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ADM-Aeolus L1B test results



Jos de Kloe,
L1B PM16 10-Mar-2009



Test cases:

- Base Reference RMS (1)
- Academic Tests [with/without noise] (27)
- Sanity Tests (2)
- Realistic Tests [LITE data] (9)
- Mispointing Tests [CALIPSO data] (9)

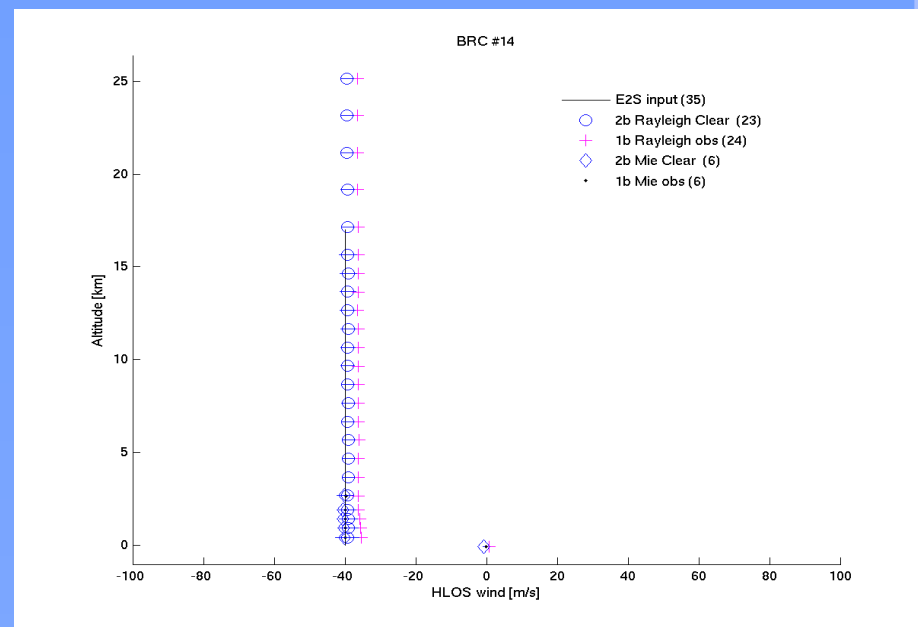


Base Reference RMS (1 test case)

- Test proposed by Dorit
- Constant atmosphere
- Constant Temperature (0 Celcius)
- RMA Aerosol profile
- Input hlos wind -40,-10,0,10,40 m/s
- Serves as first functional test case when a new L1B software version needs to be tested

Base Reference RMS

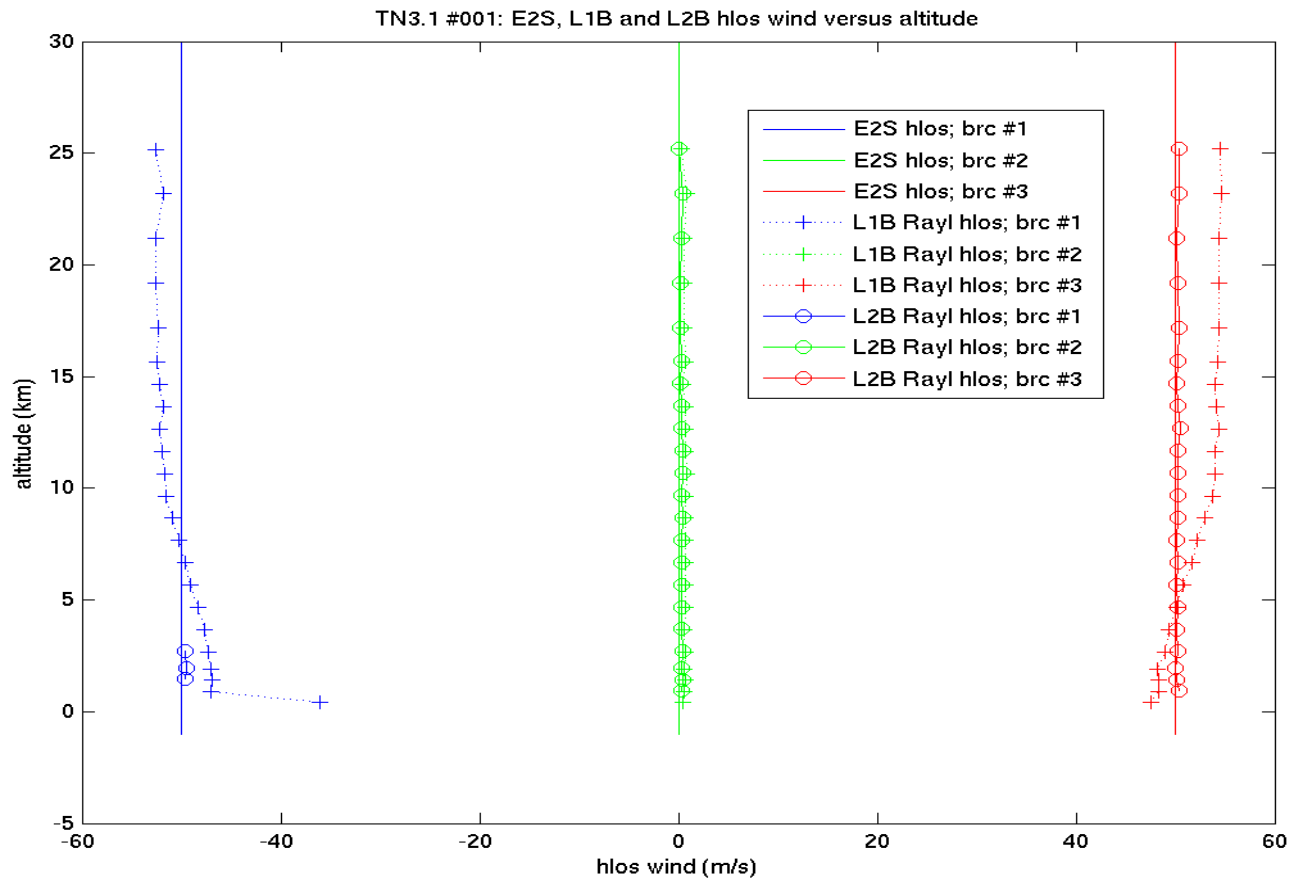
- Mie channel shows avg bias of 0.19 m/s
 - individual profiles have std. below 0.2 m/s, bias upto 0.6 m/s
- Rayleigh channel shows avg bias of 0.66 m/s
 - individual profiles std below 0.3 m/s and bias upto 3.7 m/s not corrected for by ground correction
- Mixing of Atmospheric and Ground echo signal causes variability in gnd corrections as expected



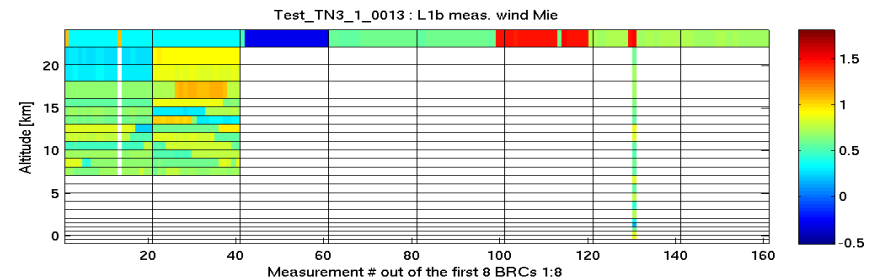
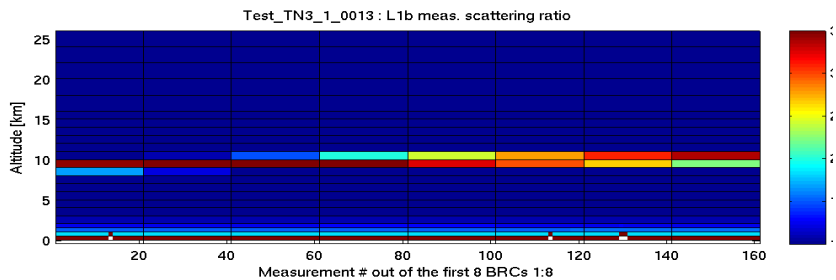
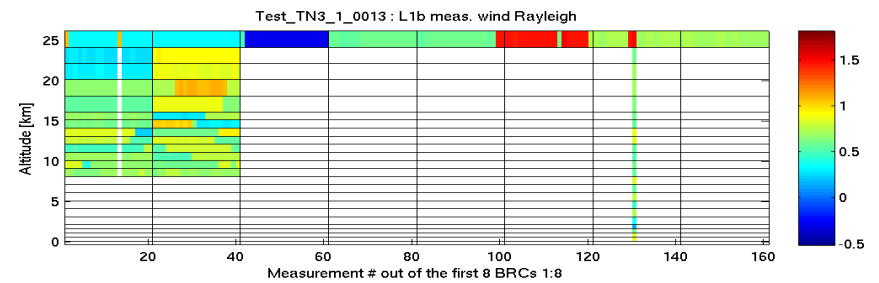
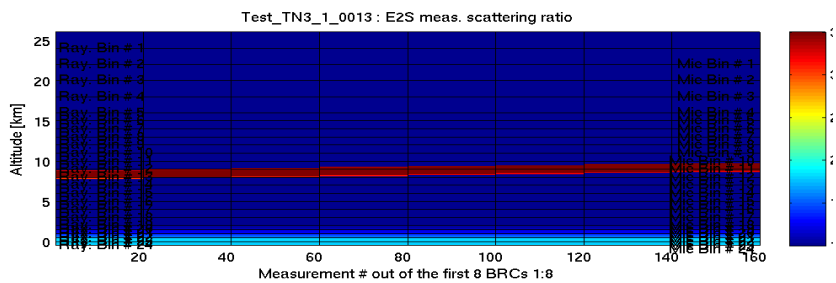
Academic Tests (27 cases)

- With/without noise
- With/without aerosol
- With/without one or more cloud layers
- Dense or transparent clouds
- No wind, high constant wind or variable wind
- Example: case #0001, molecules only
- Example: case #0013, cloud scan (same as used for L2A testing)

Test #0001: Molecules only



Test #0013: 1 km cloud scan

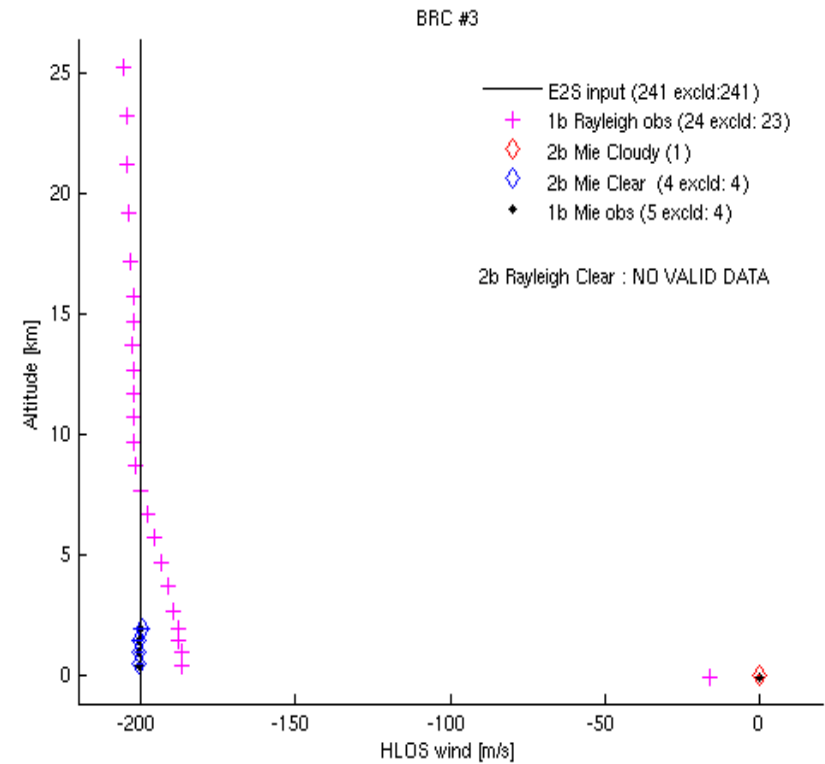
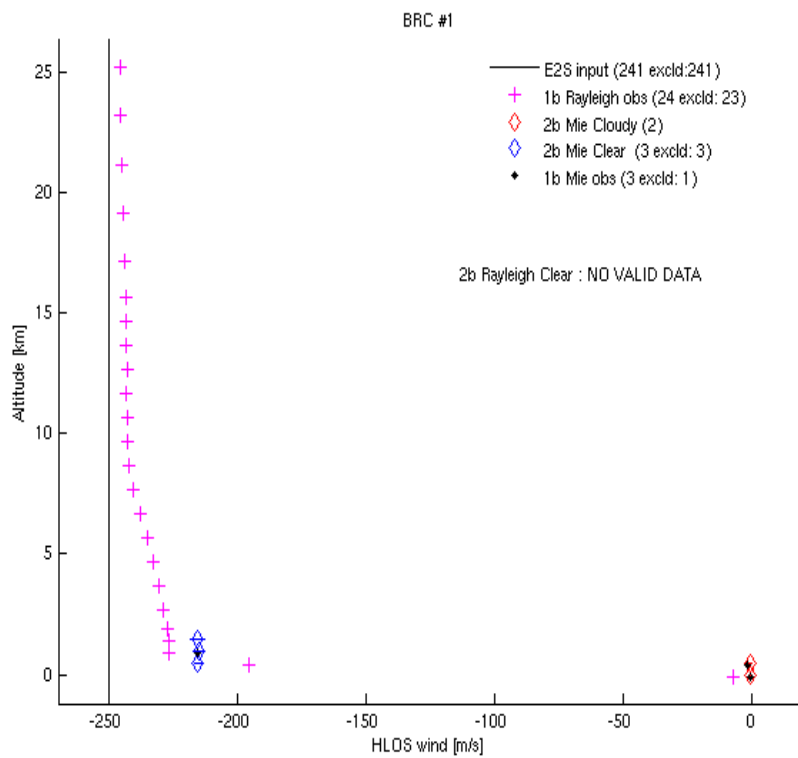


- Many meas. level winds are missing, but obs. level results are present

Sanity Tests (2 cases):

- use input winds at edge of spectrometer range
- Mie: -250, -220, -200, 200, 220, 250
- Rayleigh -400 upto +400 in steps of 50 m/s
- Mie works fine upto 200 m/s
- at -200 m/s std of 0.37, bias of 0.17 m/s
- at -220 m/s std of 0.22, bias of 9.4 m/s
- Rayleigh works fine upto 150 m/s but has skill upto 300 m/s
- at -150 m/s std of 8.6, bias 1.7 m/s
- at -200 m/s std of 38, bias of 10 m/s

Test #0050: Huge input windspeed

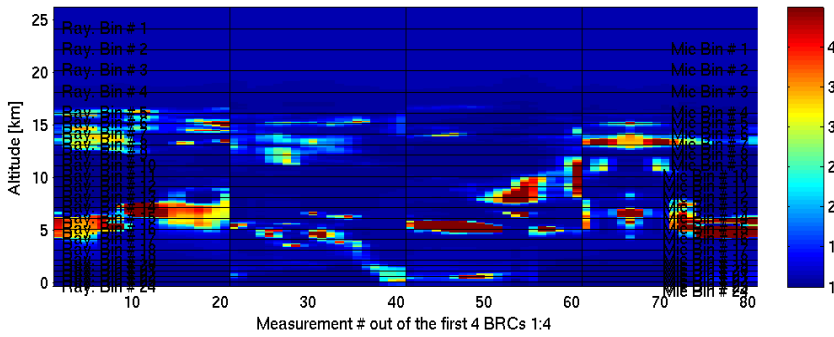


Realistic Tests (9 cases)

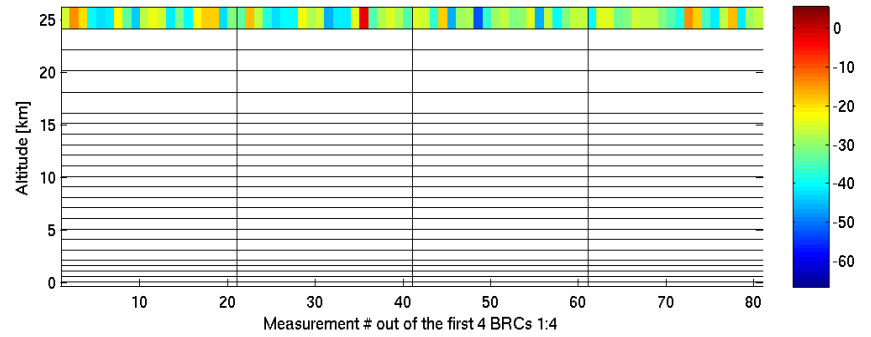
- Aerosol backscatter and extinction from LITE experiment on board of Space Shuttle
- Wind and temperature from ECMWF model
- Orbit artificial, created by E2S, not related to atmospheric data
- Poisson noise added
- Test #0106: tropical case with cirrus, convection, precipitation

Test #0106: Convective case

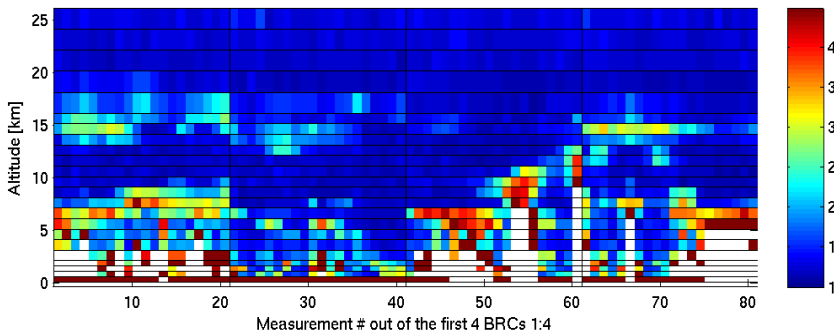
Test_TN3_1_0106 : E2S meas. scattering ratio

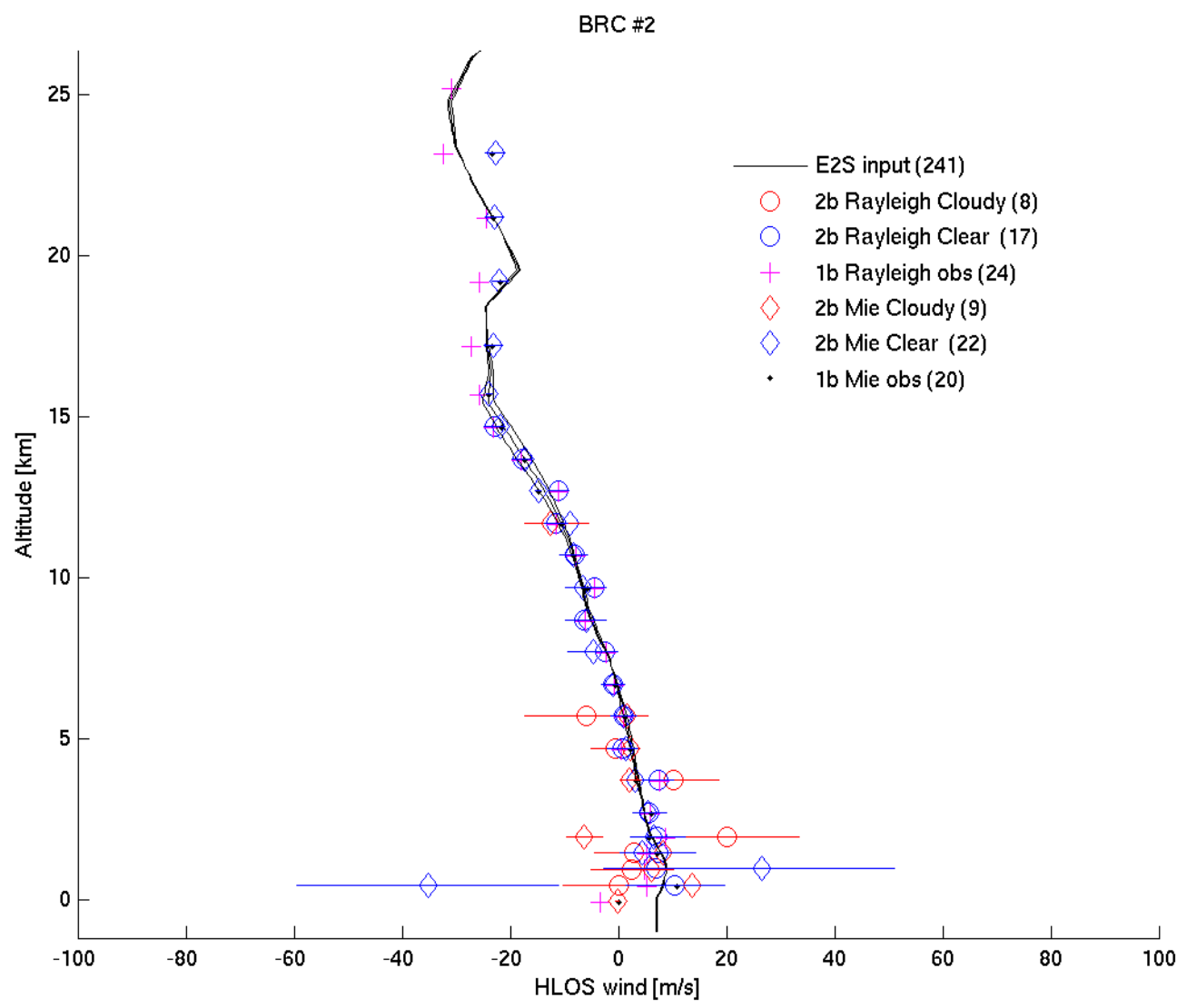


Test_TN3_1_0106 : NO L1b meas. wind Mie DATA AVAILABLE



Test_TN3_1_0106 : L1b meas. scattering ratio



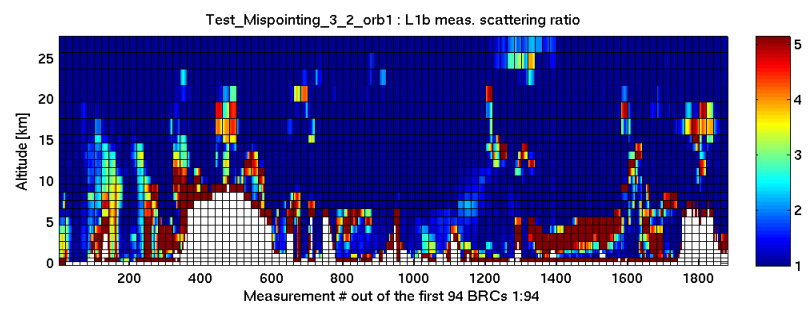
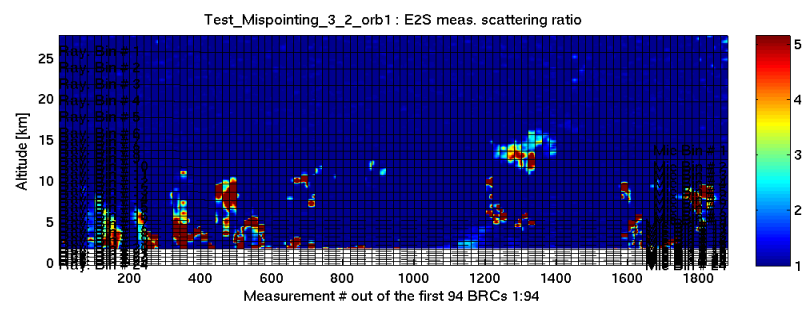


Mispointing Tests (9 cases)

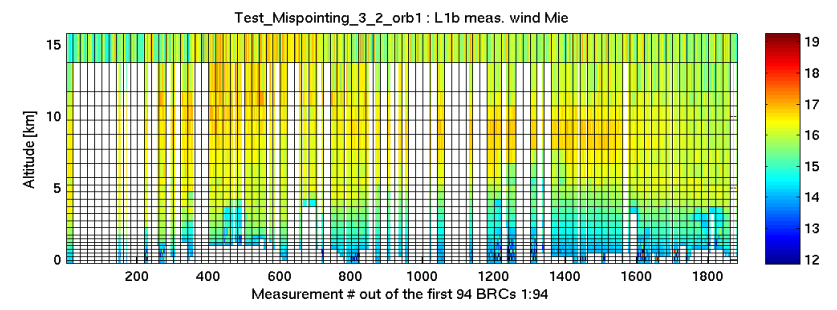
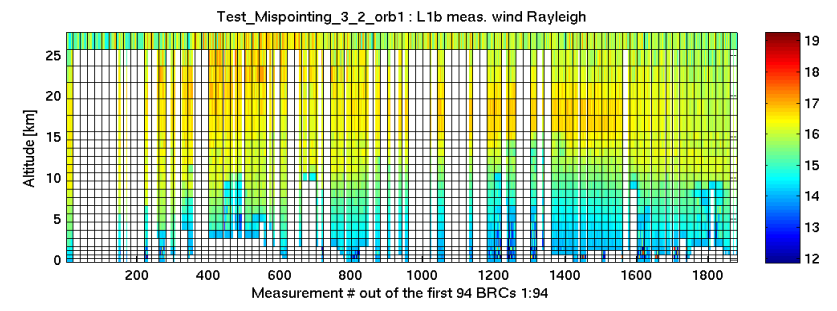
- Aerosol backscatter and extinction from CALIPSO experiment
- Wind and temperature from ECMWF model
- Orbit artificial, created by E2S, not related to atmospheric data
- Simplified variable albedo (0,0.05,1)
- Poisson noise added
- Yaw or Scan angle bias added
- Tests #0205, 0207: Yaw angle bias
- Tests #0208, 0209: Scan angle bias



Test #0205: Yaw angle bias



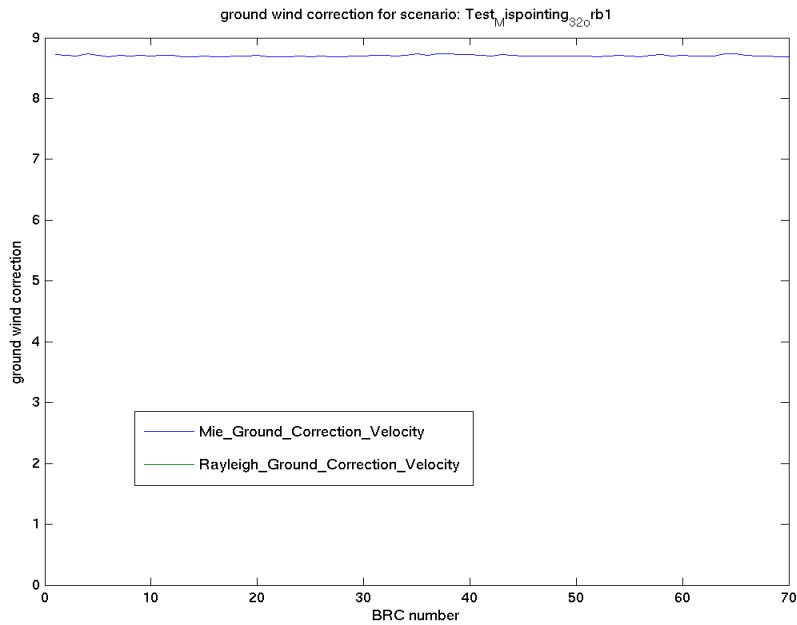
• \leq Scattering ratio
E2S and L1B



• Many missing results =>
at meas. level

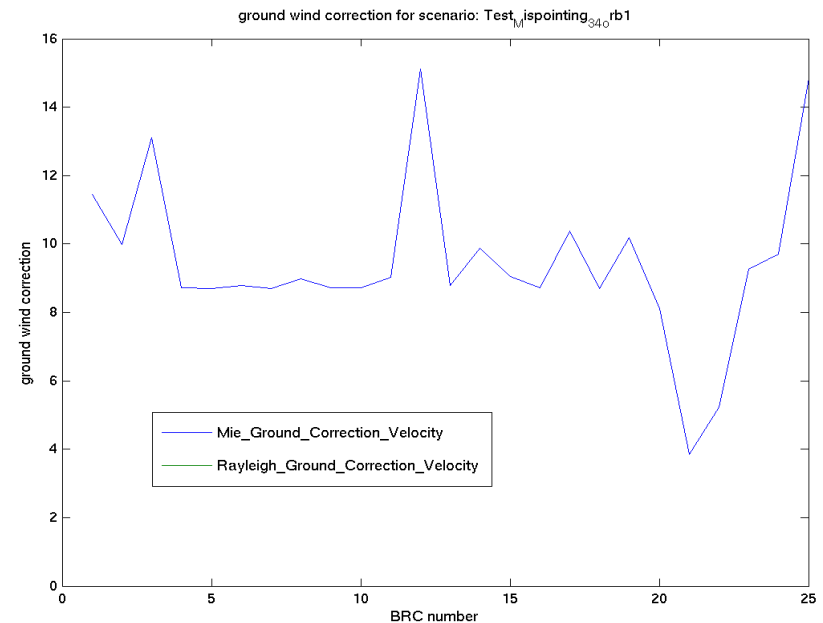


Tests #0205/0207: Yaw angle bias

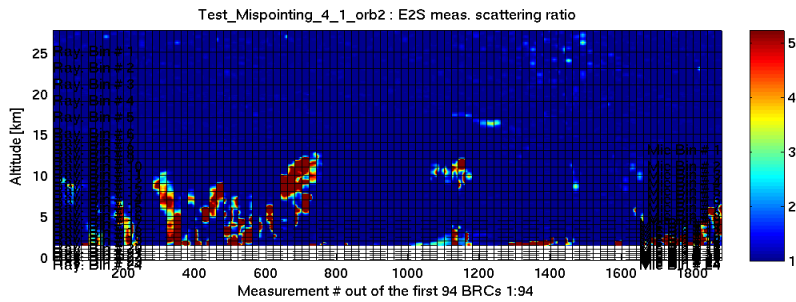


• => high albedo,
constant zero wind
70 results

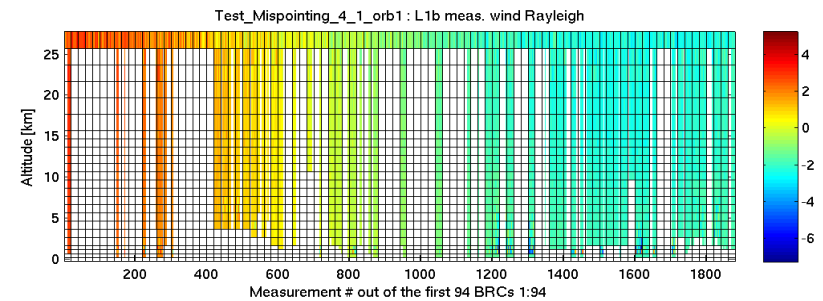
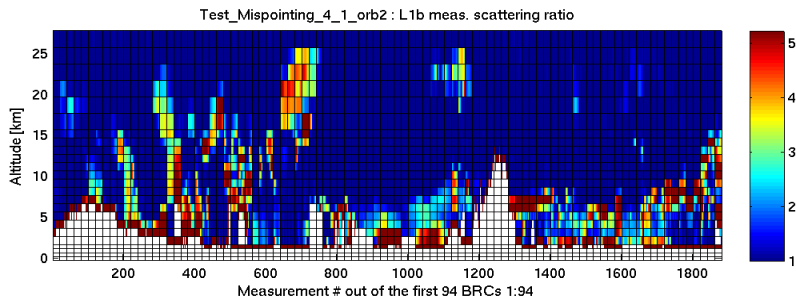
• Variable albedo =>
varying wind
Only 26 results



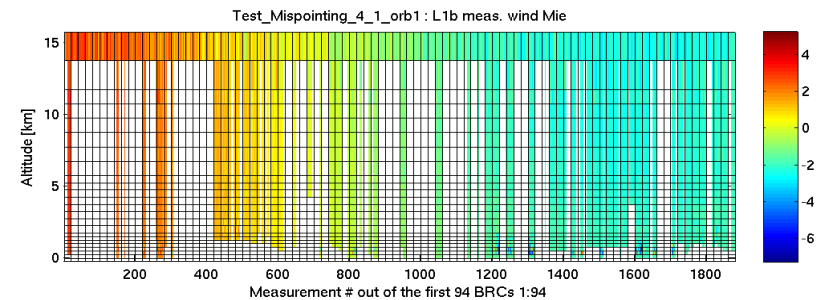
Test #0208: Scan angle bias



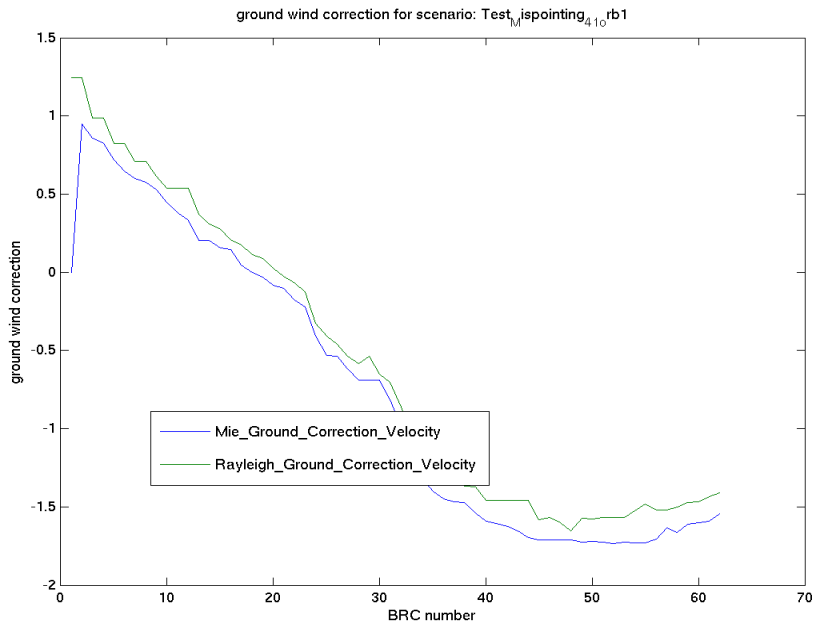
• \leq Scattering ratio
E2S and L1B



• Many missing results \Rightarrow
at meas. level

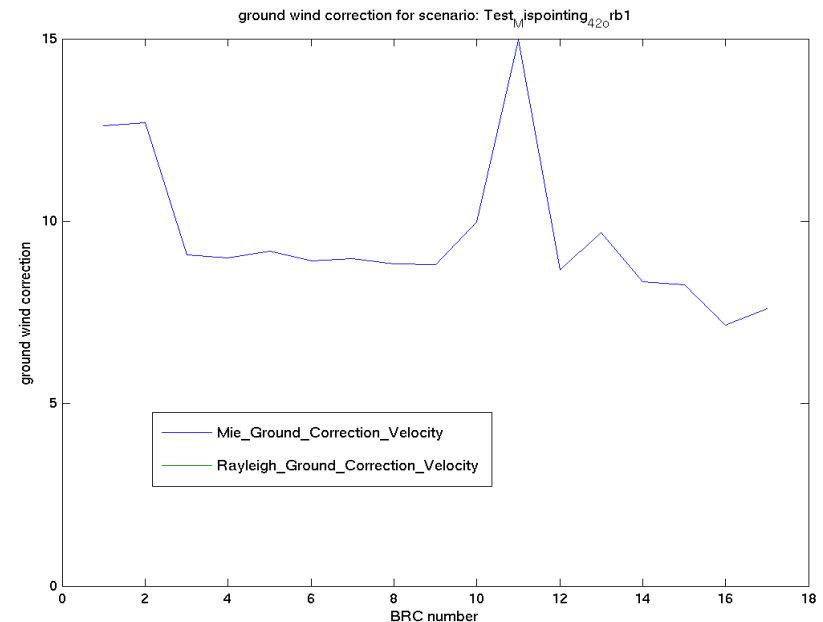


Tests #0208/0209: Scan angle bias



• \leq high albedo, constant zero wind, 70 results

• Variable albedo => varying wind
Only 18 results





The end

- questions ?

