

# EVID<22> Validation of the EarthCARE ATLID and MSI products using ground-based lidar and sunphotometry measurements in East Asia.

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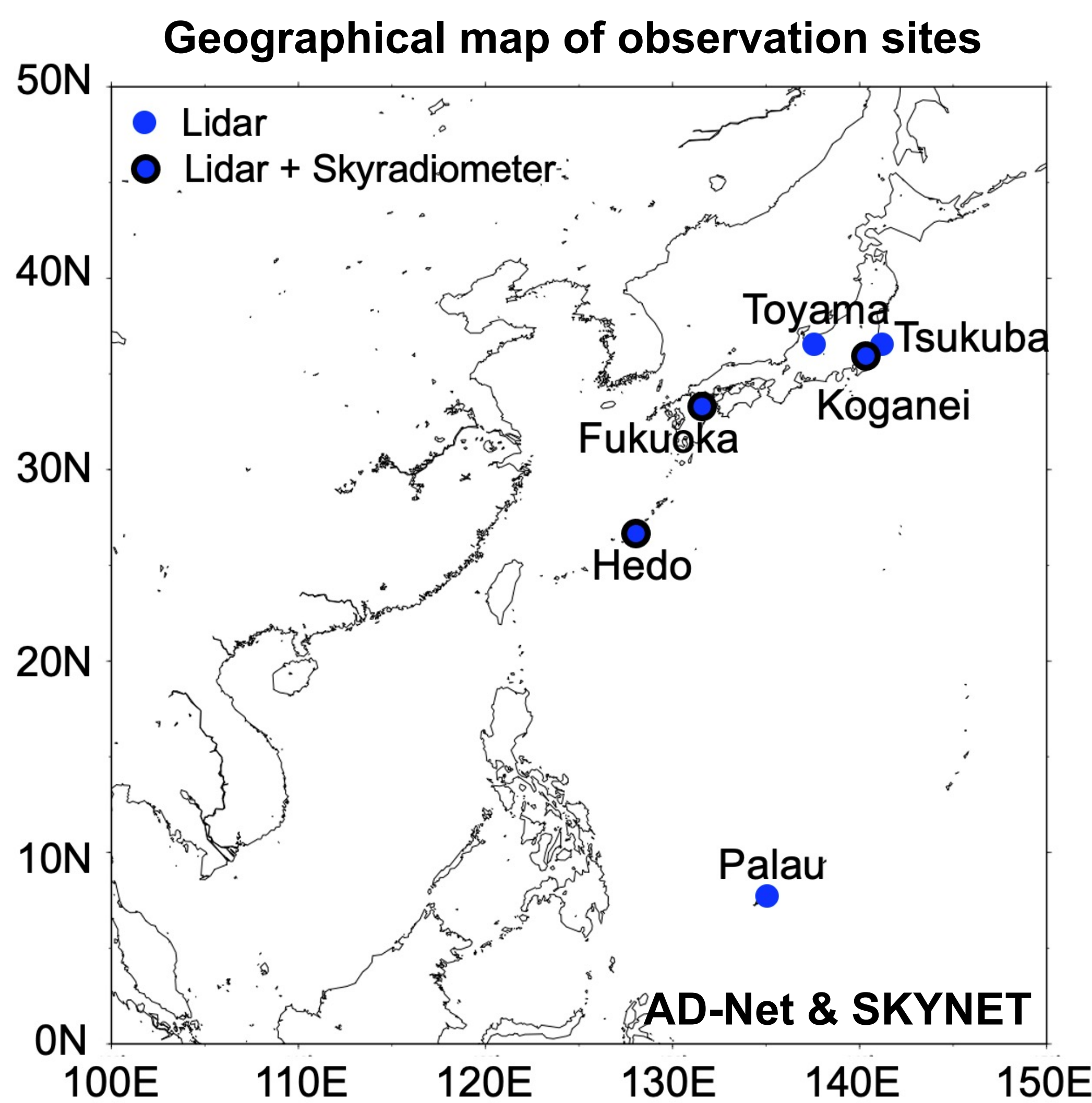
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## [Objective]

The objective is to validate the ATLID L1B, ATLID L2A, MSI L2A, and ATLID-MSI L2B products using ground-based lidar and sunphotometry data, and to contribute to the performance evaluation of EarthCARE observations. This study focuses primarily on aerosol-related products, the main target parameters being Mie co-polar, Rayleigh, and cross-polar attenuated backscatter coefficients at 355 nm (ATLID L1B); 10 km-scale aerosol-oriented 355 nm extinction, backscatter, and depolarization profiles (A-AER/ATLID L2A); 355 nm cloud and aerosol extinction, backscatter, and depolarization profiles (A-EBD/ATLID L2A), and aerosol layer products (A-ALD/ATLID L2A); aerosol optical thicknesses (AOTs) at 670 and 865 nm (M-AOT/MSI-L2A); and columnar aerosol optical properties (AM-ACD/ATLID-MSI L2B).

## [Observation]

### Measured parameters



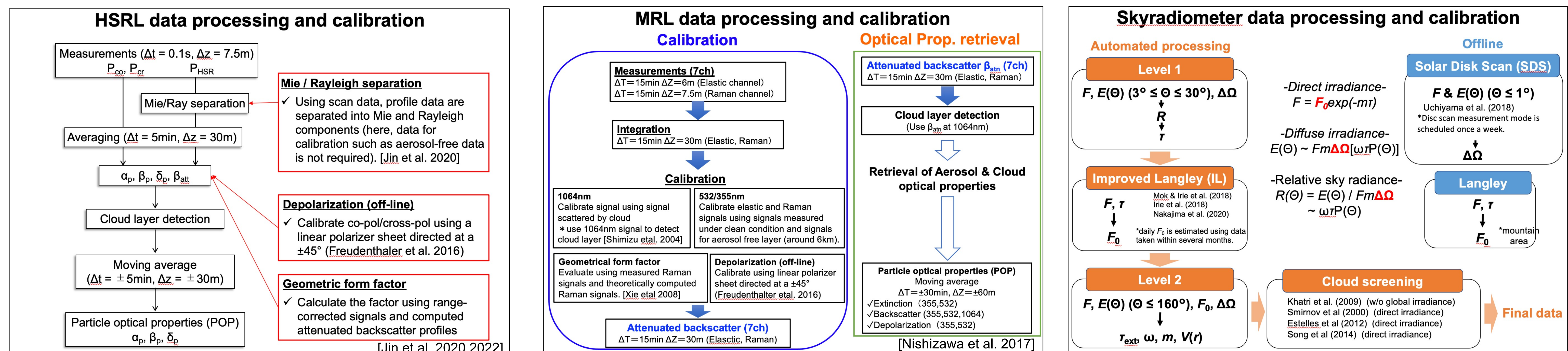
### Instruments



Site (Environment)	Lat / Lon	Instrument (Status)	Parameter
Koganei (Rural-Urban)	35.7N 139.48E	HSRL (In operation)	$\alpha, \beta, \delta, S$ : 355 (Day & Night) Attenuated backscatter: 355 (Day & Night)
		Sky Radiometer (In operation)	AOT: 340, 380, 400, 500, 675, 870, and 1020 (Day) Angstrom exponent (Day)
Tsukuba (Rural)	36.05N 140.12E	HSRL (In operation)* <sup>1</sup>	$\alpha, \beta, \delta, S$ : 355 (Day & Night) $\alpha, \beta, \delta, S$ : 532 (Day & Night) Attenuated backscatter: 355/532/1064 (Day & Night)
Hedo (Maritime)	26.87N 128.25E	MRL (In operation)	$\alpha, \beta, \delta, S$ : 355/532 (Night) Attenuated backscatter: 355/532/1064 (Day & Night)
		Sky Radiometer (In operation)	AOT: 340, 380, 400, 500, 675, 870, and 1020 (Day) Angstrom exponent (Day)
Fukuoka (Rural-Urban)	33.52N 130.48E	MRL+HSRL (In operation)	$\alpha, \beta, \delta, S$ : 355 (Night) $\alpha, \beta, \delta, S$ : 532 (Day & Night) Attenuated backscatter: (Day & Night)
		Sky radiometer (In operation)	AOT: 340, 380, 400, 500, 675, 870, and 1020 (Day) Angstrom exponent (Day)
Toyama (Rural)	36.7N 137.1E	MRL (In operation)	$\alpha, \beta, \delta, S$ : 355/532 (Night) Attenuated backscatter: 355/532/1064 (Day & Night)
Palau (Maritime)	7.34N 134.5E	MRL (Inactive)* <sup>2</sup>	$\alpha, \beta, \delta, S$ : 355/532 (Night) Attenuated backscatter: 355/532/1064 (Day & Night)
RV Mirai (ocean)	Ocean	MRL (In operation)	$\alpha, \beta, \delta, S$ : 355/532 (Night) Attenuated backscatter: 355/532/1064 (Day & Night)

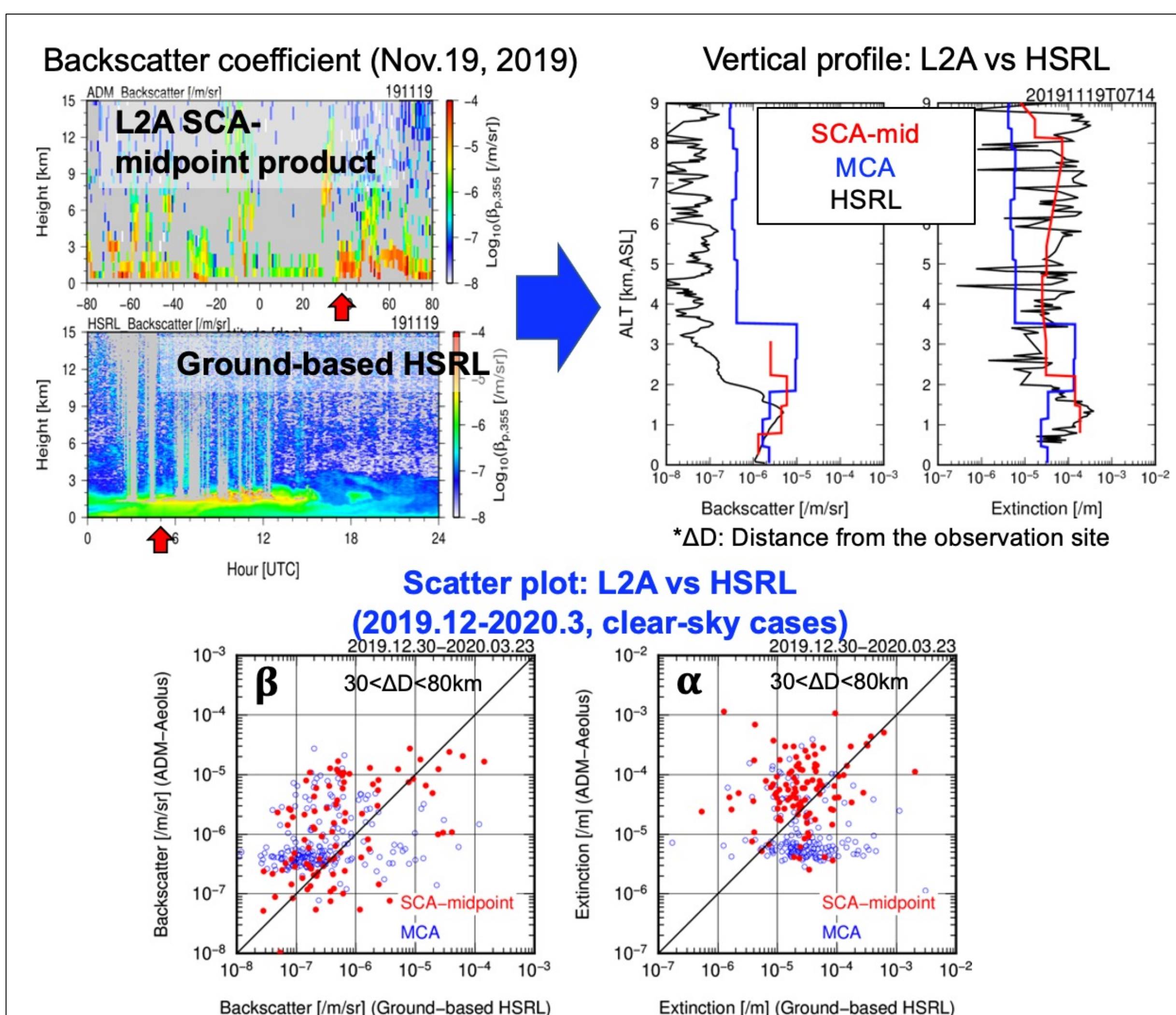
\*<sup>1</sup>) Transition to 355/532 HSRL from 2020. Intermittent measurements are being taken while improvements are being made; continuous measurements will be made during the mission after launch. \*<sup>2</sup>) Palau site is scheduled to close in 2024 and is being considered for relocation.

## [Method to derive optical properties of aerosols and clouds]

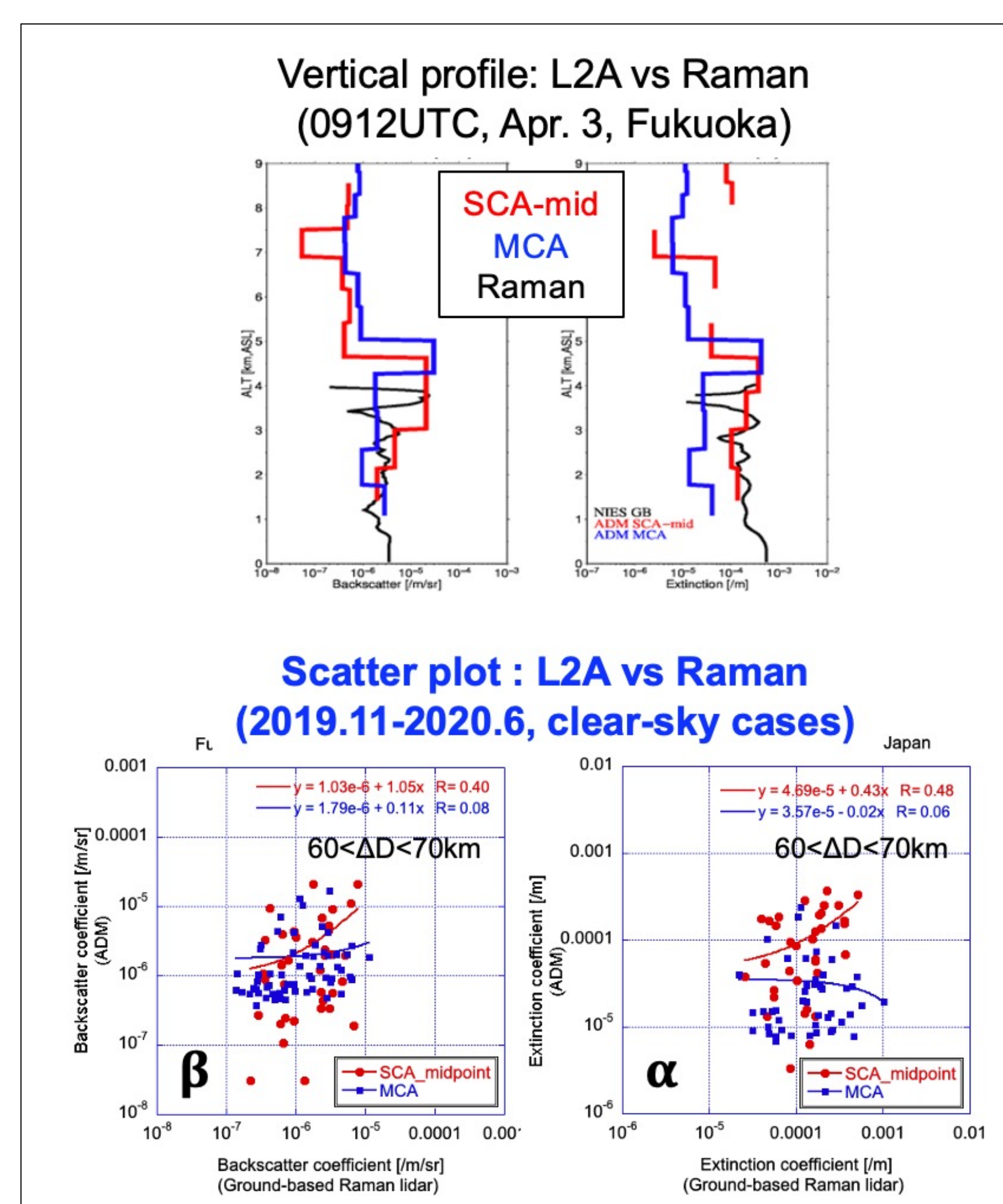


## [Aeolus-L2A comparison with ground-based lidars (validation activity)]

### ADM vs HSRL (Koganei)



### ADM vs Raman (Fukuoka)



## [Q&A]

- (Q1) Status of funding  
 ➔ Supported for all the instruments and sites except Palau. The Palau site is scheduled to close in 2024 and is being considered for relocation.
- (Q2) Status of conversion of your correlative data to GEOMS format  
 ➔ Not implemented
- (Q3) Which previous campaigns does your project have heritage in/overlap with/complement?  
 ➔ This study is planned using ground network observations AD-Net (Shimizu et al. 2016) and SKYNET (Nakajima et al. 2020).
- (Q4) Will you look at orbital/geographical differences of the cloud products?  
 ➔ No, we do not.
- (Q5) Do you plan cross-satellite validation studies?  
 ➔ Although not specifically considered, construction of a data set integrating satellite data such as AHI/Himawari and MODIS/Aqua with ground observation data is underway.
- (Q6) Do you have ground-based remote sensing instruments close to each other to validate MSI cloud products on larger spatial scales?  
 ➔ No, we do not.
- (Q7) Do you plan long-term measurements within the MSI swath to validate the L2 products and to support the long-term instrument/algorithm monitoring?  
 ➔ We will conduct long-term observations during and beyond the EarthCARE mission.
- (Q8) Do you plan MSI L1 validation?  
 ➔ No, we do not.

### Reference

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