Dead-time correction of the Joss- Waldfogel impact Disdrometer (JWD) data

JWD records number of drops in 20 size bins from 0.35 to 5.35 mm

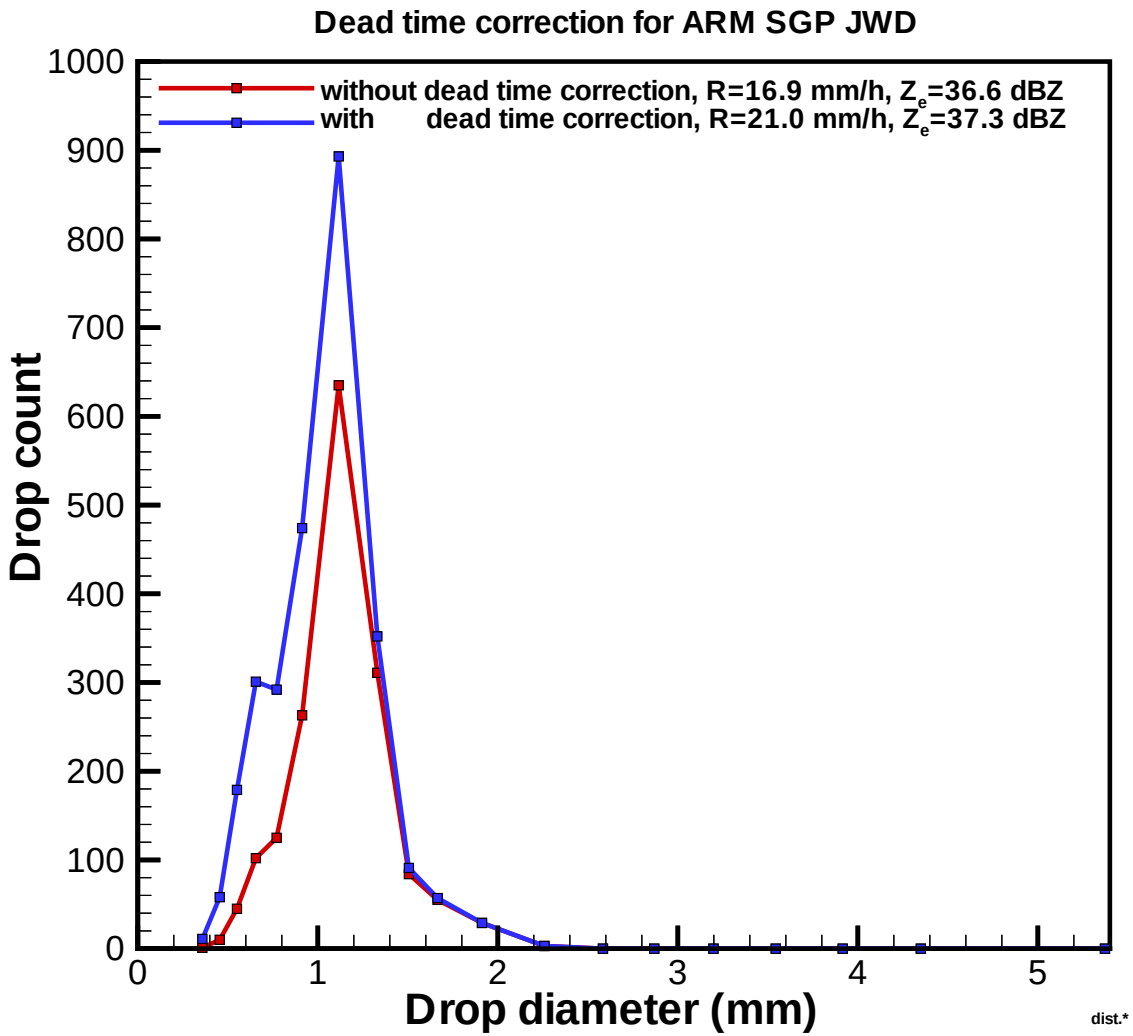
Dead-time correction for Joss-Waldvogel impact disdrometers (RD-69, RD-80)

Sheppard and Joe, JTECH, 1994, 874-887.

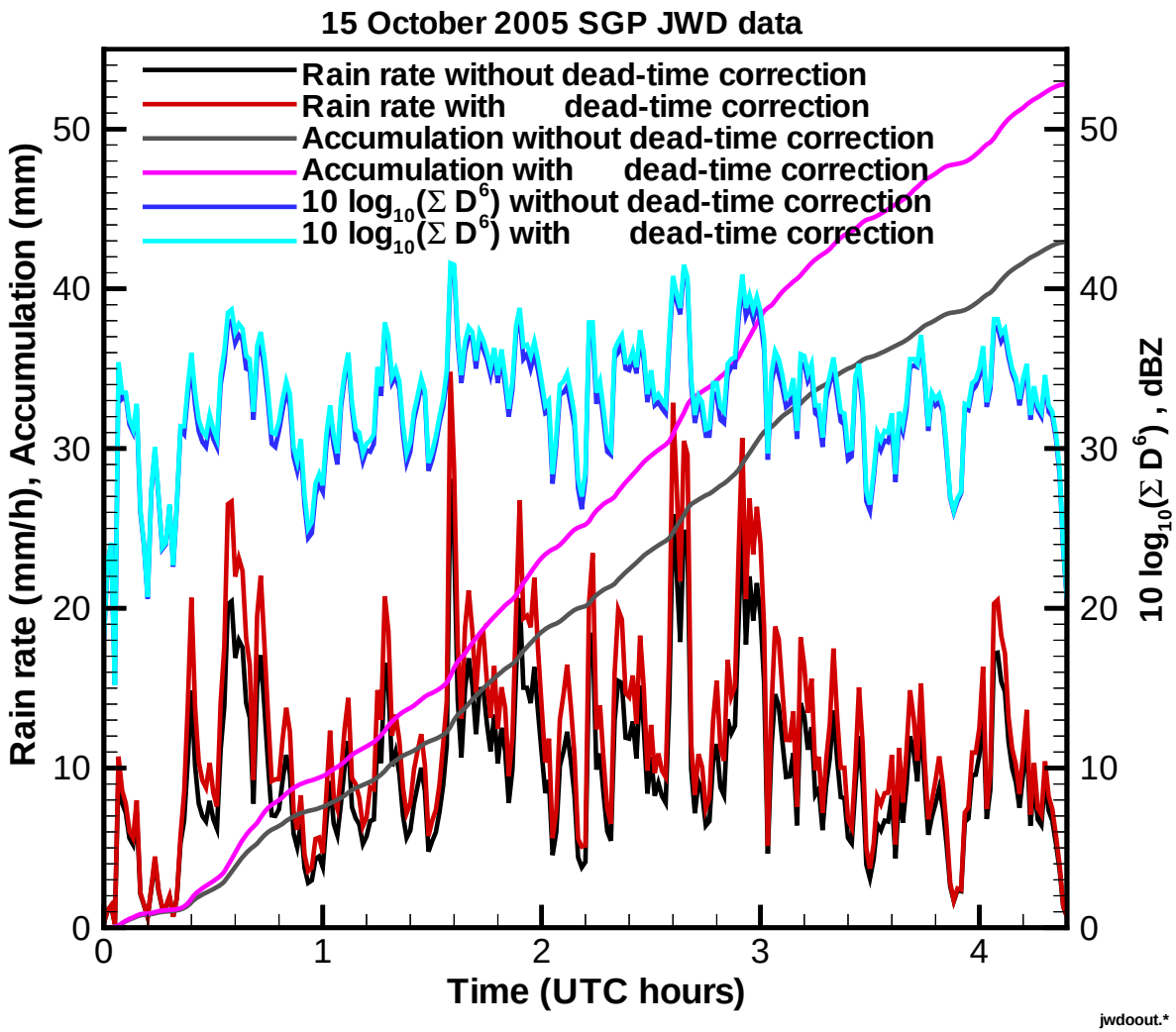
Problem: an impact of a drop on the JWD styrofoam cone causes a dead-time during which the instrument does not detect impacts of smaller drops

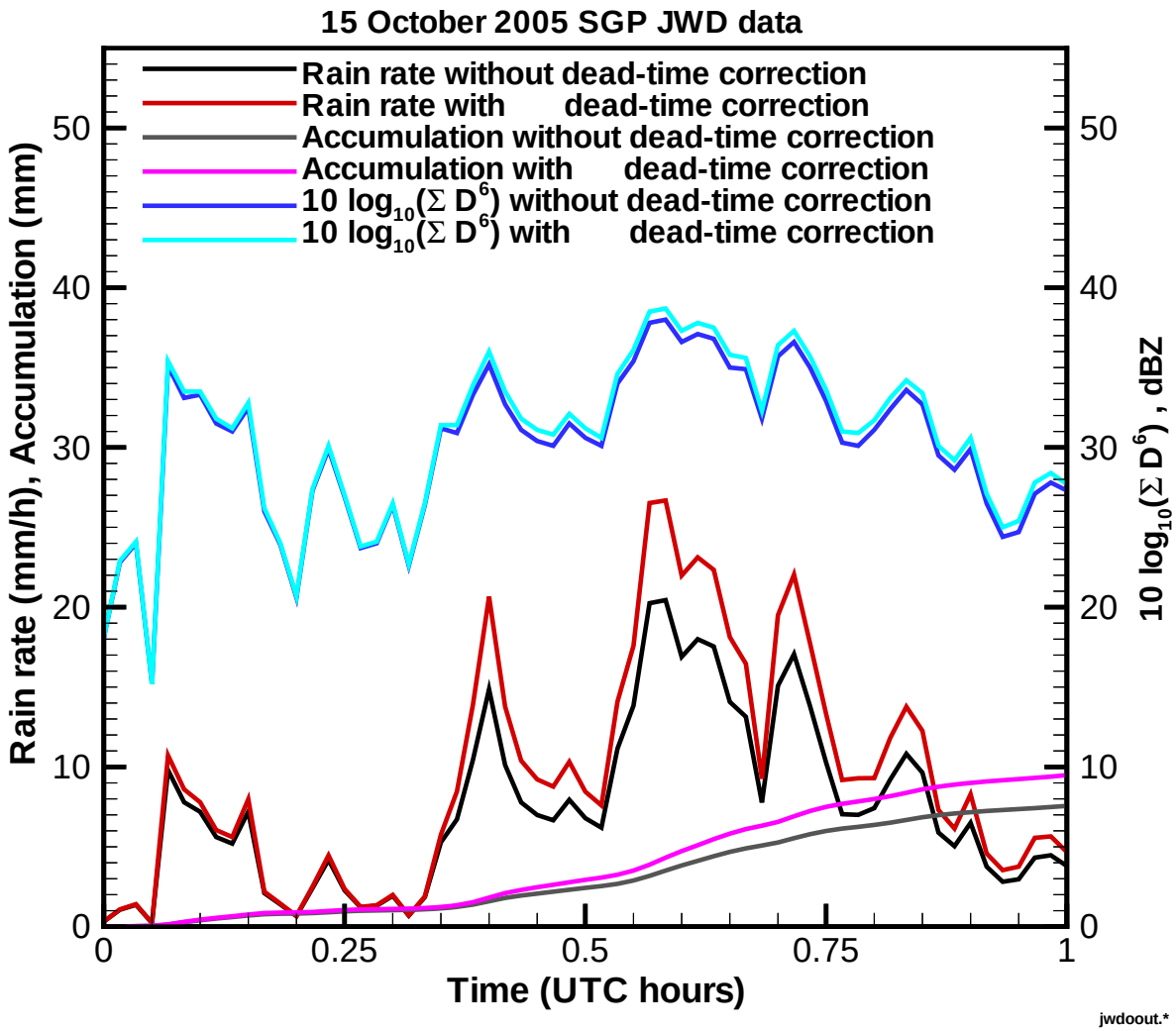
The dead-time correction adjusts the number of counts at each bin based on the drop count in larger bins to compensate for the dead-time undercount

An example from the ARM SGP JWD data (15 October 2005)

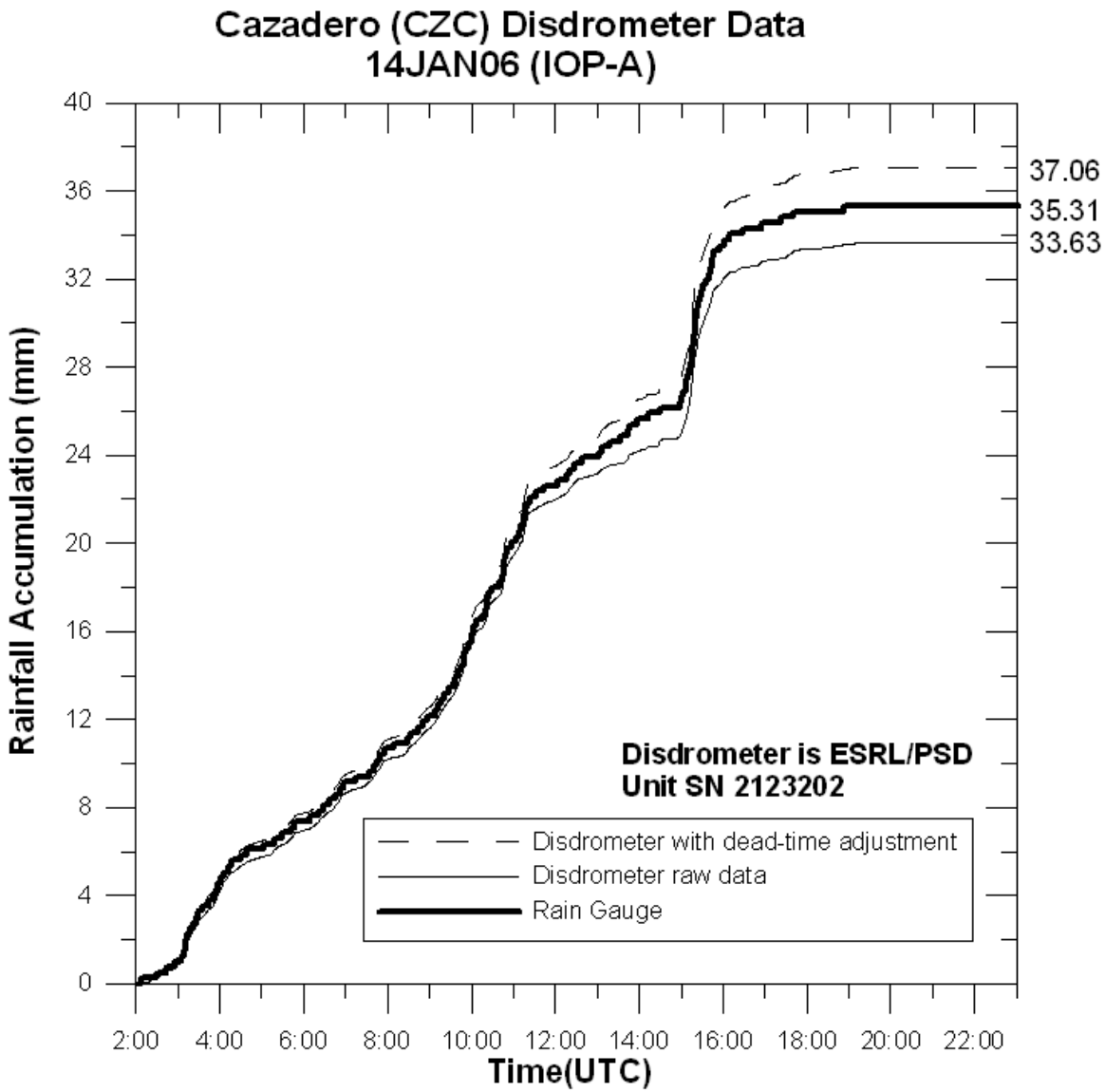


The dead-time correction causes modest changes in calculated reflectivity but changes in rainfall rates can be more significant

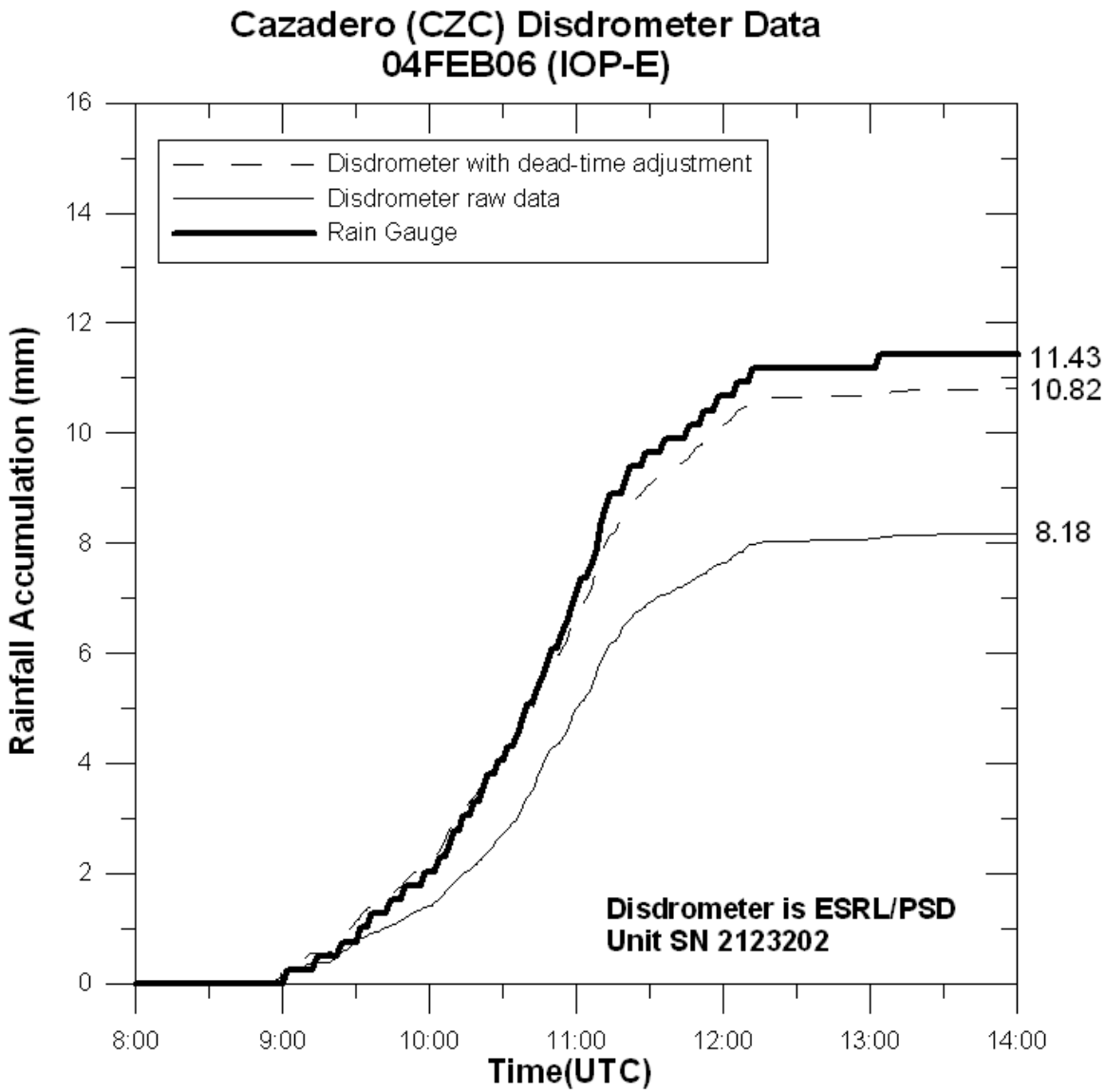
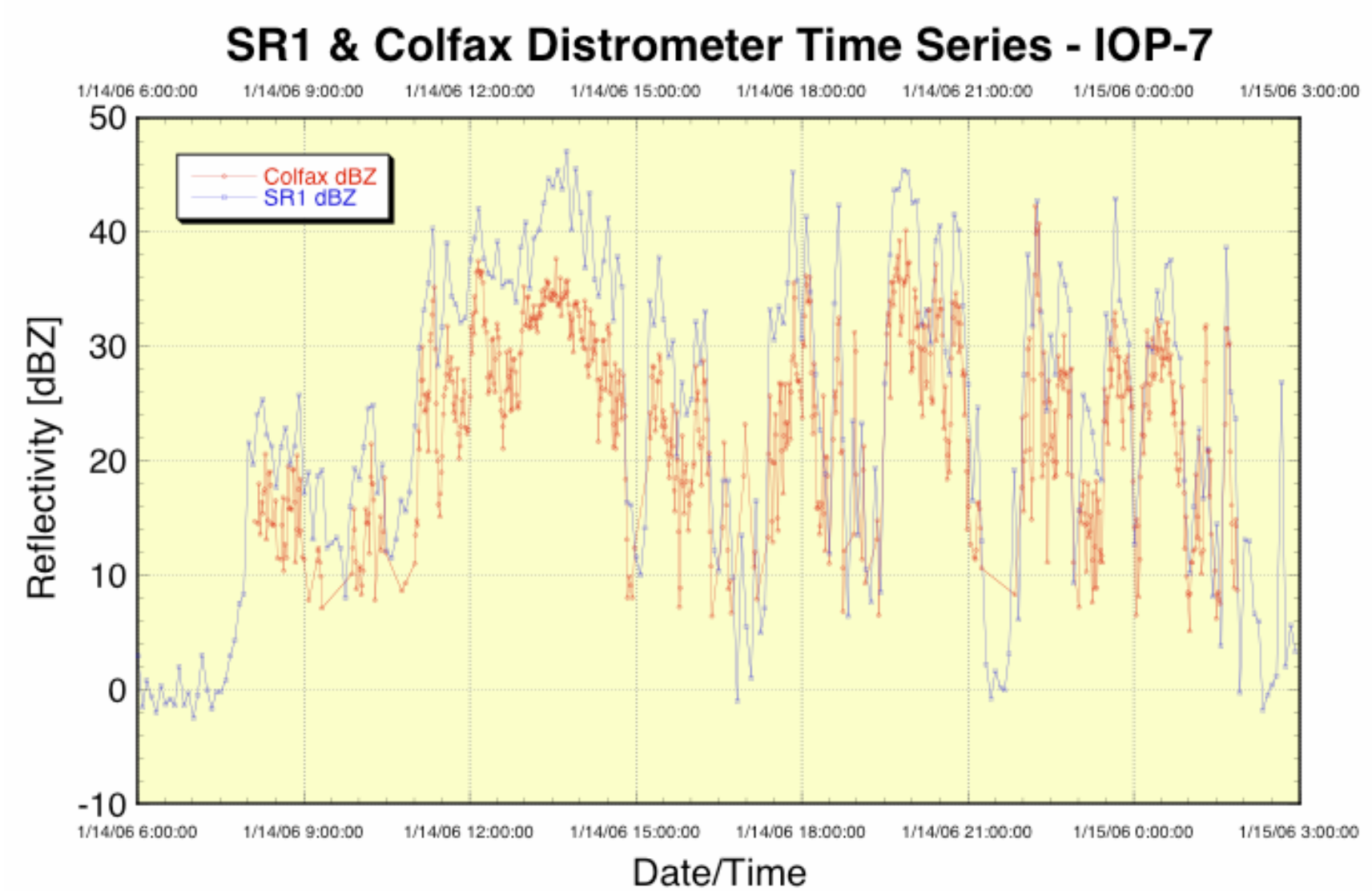



15 October 2005 SGP JWD data
Rain rate without dead-time correction
Rain rate with dead-time correction
Accumulation without dead-time correction
Accumulation with dead-time correction
10 log10(Σ D6) without dead-time correction
10 log10(Σ D6) with dead-time correction
Rain rate (mm/h), Accumulation (mm)
10 log10(Σ D6) , dBZ
Time (UTC hours)
0
10
20
30
40
50
0
0.25
0.5
0.75
1
jwdoout.*

Sometimes the dead-time correction causes little difference (e.g., before 10:00 UTC)



Sometimes the dead-time correction causes noticeable difference



Disdrometers as a calibration tool for scanning radars