VPR Correction of Bright Band Effects in Radar QPEs Using Dual Polarimetric Radar Observations

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Outline

- Overview of NMQ/Q2 VPR Correction System
- Why DP Radar Observations Needed for VPR Correction?
- New Methodology
- Case Study
- Summary

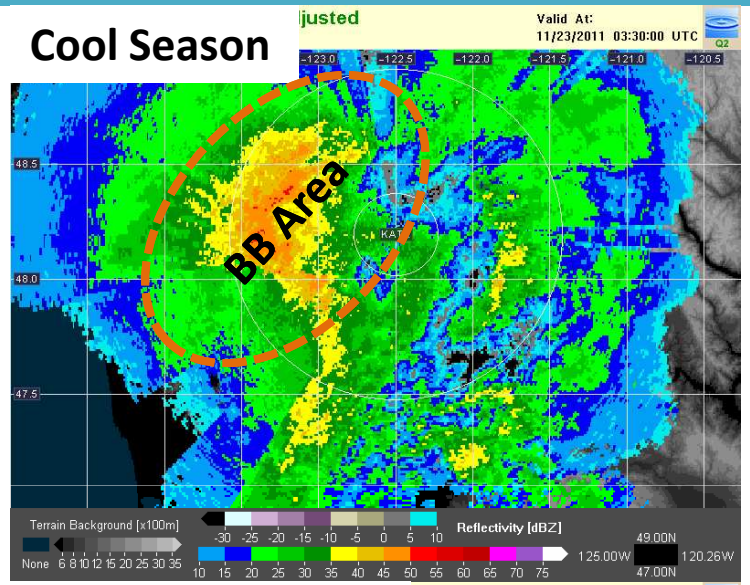
Overview of NMQ/Q2 VPR Correction System

------ZQ10 (Zhang and Qi 2010)

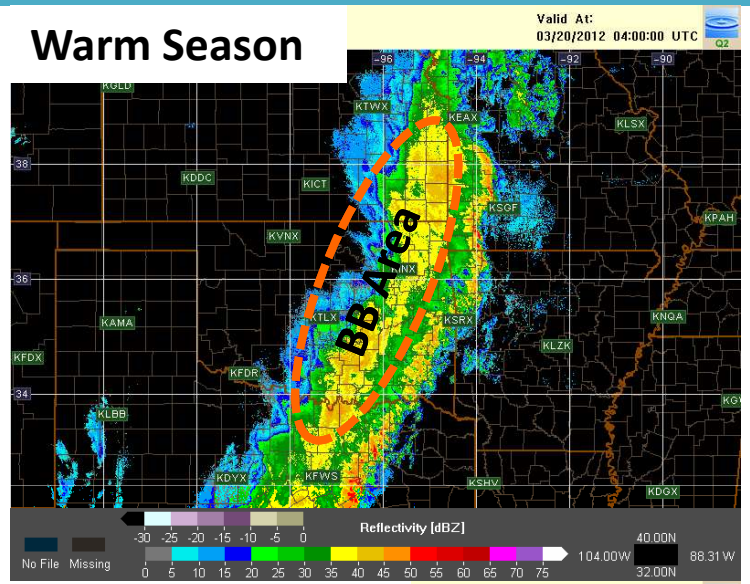
1. Separate convective and stratiform rainfall
2. Identify bright band area (BBA) from stratiform rainfall
3. Calculate apparent/tilt VPR in BBA
4. Find BB top and BB peak based on 0^{o}C height
5. Find inflexion/28dBZ point below BB peak as BB bottom
6. Calculate the slope for each part of the apparent VPR
7. Apply VPR correction

Why DP Radar observations needed for VPR correction?

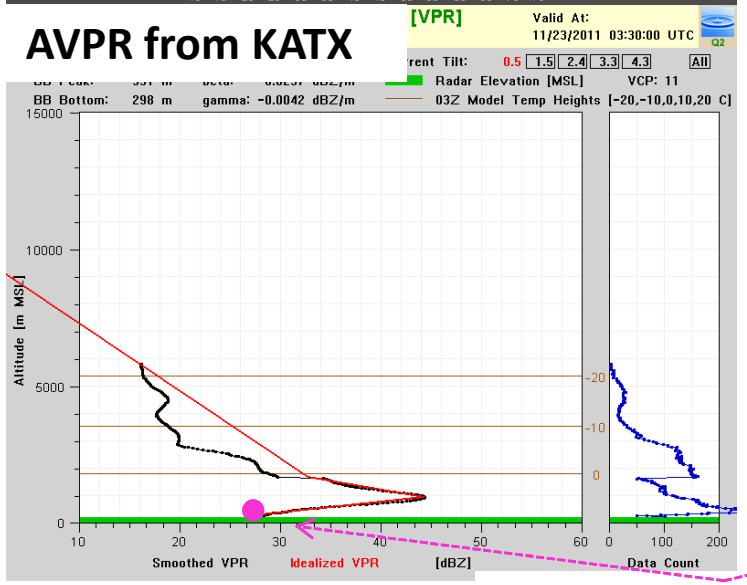
Cool Season



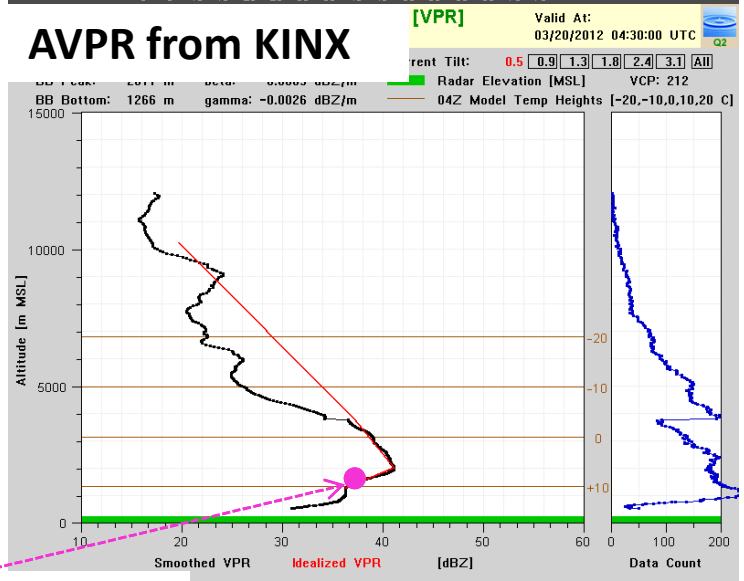
Warm Season



AVPR from KATX



AVPR from KINX



Real BB bottom or not?

New Methodology

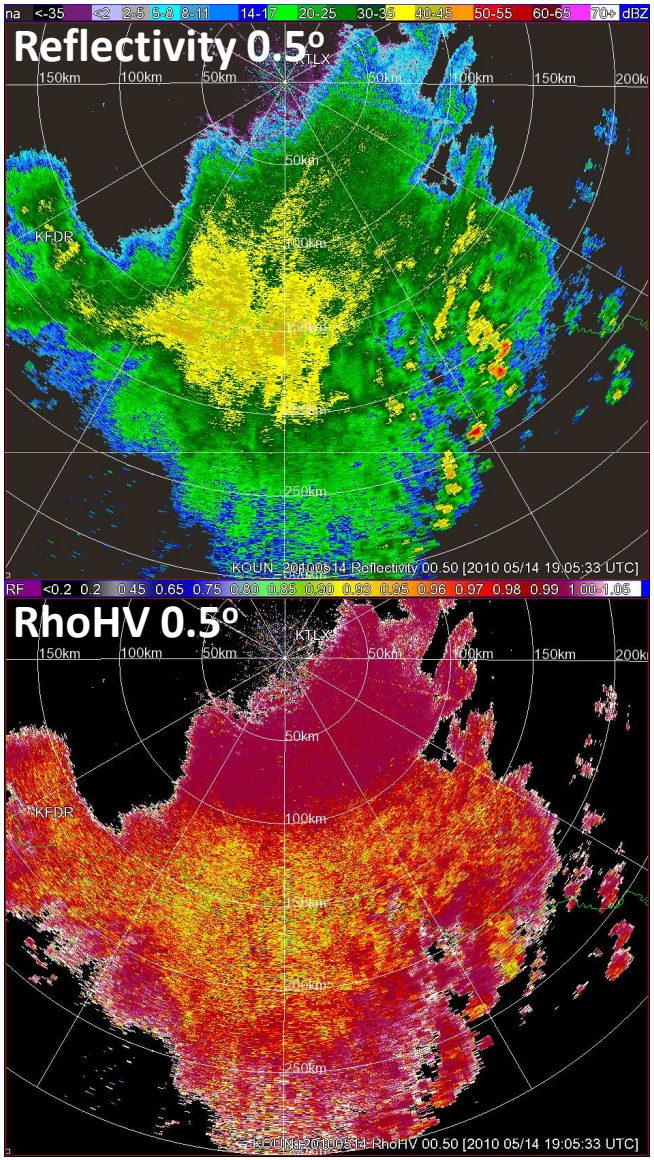
1. Calculate apparent VP RhoHV and VPR in BBA
2. Find BB top and BB peak based on apparent VPR (ZQ10)
3. Calculate the Slope of VP RhoHV
4. Find the first Inflexion point of apparent VP RhoHV below BB peak as BB bottom.
5. Calculate the slope for each part of the apparent VPR
6. Apply VPR correction

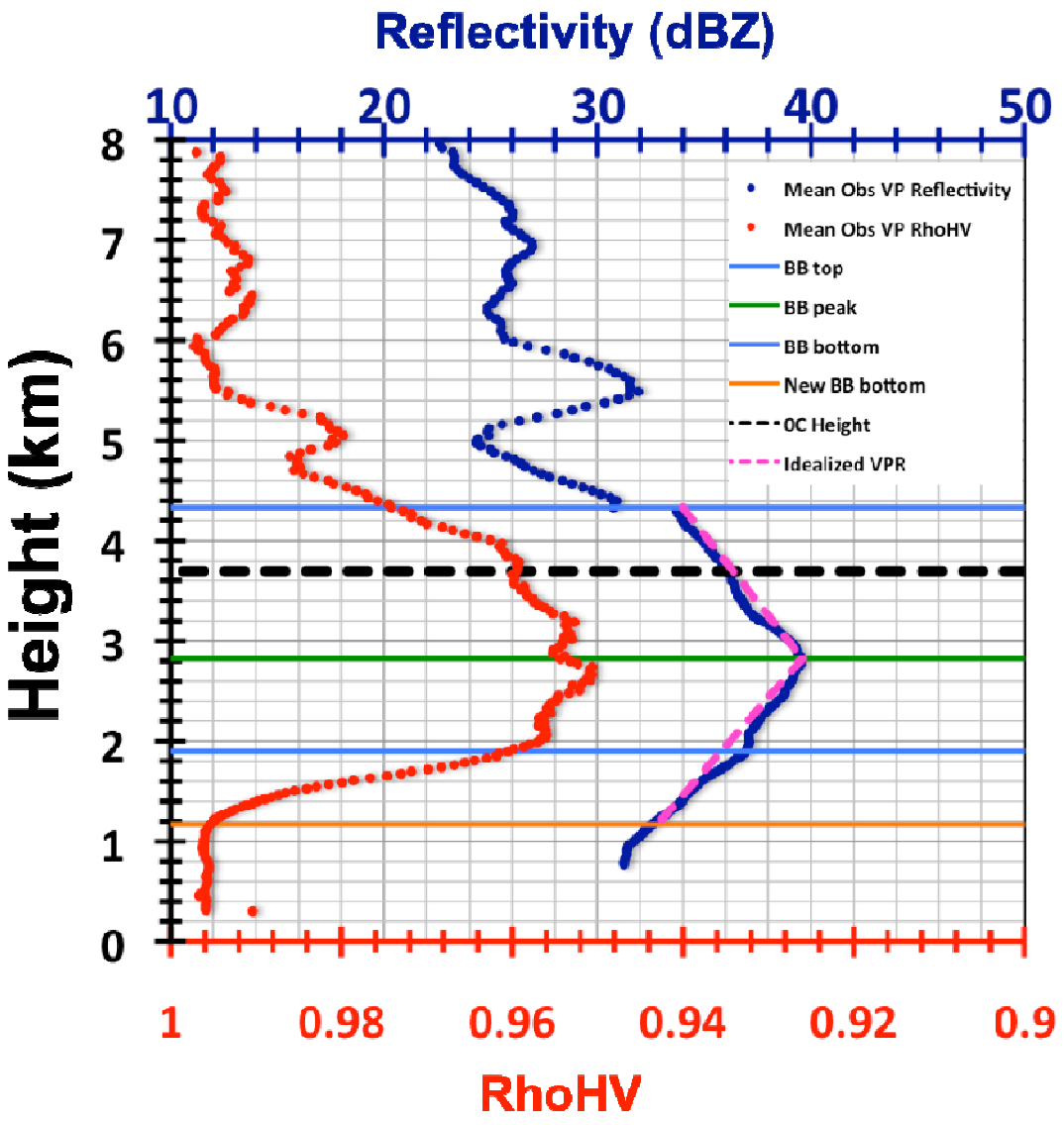
Note: threshold for RhoHV is 0.995

threshold for RhoHV slope is 0.001 (km^{-1})

Case Study (KOUN 20100514.1905UTC)

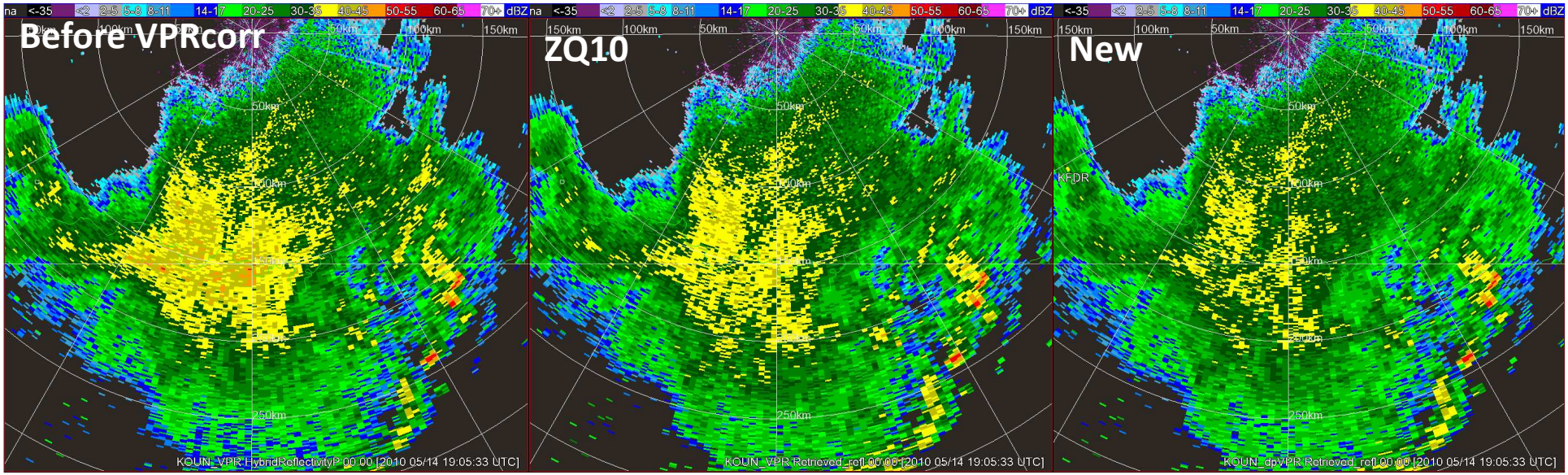
---VPRs Calculation





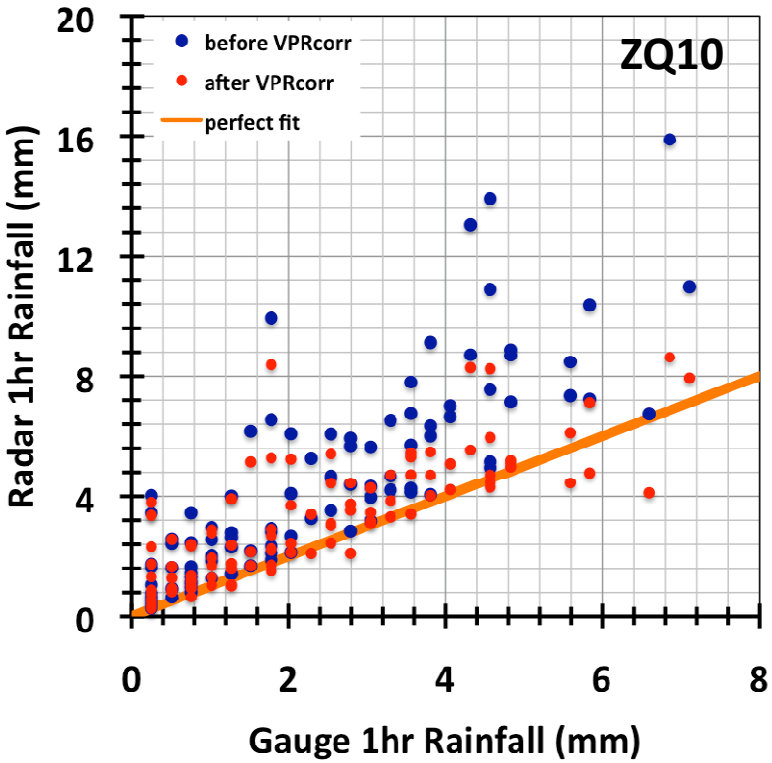
Case Study (KOUN 20100514.1905UTC)

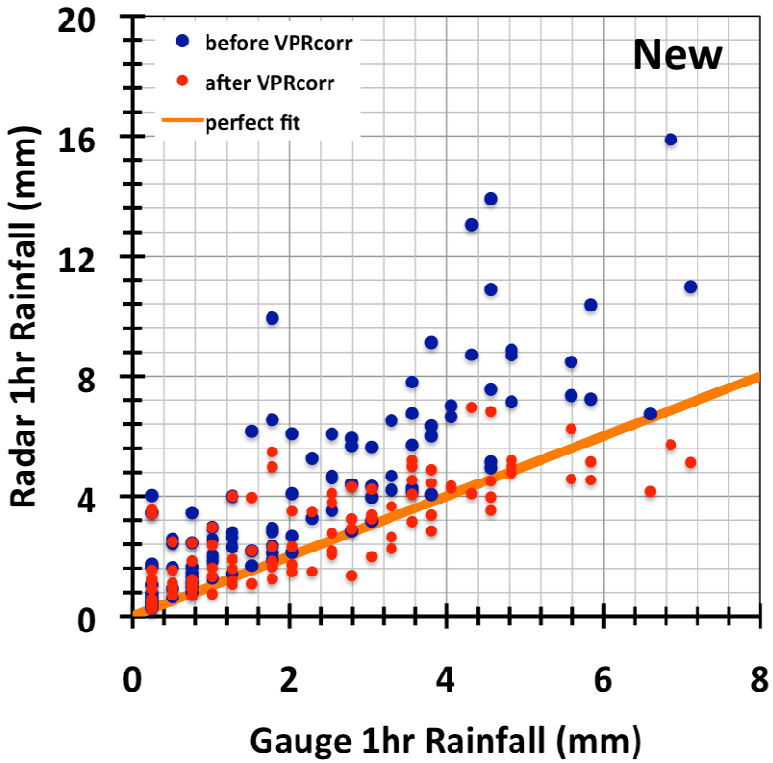
---VPRs Application



Case Study (KOUN 20100514)

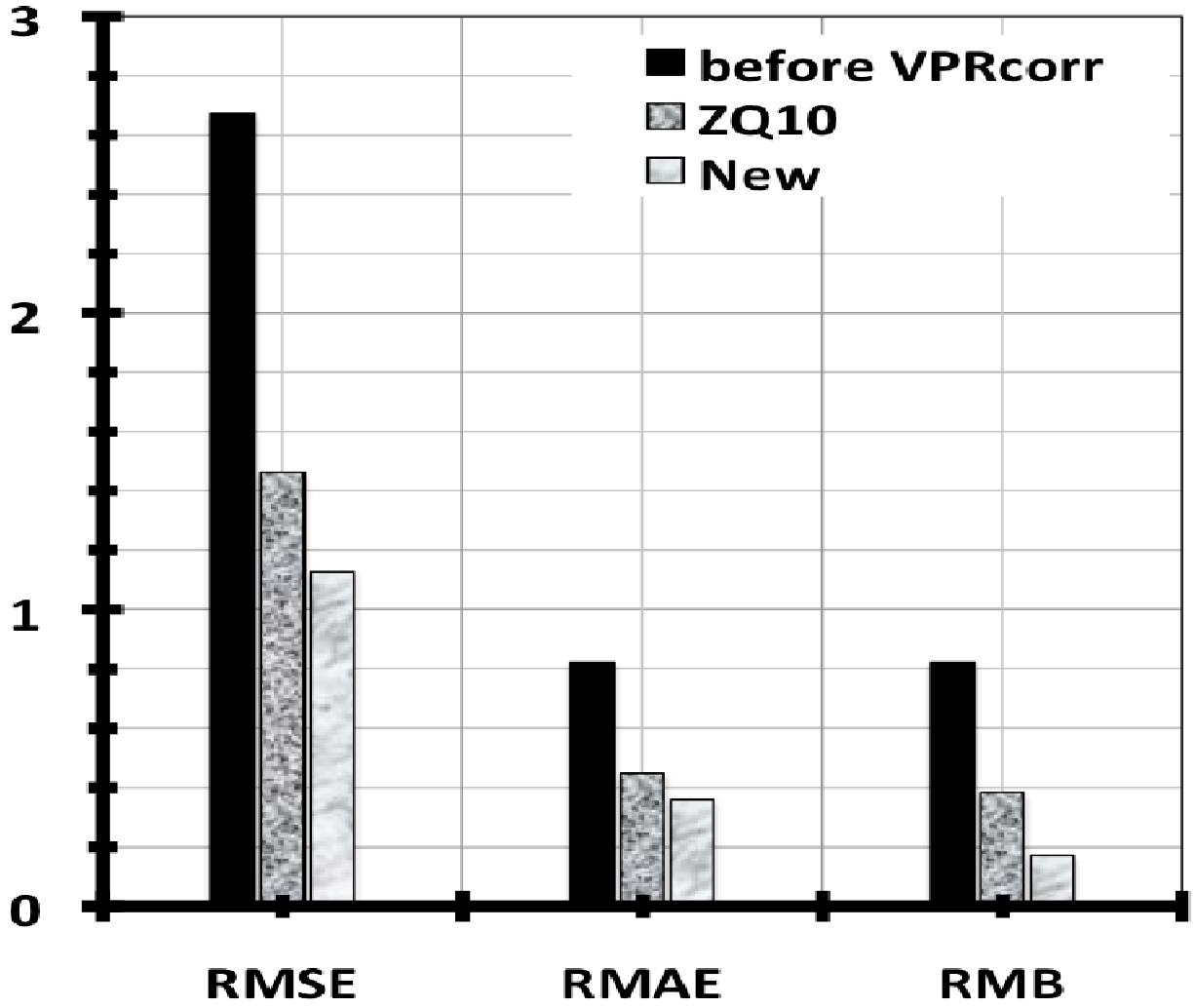
---Compare with Gauges





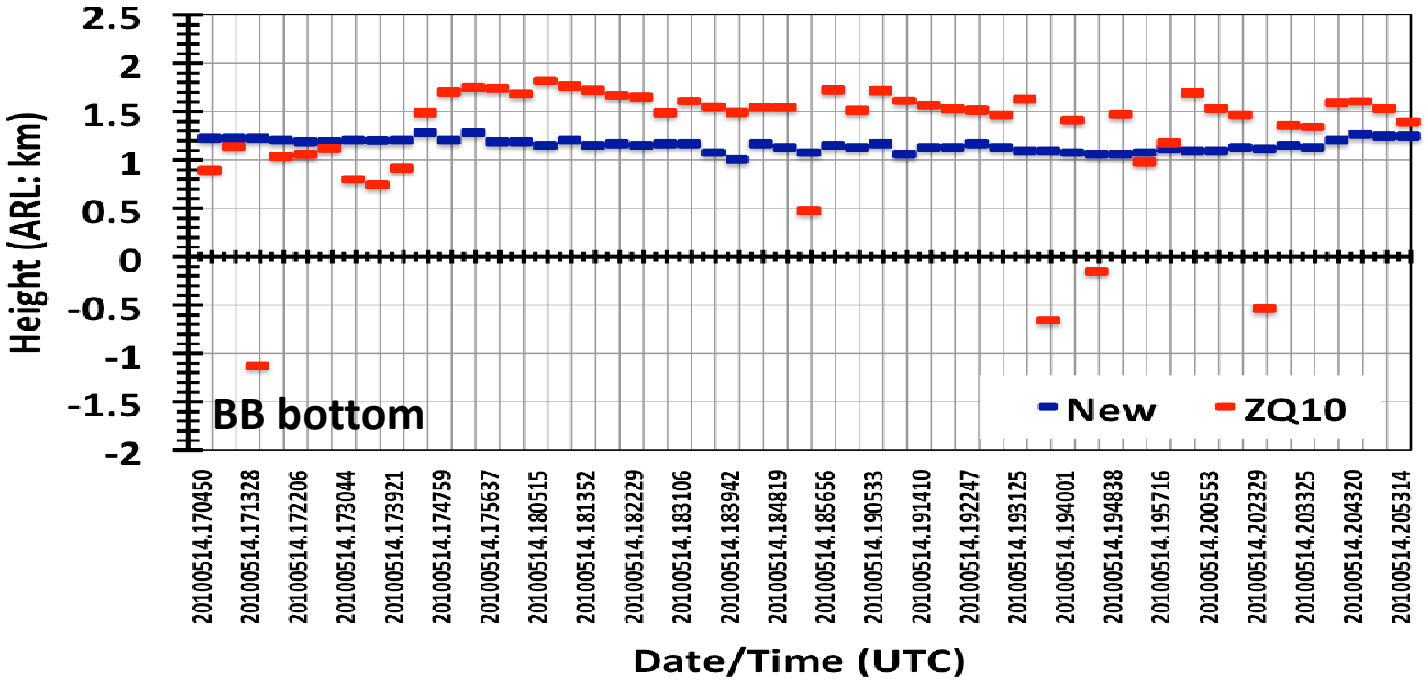
Case Study (KOUN 20100514)

---Statistics Scores



Summary (KOUN 20100514)

<u>New VPR correction scheme</u> can largely reduce the error caused by bright band (BB), and make further improvement compared to ZQ10. This is mainly due to the BB bottom can be correctly and stably found through RhoHV as shown in the following figure.



Thank you!

Comments and Suggetions