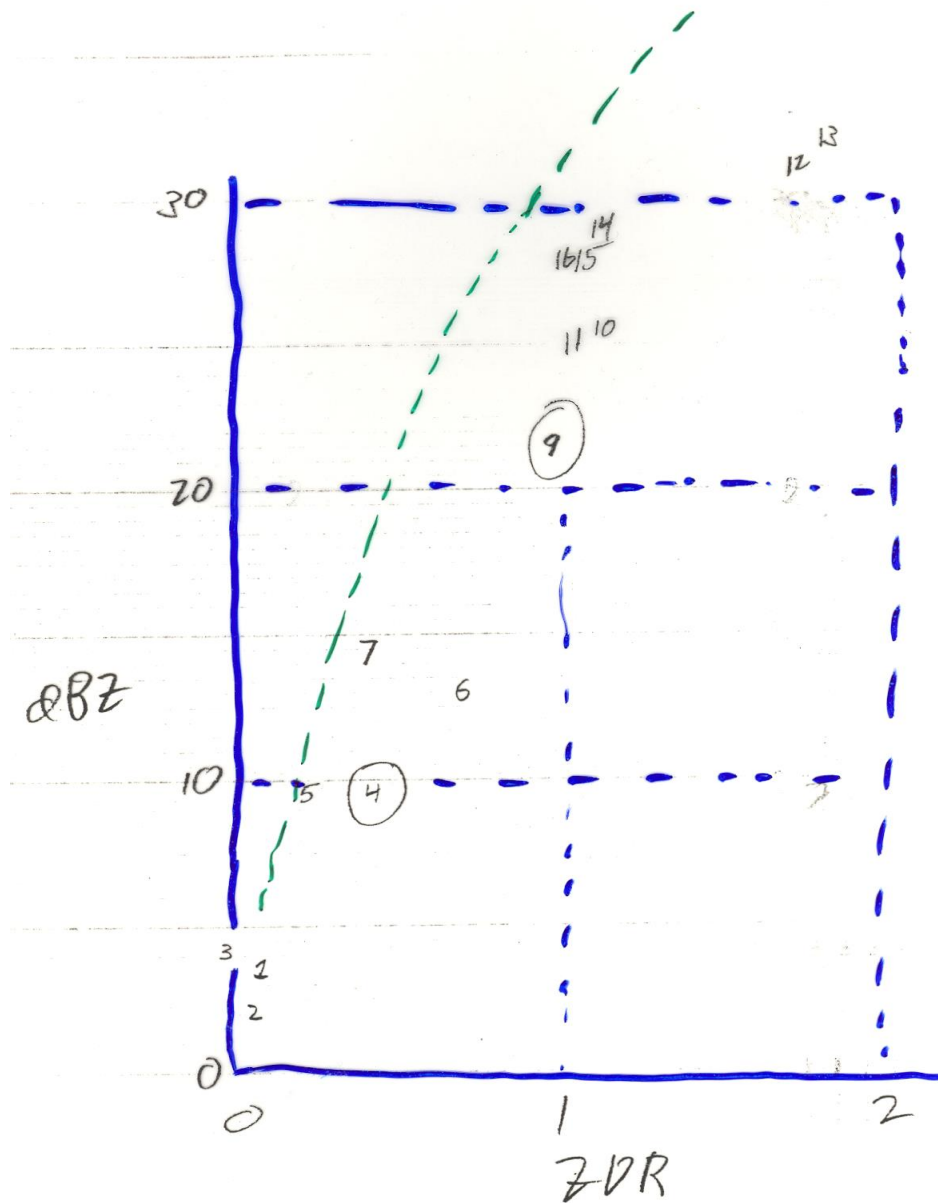
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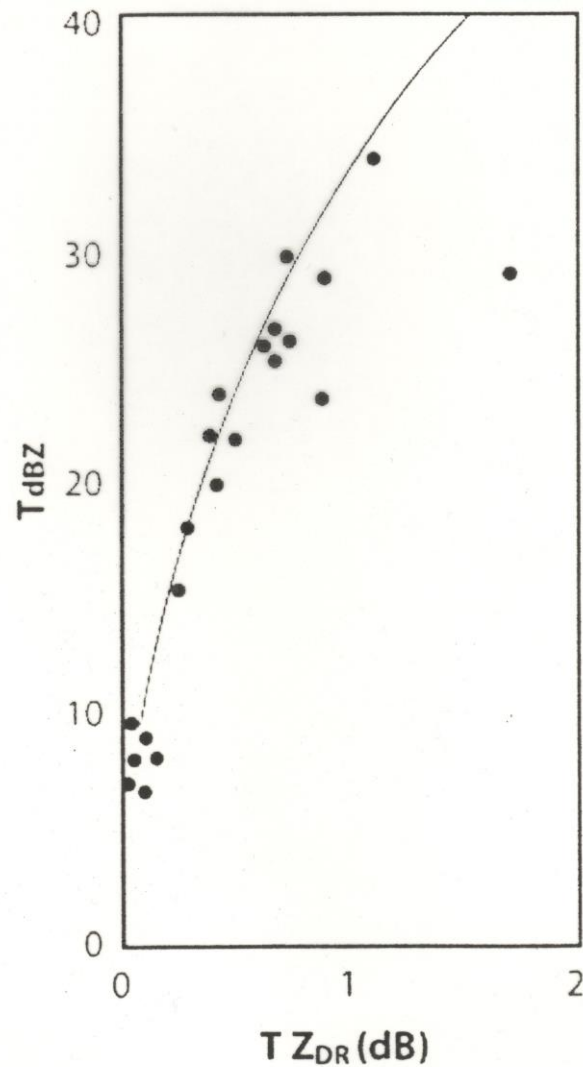


The numbers of individual measurements in each sweep total.

050105



The total-cloud-volume numbers from the case in #s 5-7 on a presentation like overhead #2. The numbers are consecutive in time.



An objective selection of cloud-volume values from the first 10 analysed RICO cases, mostly fitting quite well on the average rainfall curve. No evidence so far (and still no evidence after nearly 50 cases analysed) of the early, large drops.