ALOS-2/PALSAR-2 Calibration and Validation Results

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JAXA EORC & SAOC ALOS-2 Operation Team

Summary of evaluation results of ALOS-2 PALSAR-2 standard products [1/3]

✓ Observation dates of the evaluated scenes: July, 2014 ~ September, 2022

Items		Observation modes	Results	Number of data	Requirements
Geometric accuracy [m]		Stripmap and Spotlight	5.39 m (L1.1) 6.73 m (L2.1)	537 129	≦20 m
		ScanSAR	60.77 m (L1.1) 29.33 m (L2.1)	7 8	≦100 m
Radiometric accuracy [dB]	Evaluation using corner reflectors	Stripmap and Spotlight	0.522 dB (1σ) (mean CF: -83.028 dB)	347	≦1.0 dB
	Evaluation using images over Amazonian forests	Stripmap and Spotlight	0.41 dB (1σ) (mean γ^0: -7.50 dB)	30 scenes	
Polarimetry	VV/HH amplitude ratio	Stripmap 6m (polarimetry)	1.003 (σ=0.012)	52	≦1±0.047
	VV/HH phase difference [deg.]		-0.362 deg (σ=1.404)		≦5 deg
	Cross talk [dB]		-42.970 dB (σ=6.609) [HV/HH] -42.889 dB (σ=5.590) [VH/VV]		≦-30 dB

Summary of evaluation results of ALOS-2 PALSAR-2 standard products [2/3]

Items		Observation modes	Results	Number of data	Requirements
Resolution [m]		Spotlight	Az. 0.95 (σ=0.32) Rg. 1.69 (σ=0.01)	8	Az. 1.00 x 1.1 Rg. 1.78
		Stripmap 3m	Az. 2.81 (σ=0.02) Rg. 1.71 (σ=0.02)	190	Az. 2.75 x 1.1 Rg. 1.78
		Stripmap 6m	Az. 4.01 (σ=0.03) Rg. 3.51 (σ=0.02)	98	Az. 3.75 x 1.1 Rg. 3.57
		Stripmap 10m	Az. 4.96 (σ=0.05) Rg. 5.32 (σ=0.05)	74	Az. 5.00 x 1.1 Rg. 5.36
Sidelobe (dB)	PSLR	All	Az. -16.286 (σ=2.267) Rg. -12.776 (σ=0.509)	370	≦-13.26+2.00 dB
	ISLR	All	-9.191 (σ=1.566)		≦-10.16+2.00 dB

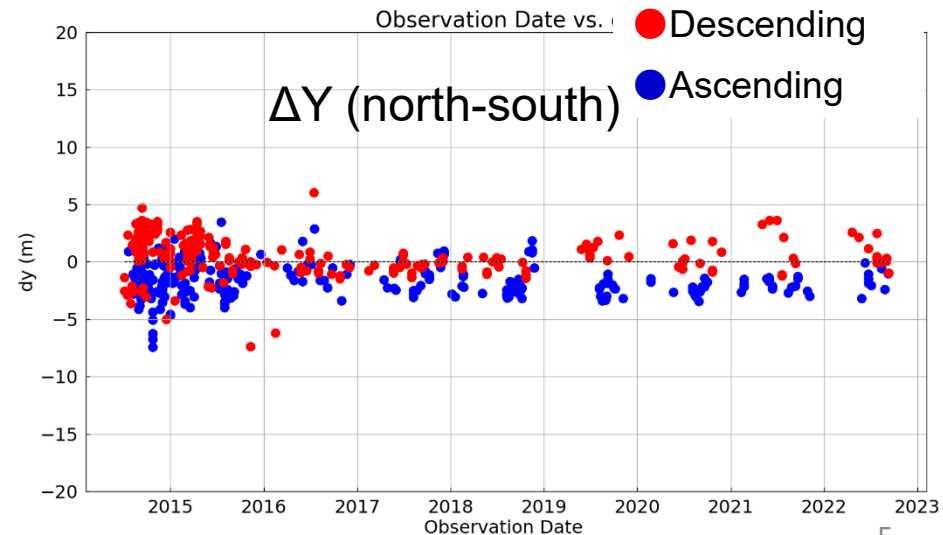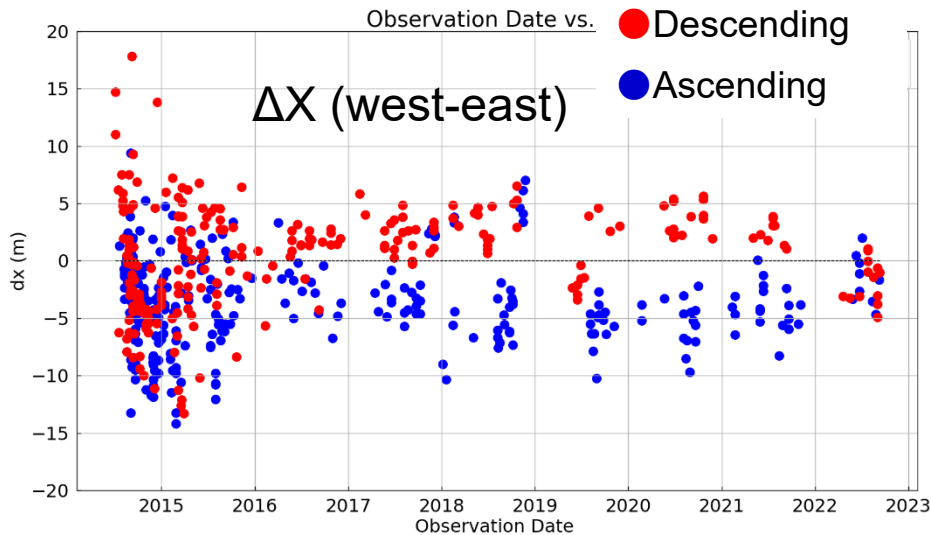# Summary of evaluation results of ALOS-2 PALSAR-2 standard products [3/3]

Items		Observation modes	Results	Number of data	Requirements
NESZ [dB]		Stripmap 3m (U2)	-36.6 (HH)	3	≦-24.0 dB (scene center)
		Stripmap 6m (FP6-3〜7)	-36.0 (HH) -46.0 (HV)	5	≦-28.0 dB (scene center)
		Stripmap 10m (F2)	-41.1 (HH) -49.2 (HV)	3	≦-26.0 dB (scene center)
Ambiguity [dB]	Azimuth	All	14-23 dB (ave. 20dB)	7 scenes	≧20-25 dB
	Range	All	Not visible	7 scenes	≧20-25 dB

Evaluation results of geometric accuracy

Differences between point target responses in SAR images and in situ GPS measurements

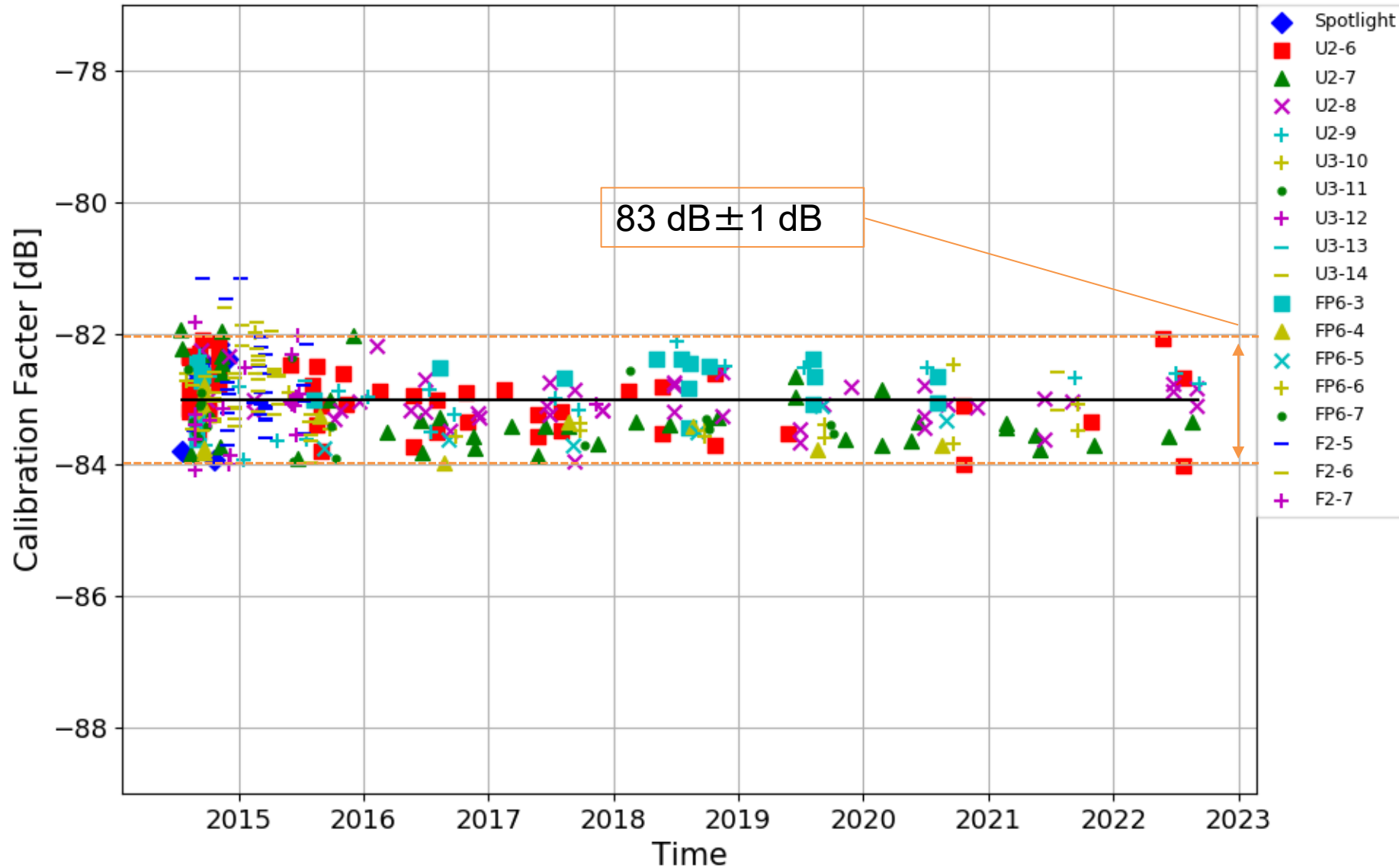| Mode	ΔX (west-east) [m]			ΔY (north-south) [m]			n
	mean (bias)	SD	RMS	mean (bias)	SD	RMS	
Spotlight	-5.126	4.365	6.946	-0.569	1.870	1.964	10
Stripmap 3 m (U2-6~9, U3-10~14)	0.079	4.197	4.198	0.011	1.822	1.822	260
Stripmap 6 m (FP6-3~7)	-3.329	3.713	4.994	-1.514	1.382	2.054	148
Stripmap 10 m (F2-5~7)	-3.533	5.226	6.317	-0.736	2.282	2.399	119

Timeseries plot of Stripmap 3 m, 6m, 10m and Spotlight 1m

Evaluation results of radiometric accuracy – calibration factor (CR) [1/2]

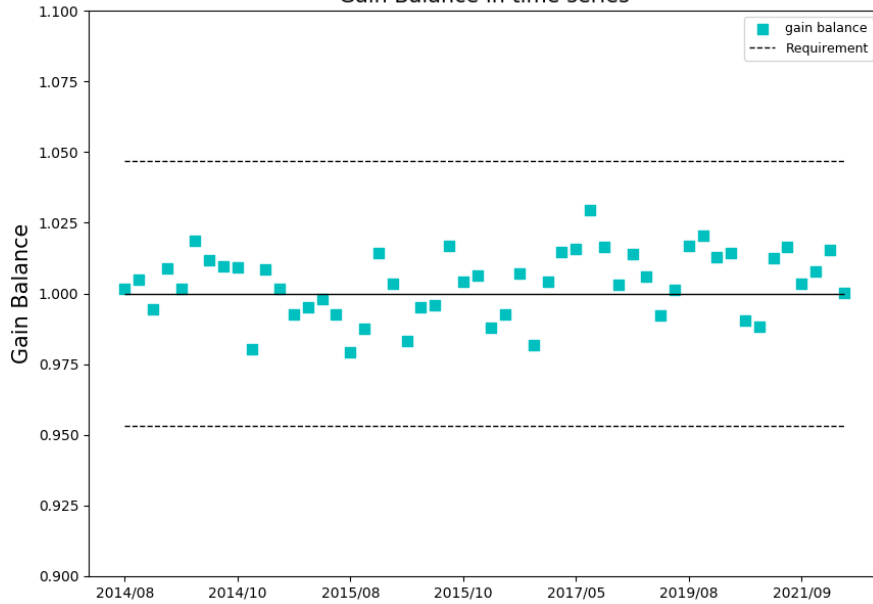| Mode	Mean [dB]	SD [dB]	RMS to -83 dB [dB]	n
Spotlight	-82.831	0.657	0.682	8
U2-6	-82.975	0.464	0.465	54
U2-7	-83.289	0.505	0.584	38
U2-8	-83.060	0.352	0.358	44
U2-9	-82.947	0.459	0.463	27
FP6-3	-82.776	0.376	0.441	19
FP6-4	-83.419	0.381	0.580	12
FP6-5	-83.471	0.233	0.559	7
FP6-6	-83.278	0.397	0.491	14
FP6-7	-83.272	0.377	0.469	19
F2-5	-82.806	0.659	0.687	31
F2-6	-82.838	0.526	0.551	44
F2-7	-83.172	0.583	0.609	17
ALL	-83.037	0.512	0.513	334

Evaluation results of radiometric accuracy – calibration factor (CR) [2/2]
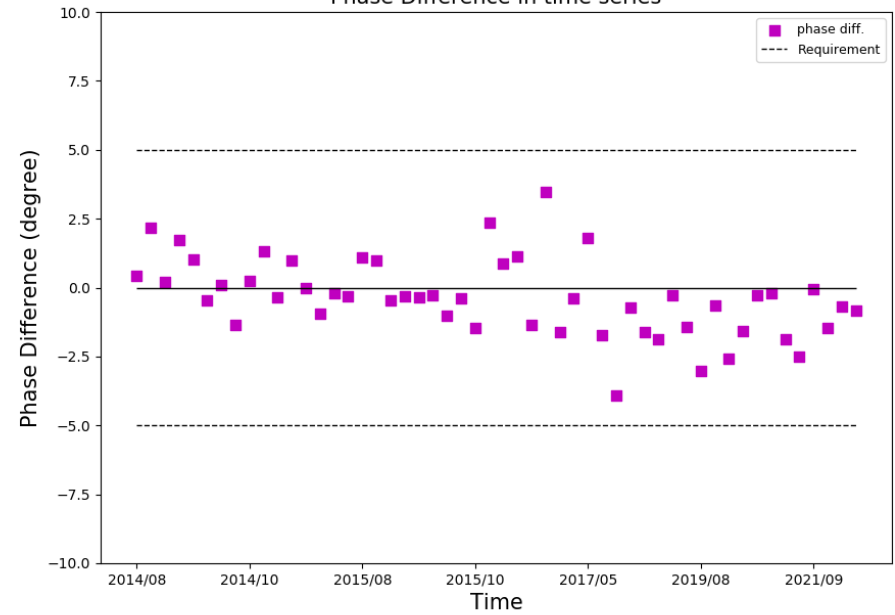

Calibraion Factor by beams in time series

83 dB±1 dB

Evaluation results of polarimetric accuracy