In-situ observational Plan to validate ATLID and CPR for oceanic aerosols and clouds

For the validation of ABL heights estimated by HSRL data

Members

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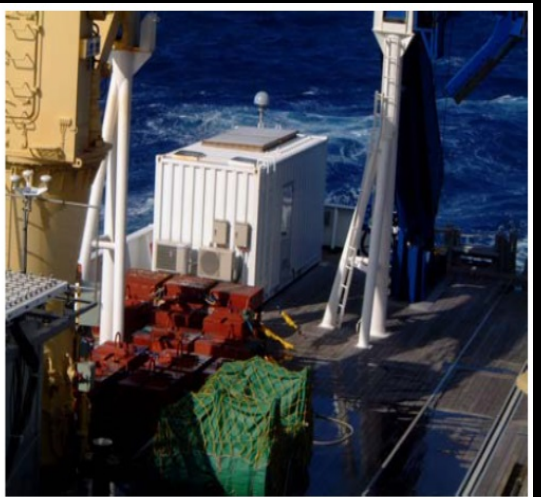
Our plan for the validation

- Purpose

to evaluate EC products in the clean condition (over the oceanic regions)

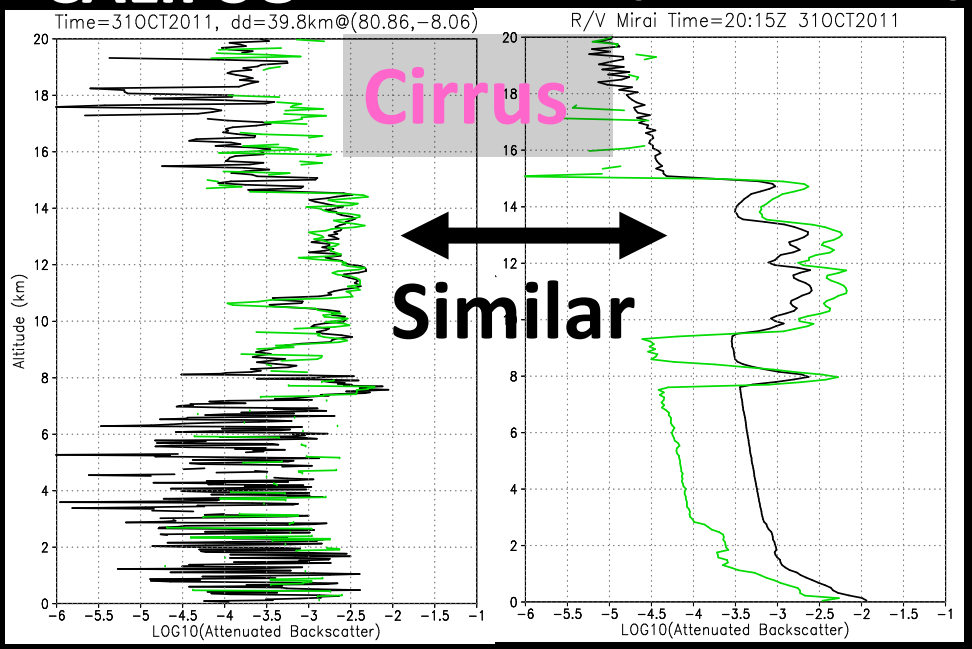
Continental condition ⟷ remote ocean condition

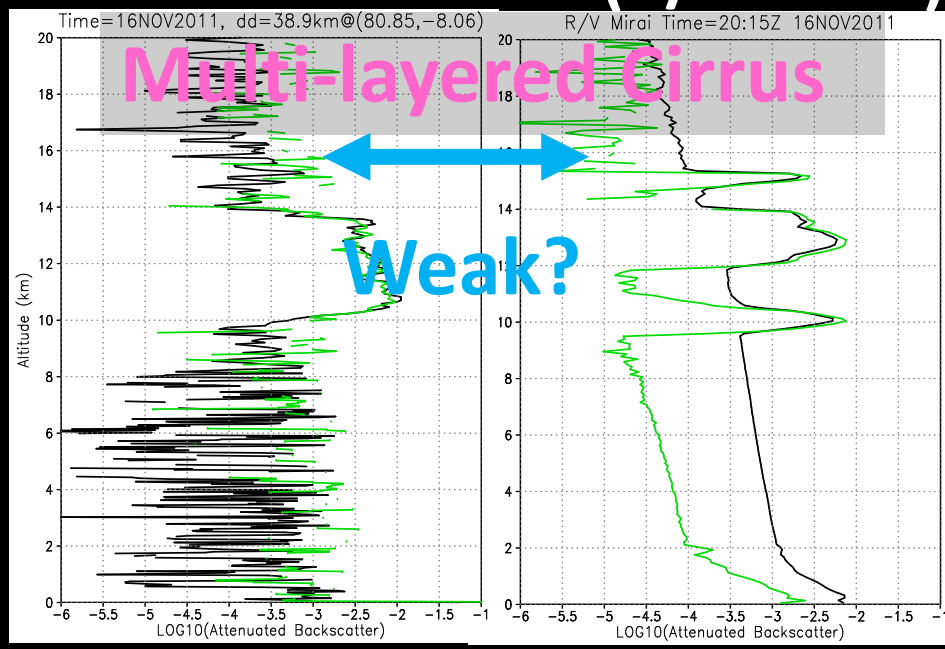
significantly different !!



Summary in the 1st EC meeting

- For the validation rehearsal
  - 4 samples of CALIPSO overpass in CINDY2011

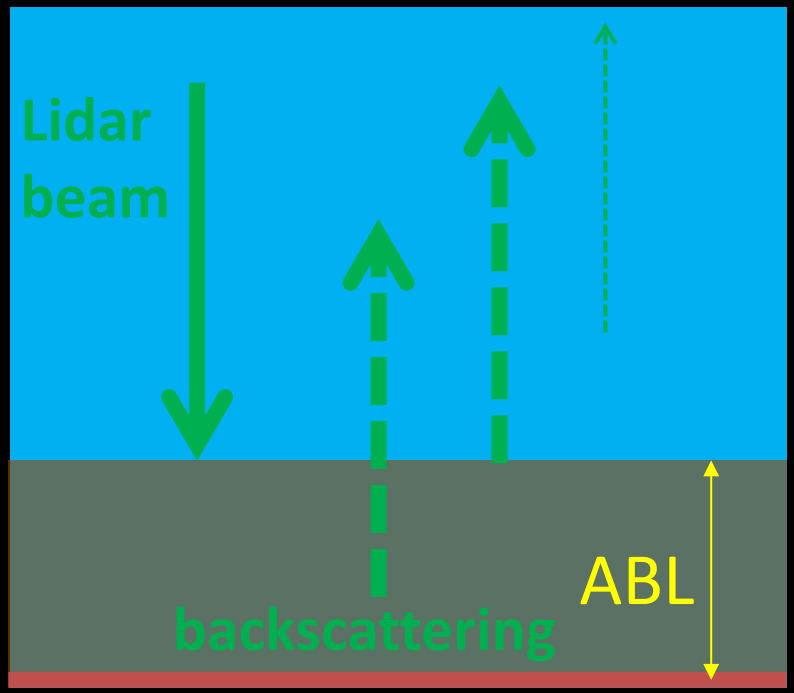




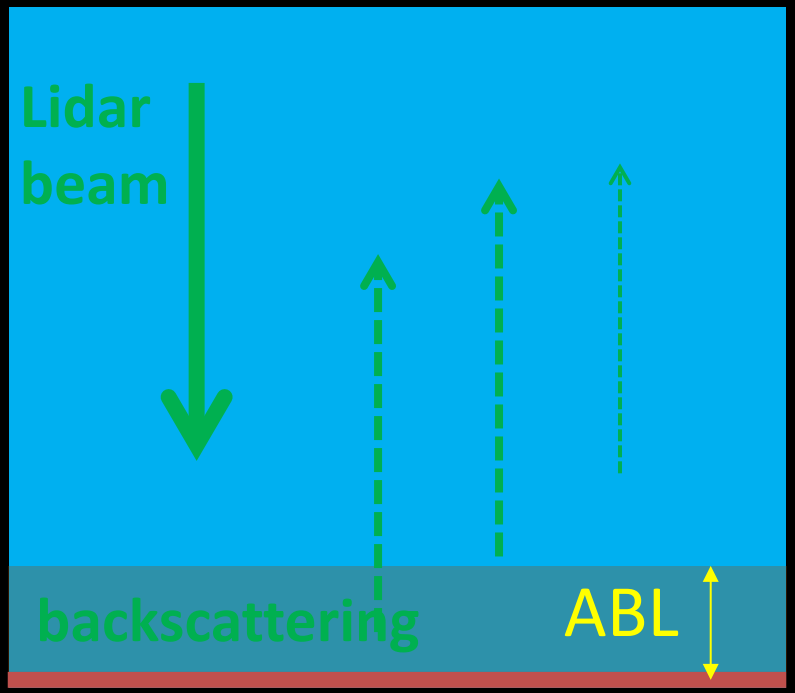
4 samples in 2 months -> Inefficient?
(within 40km)

Algorithm to estimate ABL heights by Lidar

Land



Remote Oceanic Region



- ABL height is detected by a vertical gradient of backscattering coefficients.
- ABL over the ocean is clean and thin.
- How accurate is the Lidar-detected ABL height?

CINDY2011 / DYNAMO Project (Oct.-Nov.2011)

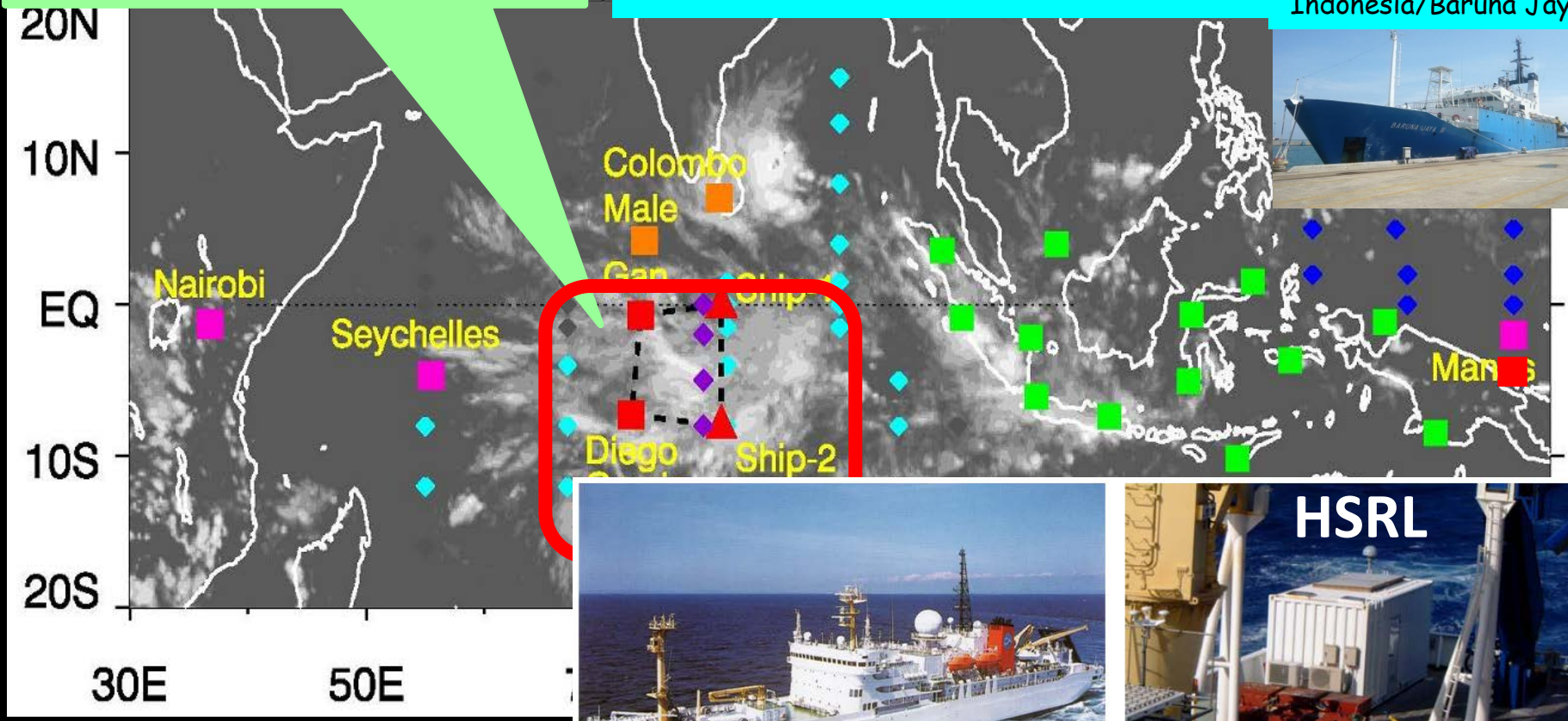
Gan ; Super site

Japan / Mirai

US / Roger Revelle

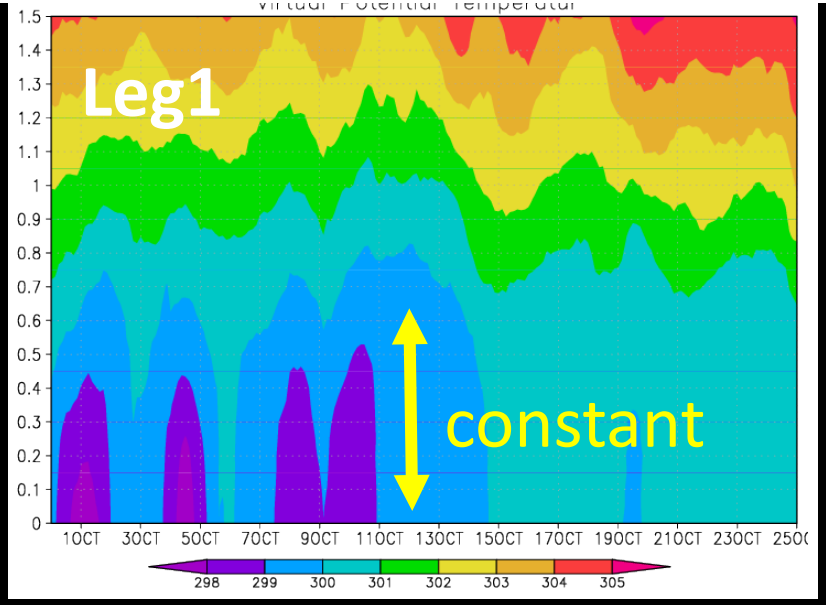
India / Sagar

Indonesia/Baruna Jaya

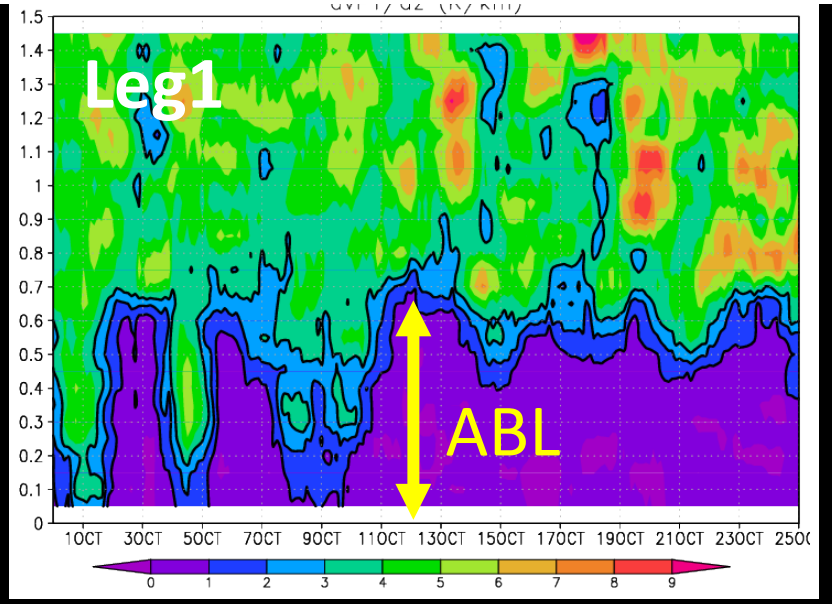


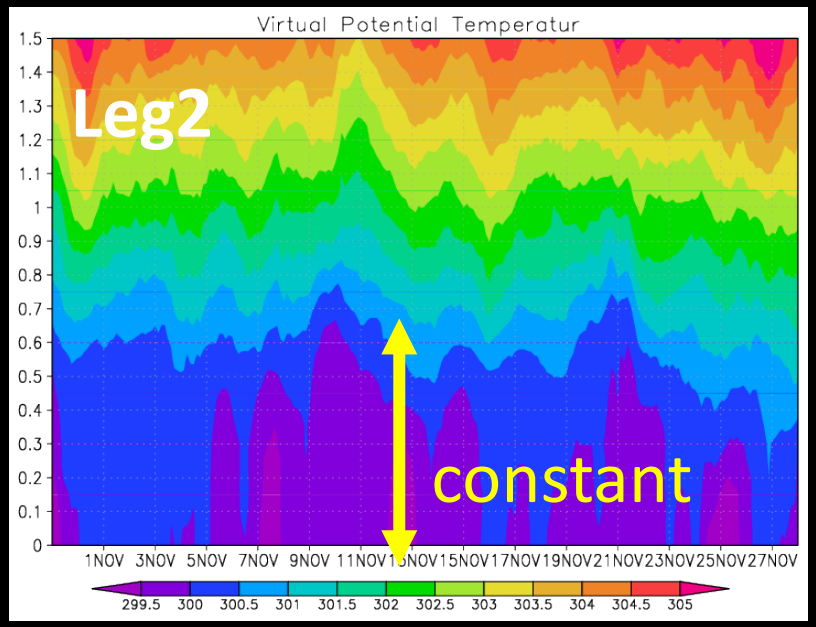
Radiosonde-derived ABL heights

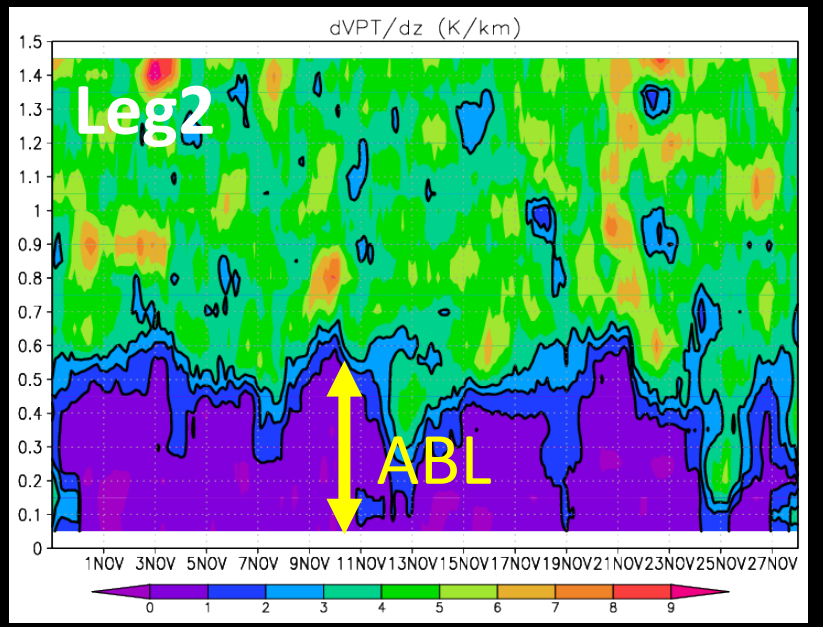
Virtual Potential Temperature



Vertical Gradient of V.P.T

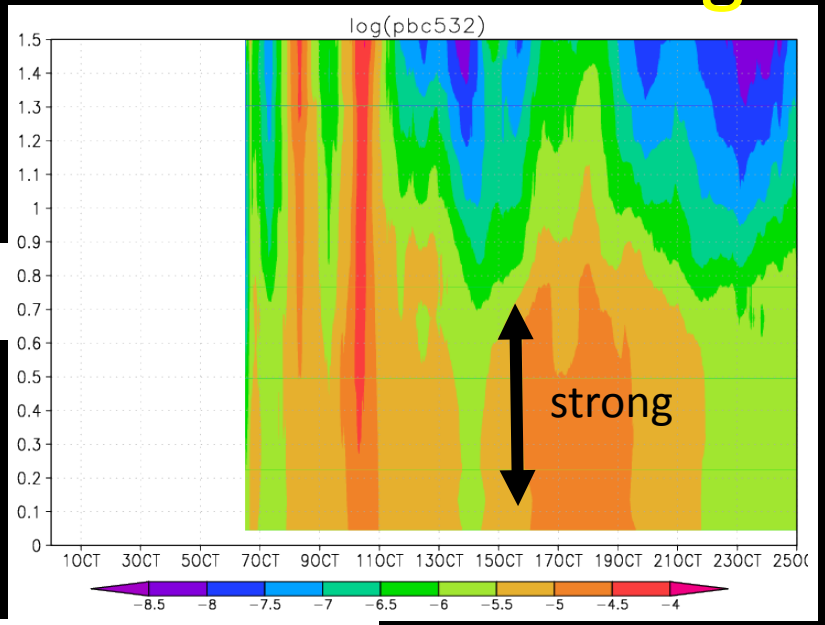




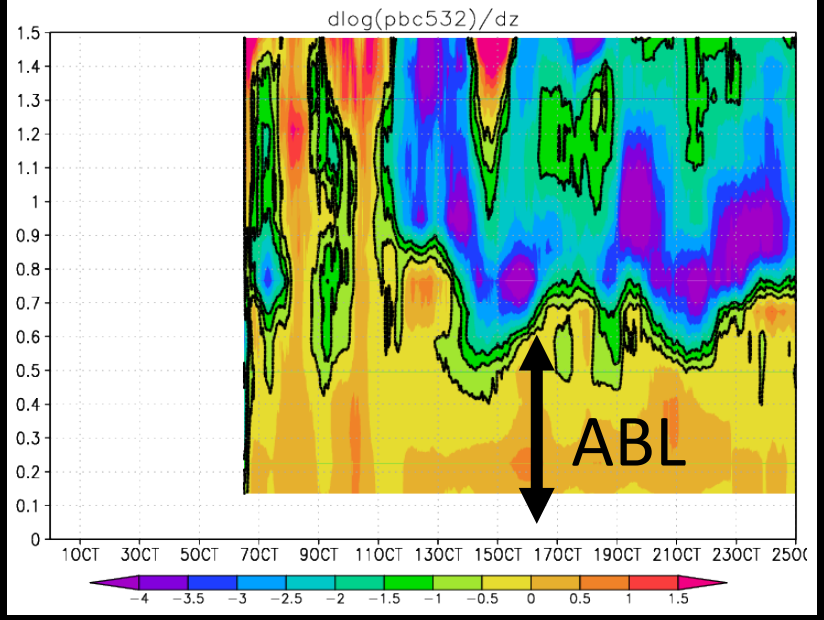


Lidar-derived ABL heights (Leg1)

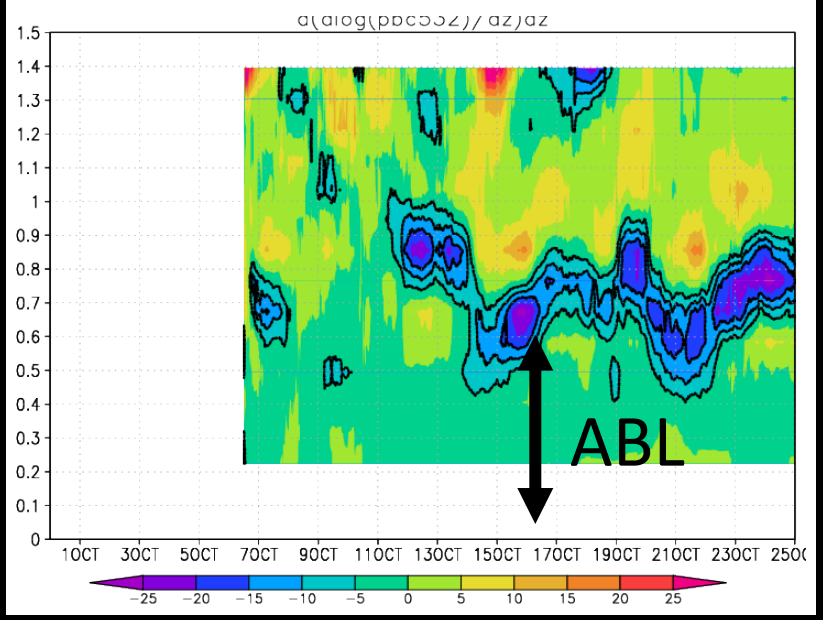
Log(pbc532)



Vertical Gradient of log(pbc)

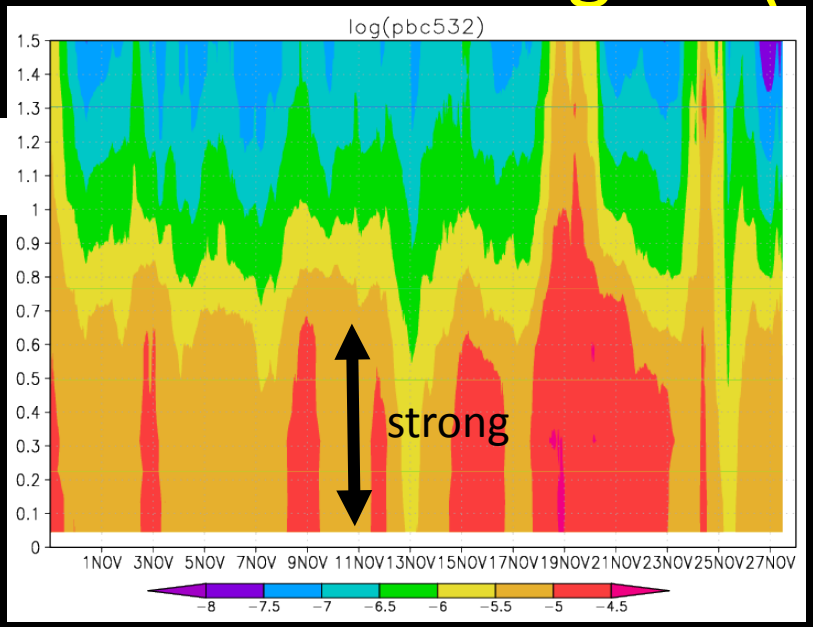


2nd derivative of log(pbc)

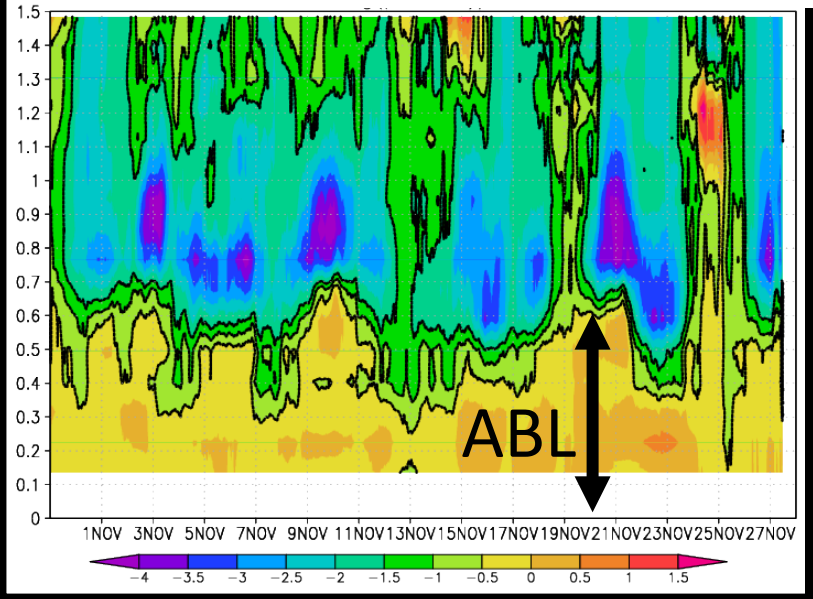


Lidar-derived ABL heights (Leg2)

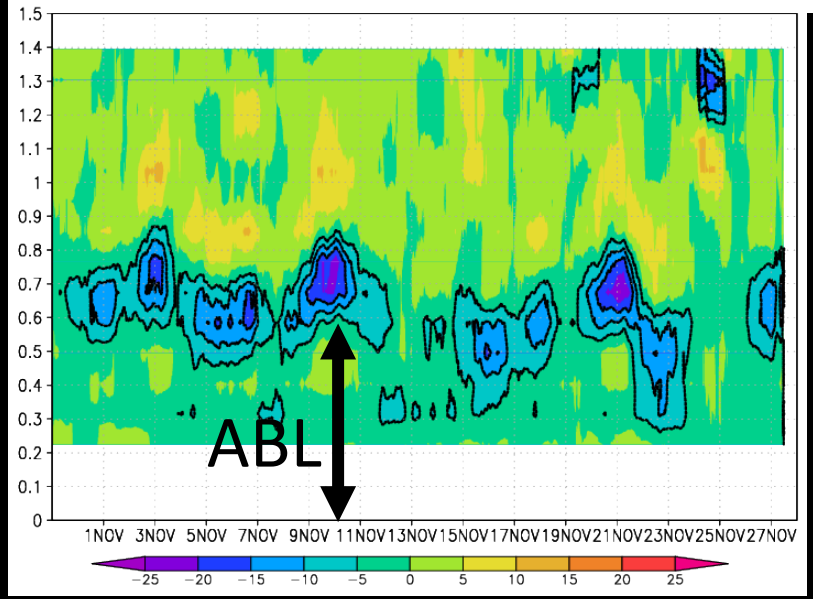
Log(pbc532)



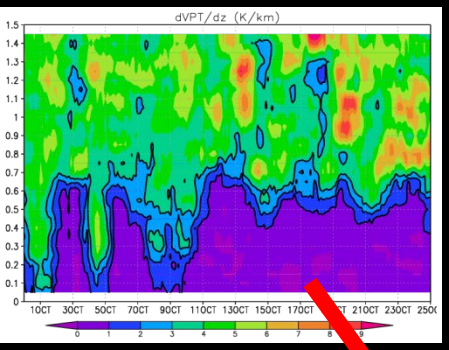
Vertical Gradient of log(pbc)

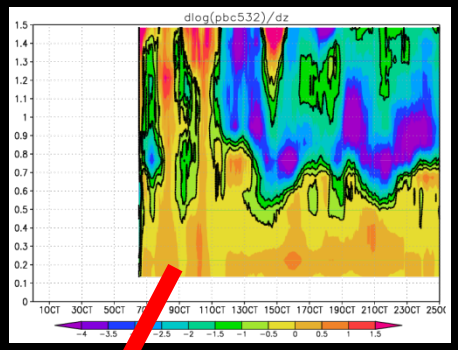


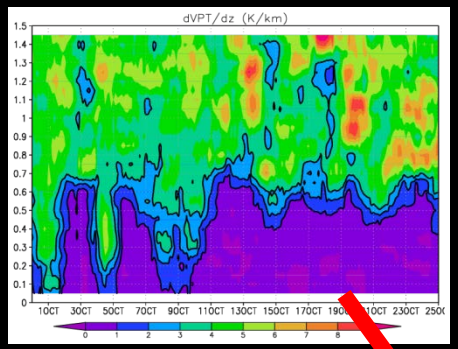
2nd derivative of log(pbc)

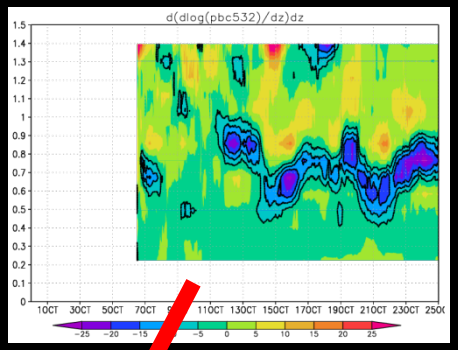


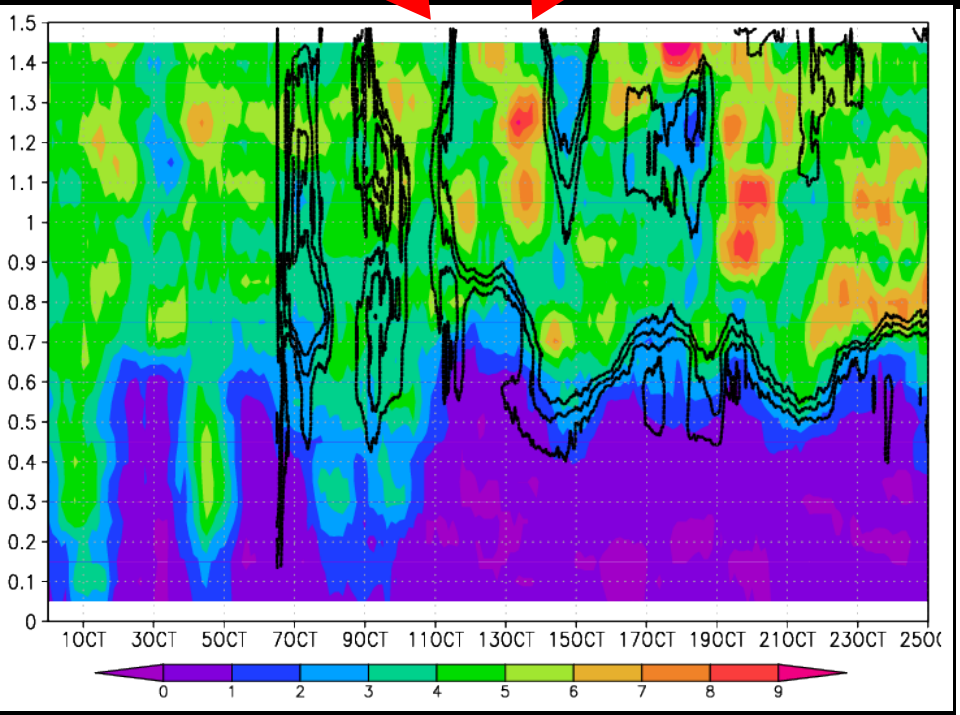
Comparison of detected ABL heights (Leg1)

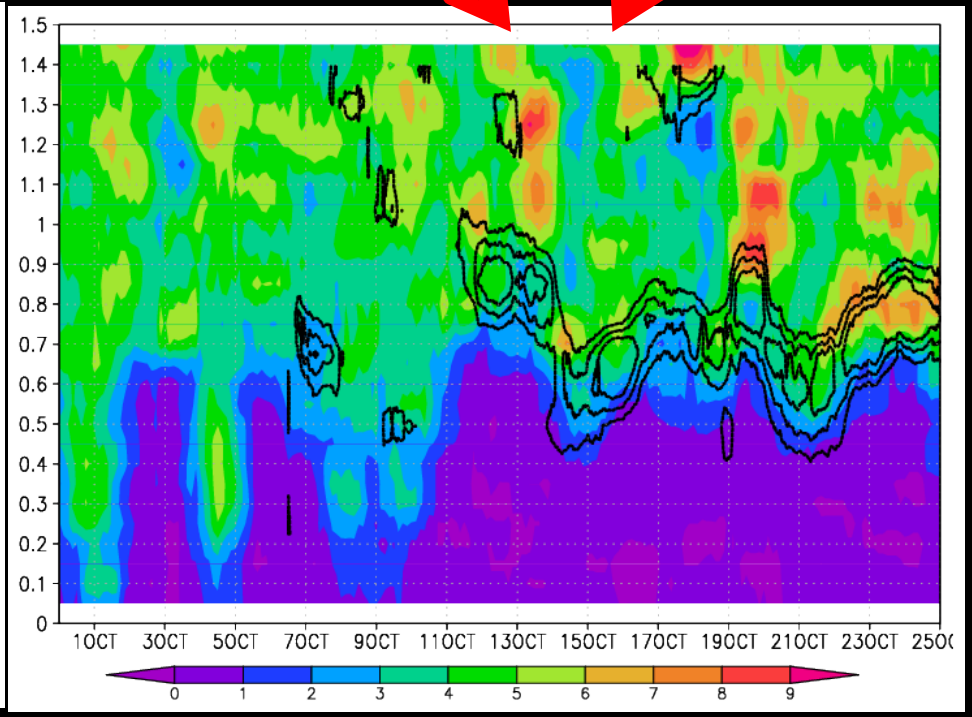






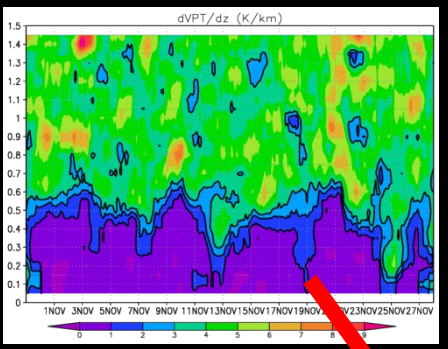


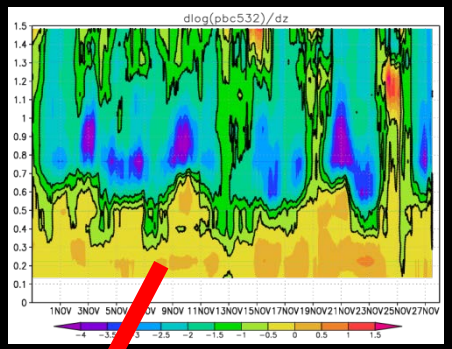


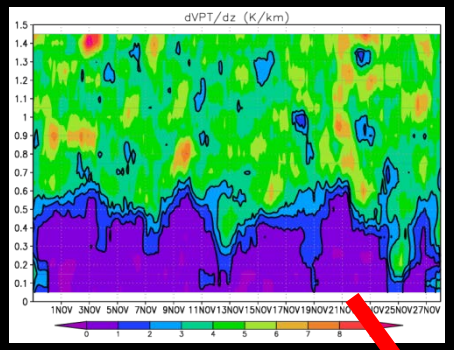


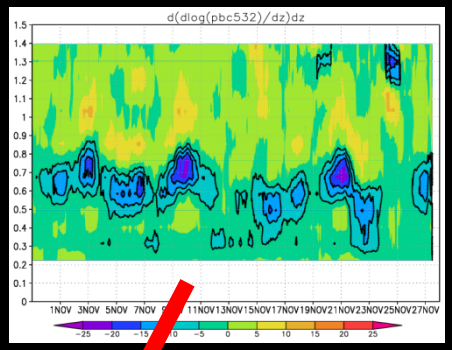
Good agreement

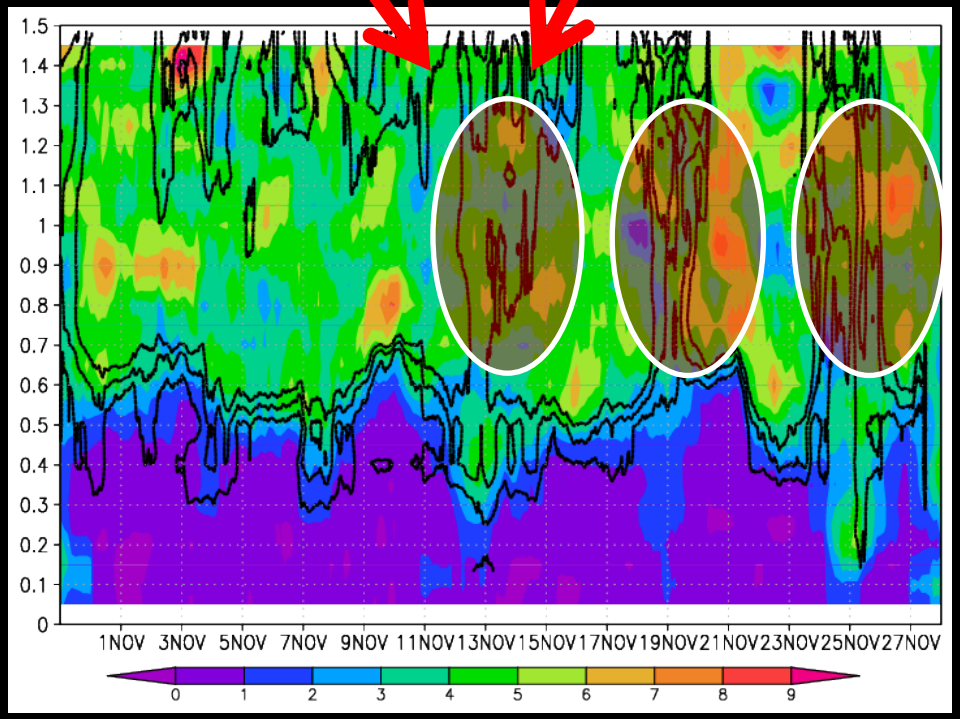
Comparison of detected ABL heights (Leg2)

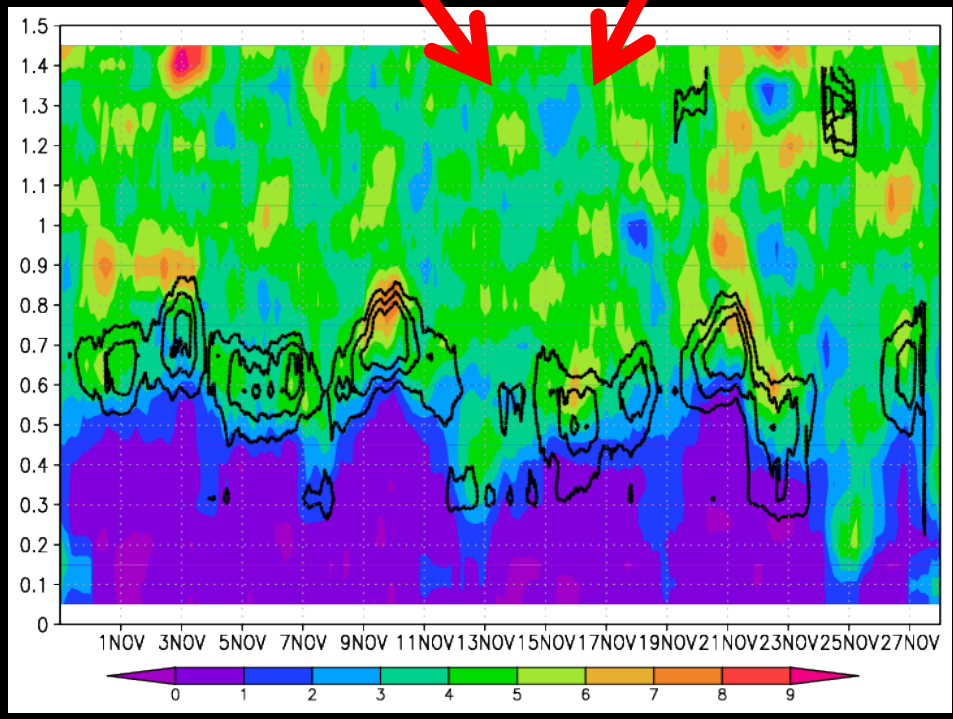






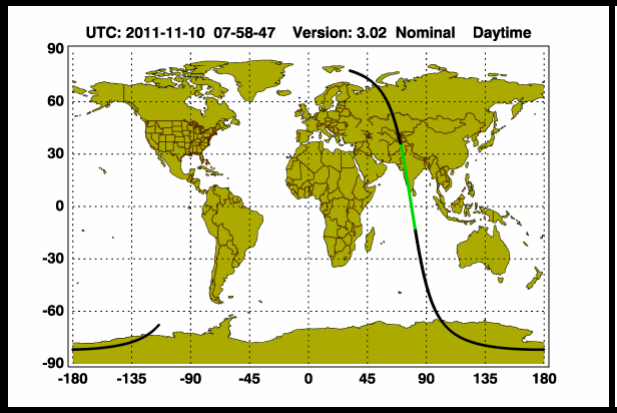


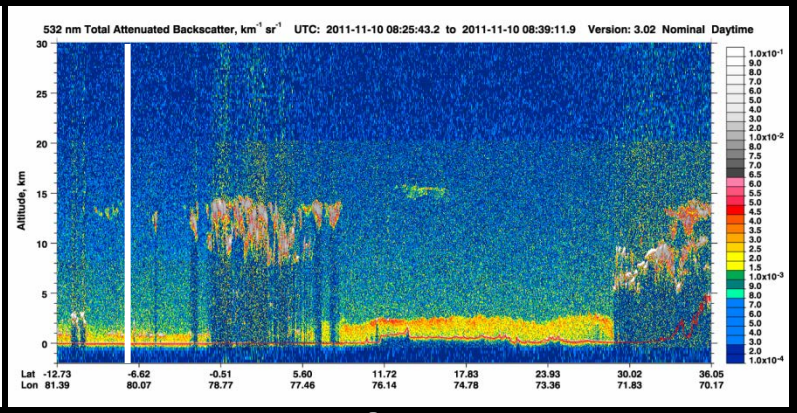




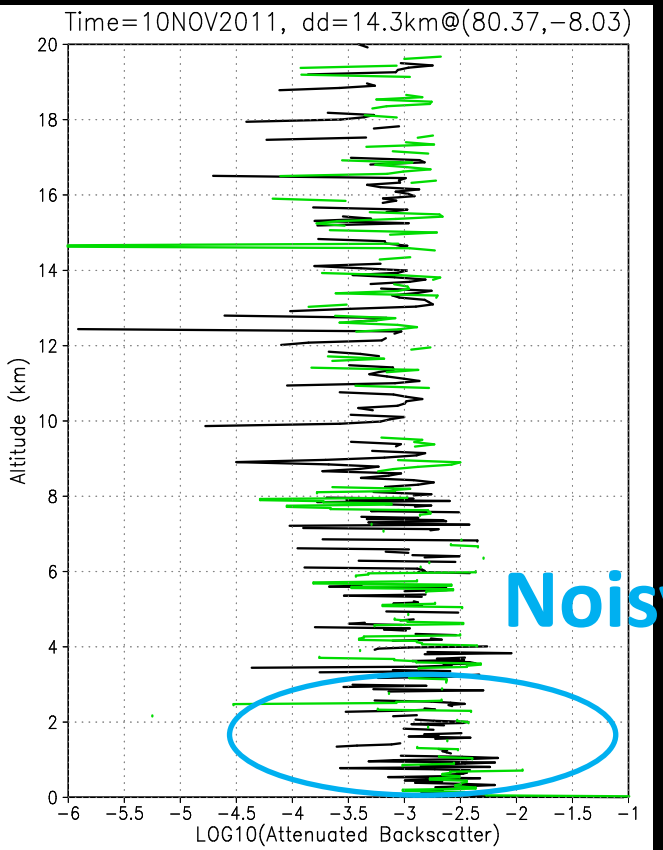
- **Good agreement**
- **Large –gradient areas sometimes rise to free troposphere**

November 10

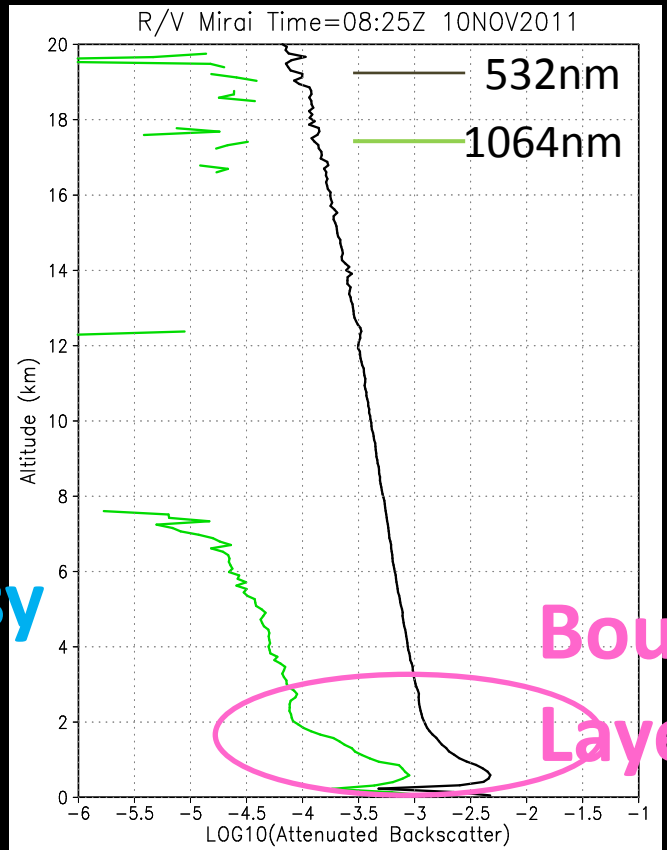




CALIPSO



HSRL (R/V Mirai)



Accumulation!

Summary

- For the validation of ABL height estimated by Lidar
  - Data: Radiosonde and HSRL during CINDY2011
    - Over the tropical India Ocean (ABL is clean and thin)
  - Comparison with sonde-ABL and Lidar-ABL heights
    - Similar evolution
    - 2^{nd} derivative of log(pbc) is better?
  - Comparison with ABL height estimated by CALIPSO
    - Snapshot is too noisy to estimate ABL height (even if there are no clouds in the upper level).
    - Sufficient accumulation is needed in order to precisely estimate ABL heights by CALIPSO data.