



EarthCARE 2026 Science and Validation workshop

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Breakthrough in ATLID's polarization characterization

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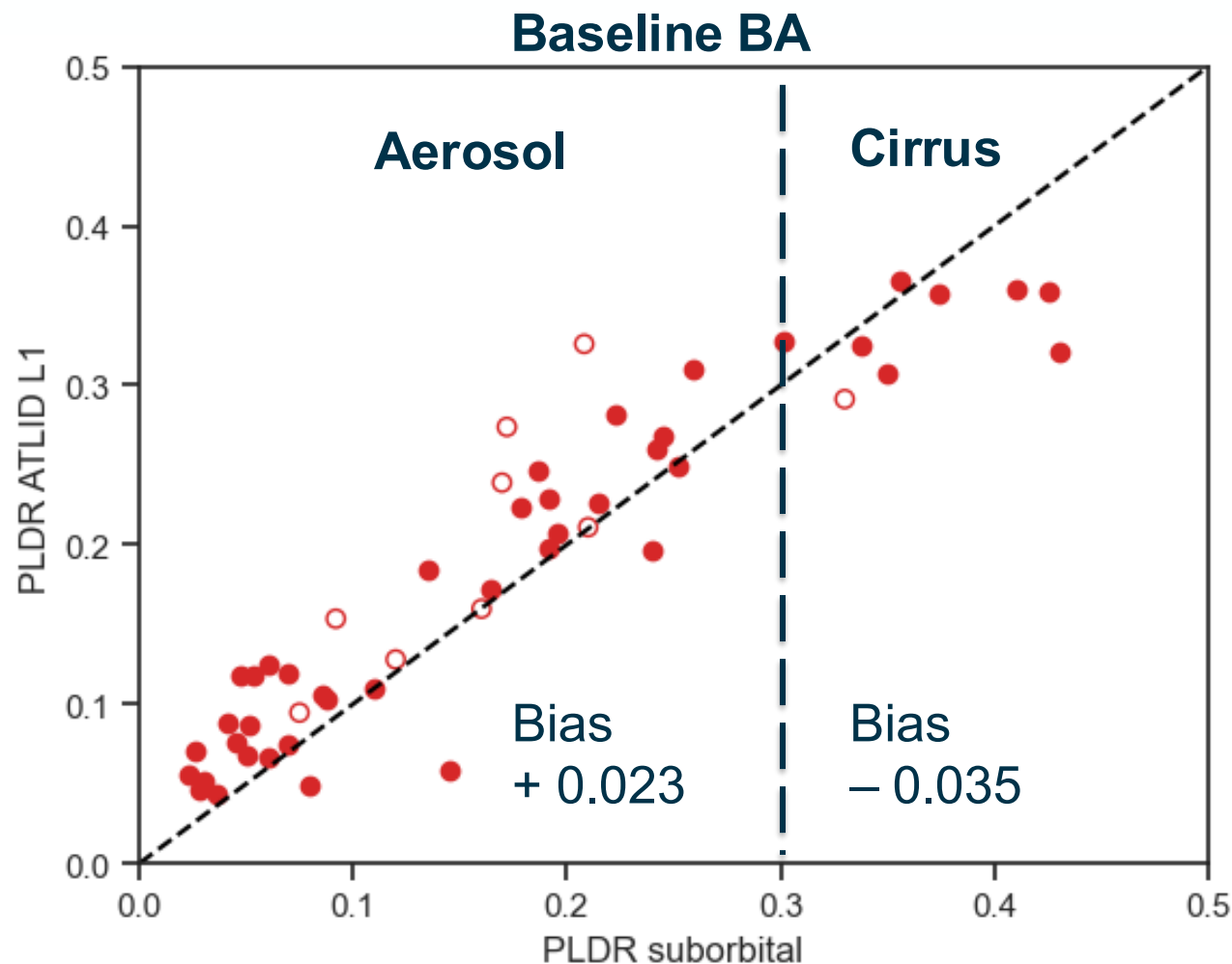
Suborbital Data Collection



ATLID L1 Validation – Status at Tokyo



L1 – 100 km around the station



- 53 layer-mean values, mostly night time
- Agrees within error bars, BUT there is a systematic bias
- Bias differently for aerosol and cirrus
- Stronger bias during daytime

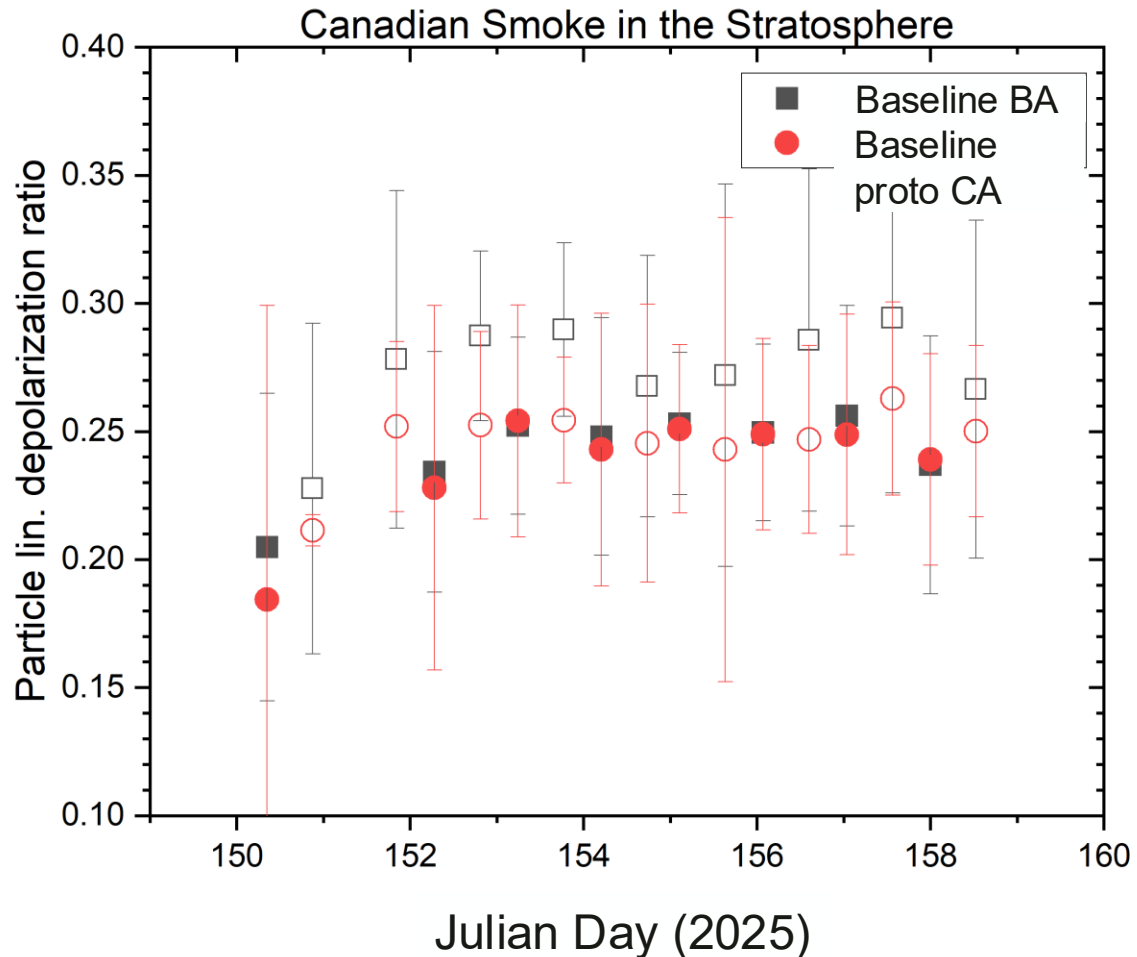
Issue 1

Daytime overestimation.

Issue 2

Overestimation of depolarization ratio.

Issue 1: Daytime overestimation



Tracking a stratospheric smoke plume with EarthCARE (Haarig et al., GRL 2026)

Higher depolarization during daytime
→ Unphysical behavior

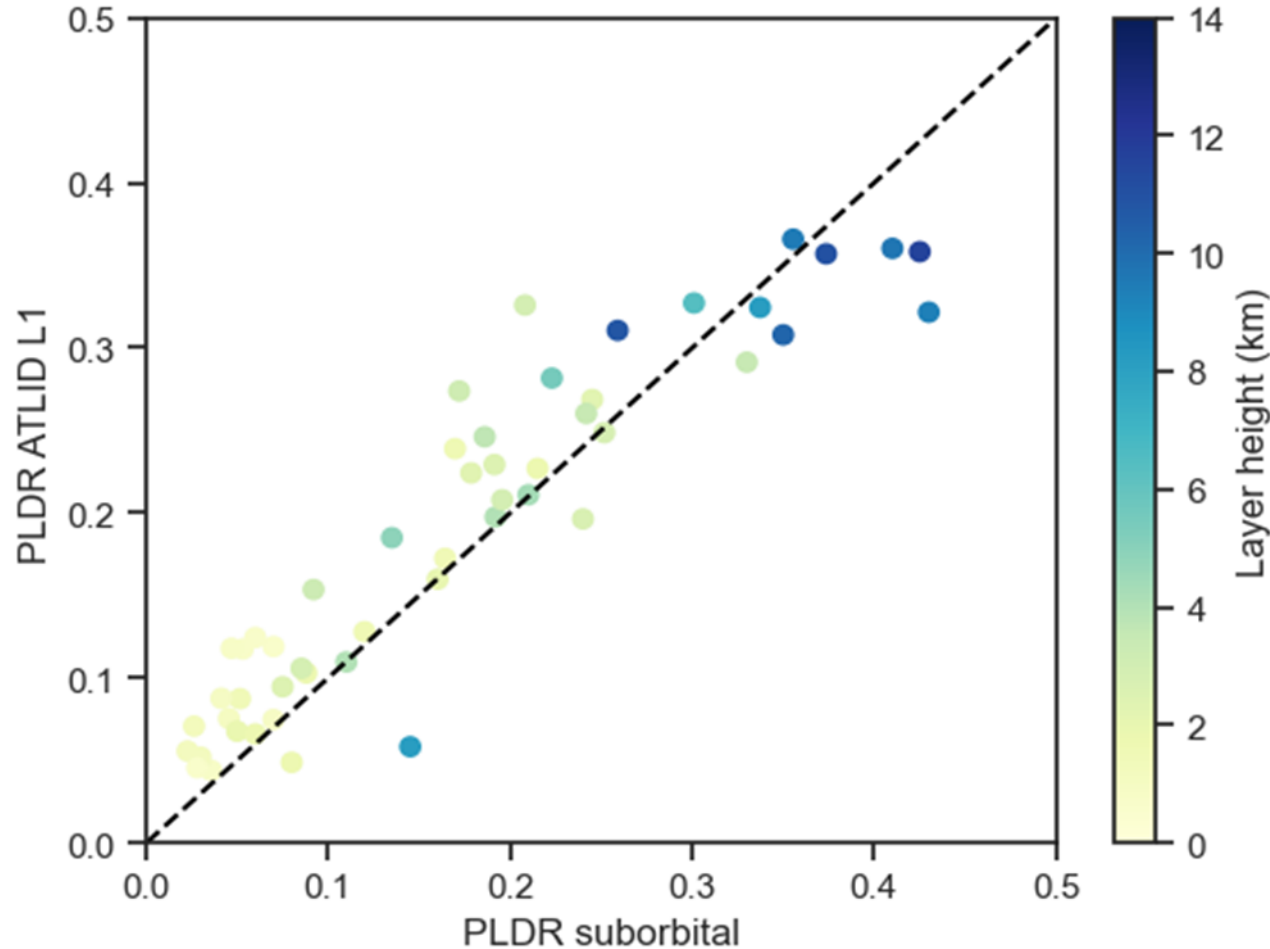
Solution 1

Improved background DC estimate for cross-polar channel during daytime.
(Dave, Dec 2025).

Issue 2: Overestimation of depolarization ratio



Baseline BA

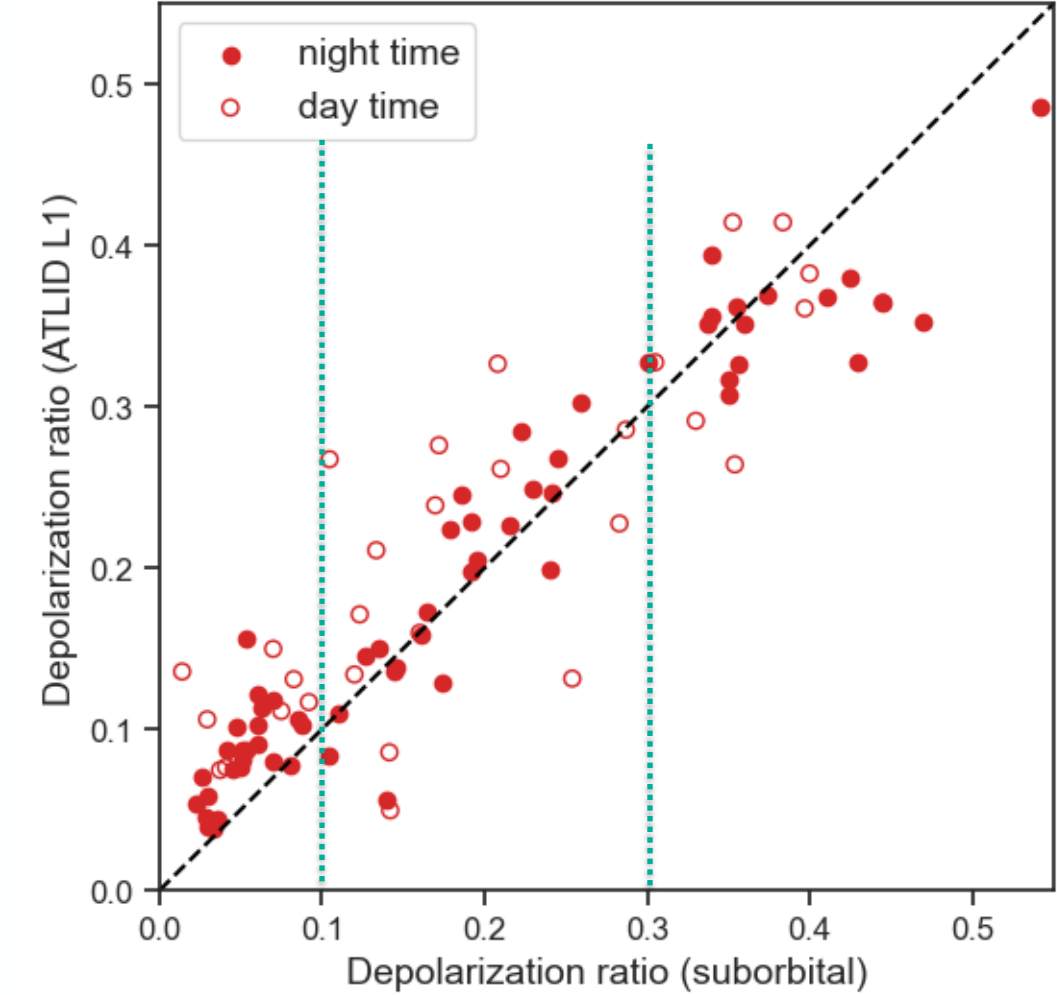


Bias seems to depend on layer height
→ Hint to some correction issue,
e.g., Rayleigh – Mie_cross cross talk

Solution 2

Correction of transmission and cross-talk definitions in L1 processor (Dave, Jan 2026).

Baseline BA (92 cases)

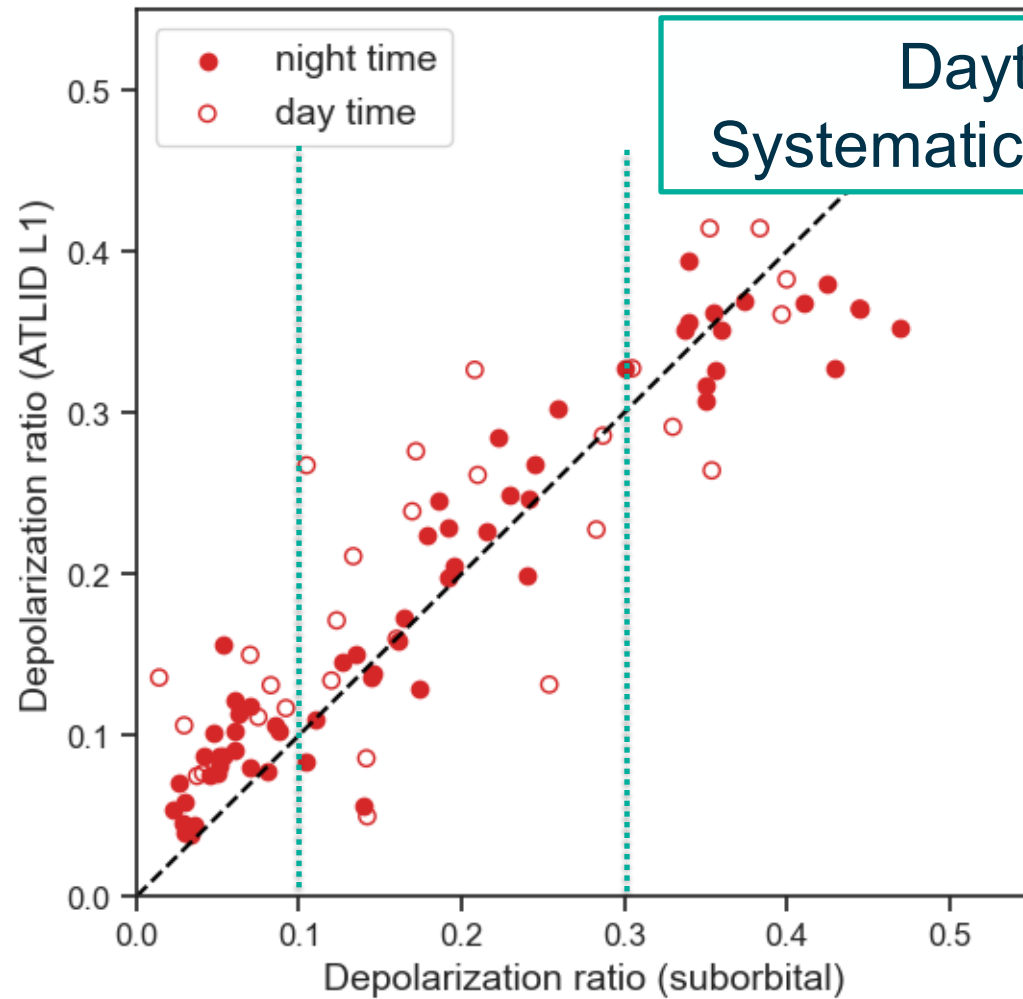


BIAS BA	Low depol	Medium depol	High depol	All
Night	0.0325	0.0071	−0.0312	0.0080
Day	0.0576	0.0227	−0.0184	0.0211
All	0.0388	0.0132	−0.0268	0.0123

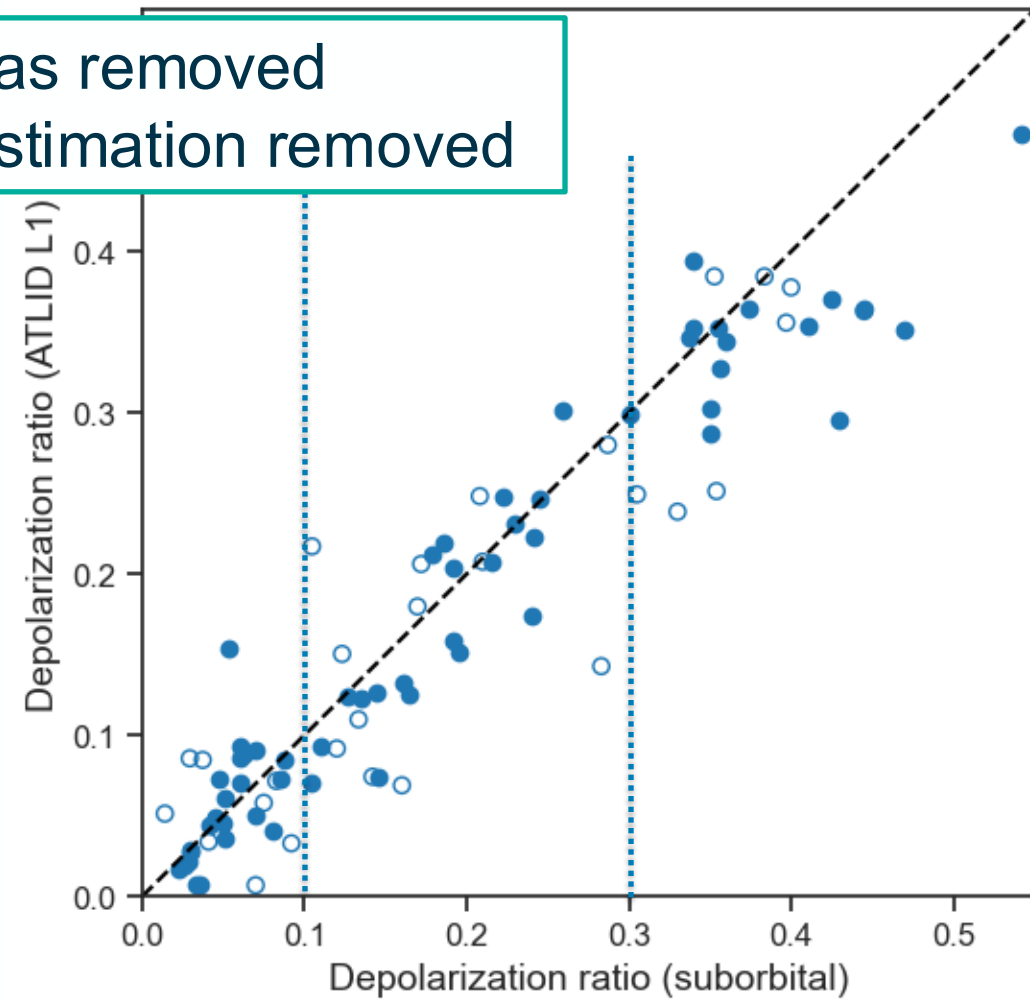
Results – L1



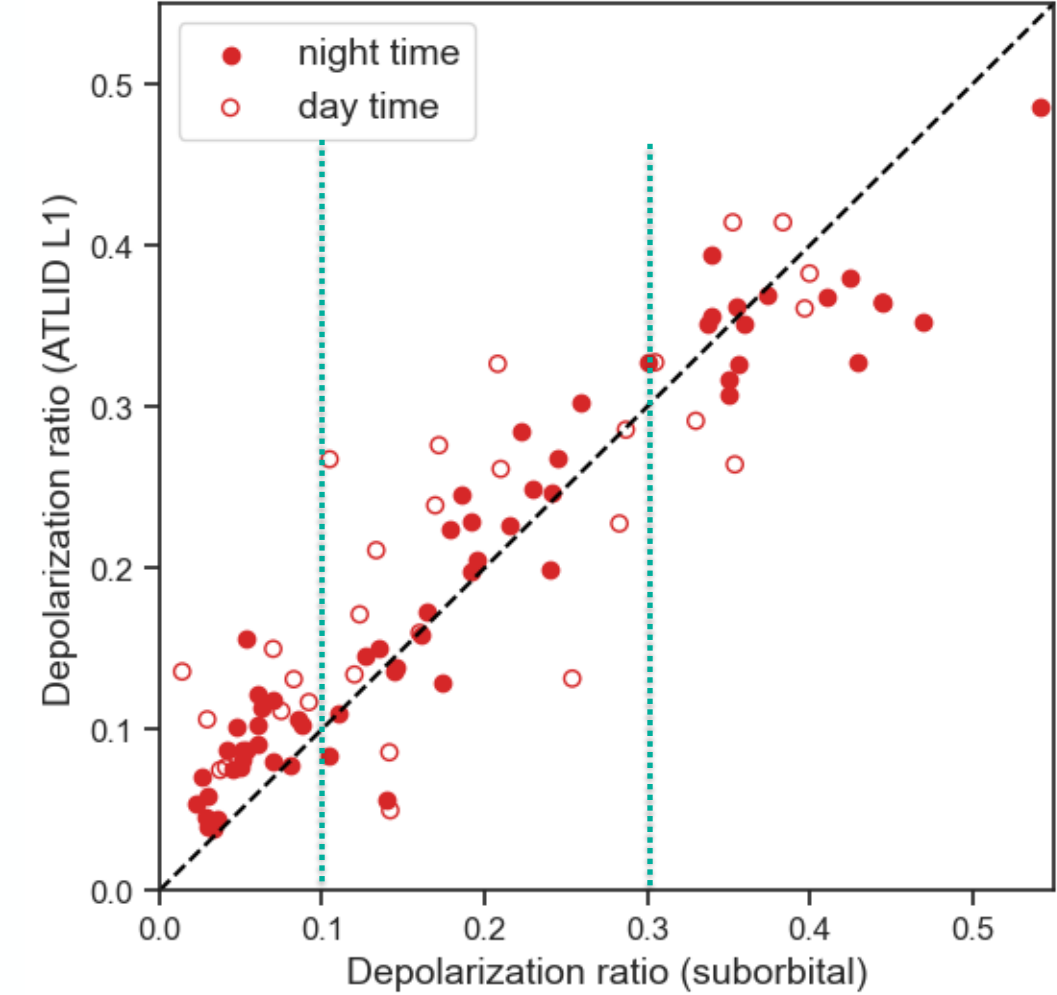
Baseline BA (92 cases)



Baseline proto-CA (87 cases)

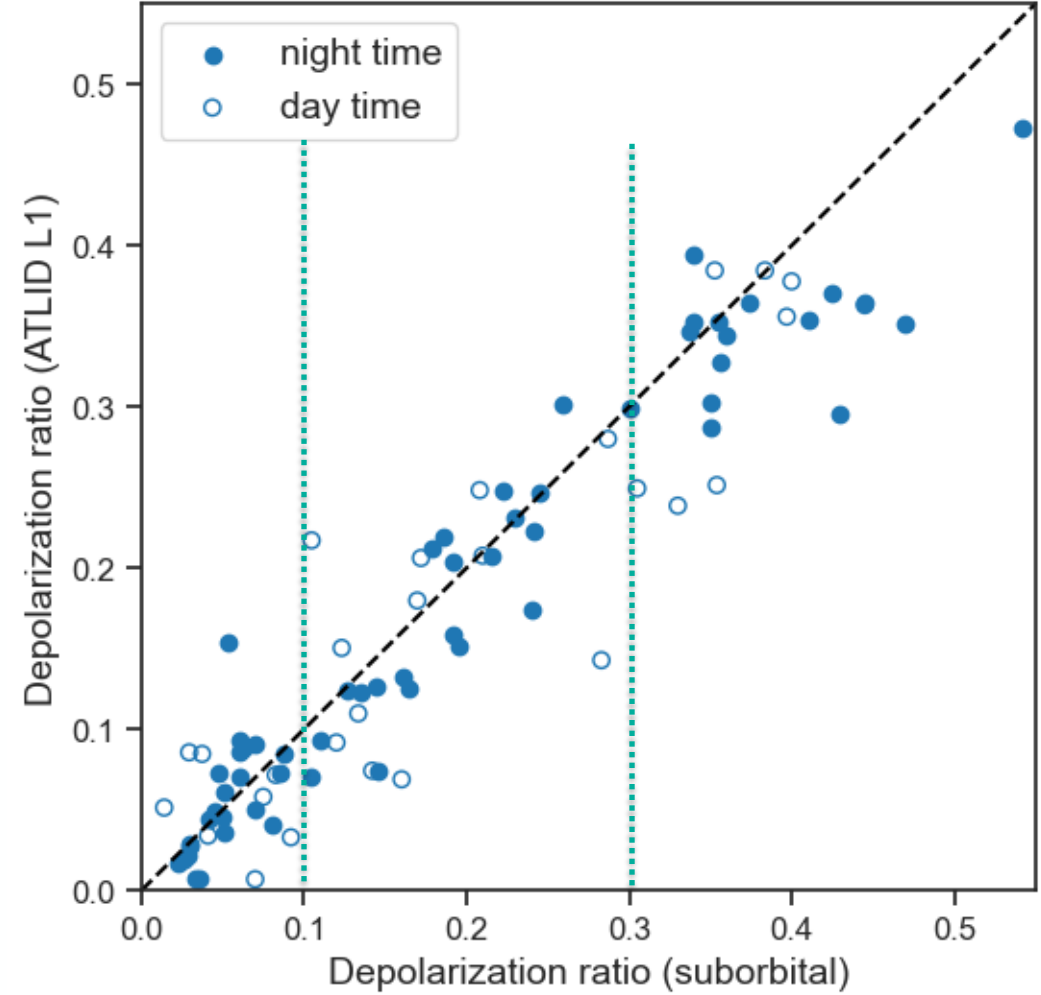


Baseline BA (92 cases)



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Baseline – proto CA (87 cases)



BIAS BA	Low depol	Medium depol	High depol	All
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BIAS proto CA	Low depol	Medium depol	High depol	All
Night	0.0039	−0.0121	−0.0400	−0.0128
Day	−0.0020	−0.0113	−0.0452	−0.0184
All	0.0024	−0.0118	−0.0418	−0.0146

- Now underestimation for medium and high depol

Conclusion



- Validation of ATLID L1 depolarization ratio
- Since workshop in Tokyo:
 - Daytime overestimation solved
 - General overestimation solved especially for low depol
 - BUT: turned into underestimation for medium & high depol
- New results and further investigations are needed.
- Thank you for all validation teams for the valuable measurements!