Time Evolution of a storm from X-POL in São Paulo: a ZH - ZDR and Titan metrics comparison

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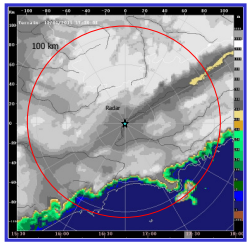
OBJECTIVES

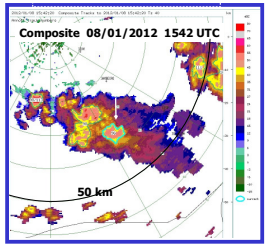
- Study the time evolution of hydrometeor contents along the life cycle of storms, in a tropical environment.
- Explore data from CHUVA Project X- band polarimetric radar acquired during the Paraíba Valley campaign to compare the time evolution of the ZH-ZDR scatter plots for a particular storm cell with corresponding TITAN metrics.

DATA

Volume scans were performed every 6 minutes including an additional 89° elevation azimuth scan for ZDR bias correction. PPI at 1° and 6.2° elevations were used. A cell from 8/01/12 as identified by TITAN and tracked from 14:48 UT to 15:48 UT was selected for the study. ZH, ZDR pairs from the PPIs constituted the data base.



X-band Radar from CHUVA Project at 23.21°S, 45.95° W, in S. J. Campos (SP-Brazil).



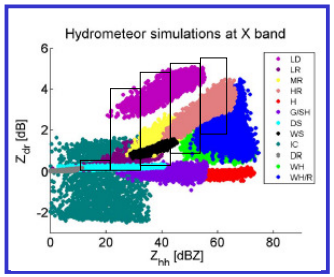
The white arrow indicates the cell selected for study as identified by TITAN.

PROCESSING

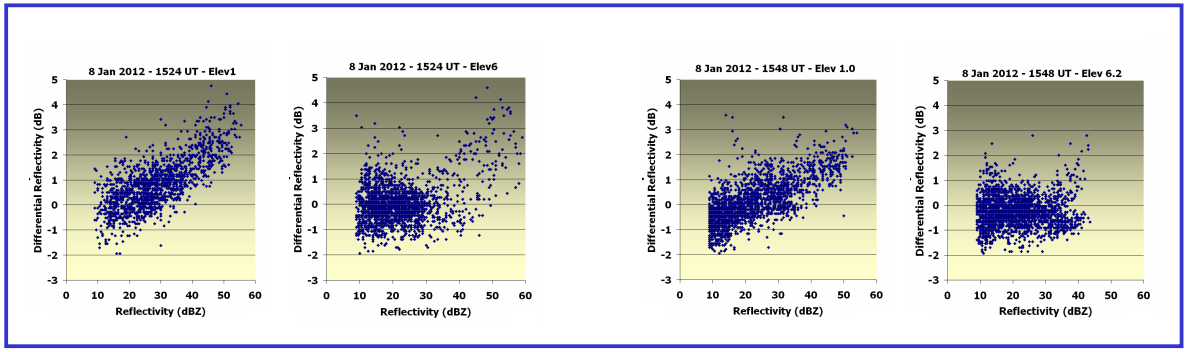
Identification of hydrometeors as rain was performed using the classifying boxes defined in the table.

Box	ZH (dBZ)	ZDR (dB)
1	9<ZH<20	0<ZDR<0.5
2	20<ZH<30	0<ZDR<4
3	30<ZH<40	0.3<ZDR<5
4	43<ZH<53	0.8<ZDR<5.2
5	53<ZH<63	1.5<ZDH<5.5

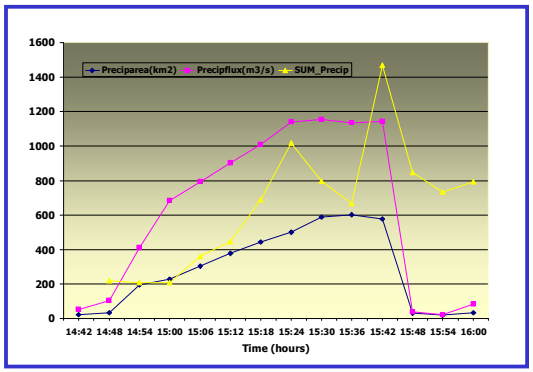
Hydrometeor simulations at X-band supported the definition of the classifying boxes. Simulations are presented in the figure with the boxes overlaid on them.



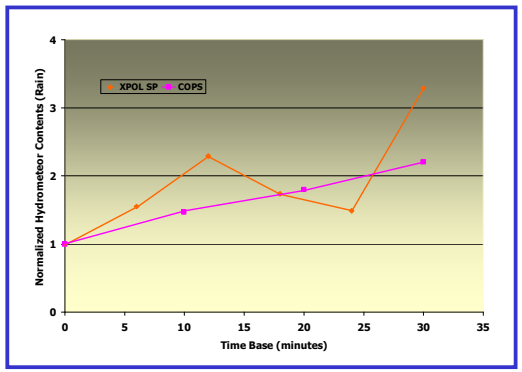
RESULTS



ZH-ZDR scatter plots for 1° and 6.2° PPIs.



TITAN was run providing the metrics along with the total hydrometeors counts for rain.



Normalized evolution of hydrometeor counts at 1km height from both this study and of a storm during COPS experiment.

CONCLUSIONS

- Hydrometeor classification schemes from previous works abroad applied to the CHUVA X-Pol data have shown satisfactory performance.
- Results indicate that the polarimetric variables ZH and ZDR are useful for hydrometeor classification in tropical areas.
- Time evolution of hydrometeor counts for rain from ZH and ZDR were comparable to TITAN metrics.