

# **ALOS-2/PALSAR-2 Calibration and Validation Results**

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

✓ Observation dates of the evaluated scenes: July, 2014 ~ September, 2019

Items		Observation modes	Results	Number of data	Requirements
Geometric accuracy [m]		Stripmap and Spotlight	6.29 m (L1.1) 6.73 m (L2.1)	350 129	$\leq 20$ m
		ScanSAR	60.77 m (L1.1) 29.33 m (L2.1)	7 8	$\leq 100$ m
Radiometric accuracy [dB]	Evaluation using corner reflectors	Stripmap and Spotlight	0.551 dB ( $1\sigma$ ) (mean CF: -82.977 dB)	296	$\leq 1.0$ dB
	Evaluation using images over Amazonian forests	Stripmap and Spotlight	0.41 dB ( $1\sigma$ ) (mean $\gamma^0$ : -7.50 dB)	30 scenes	
Polarimetry	VV/HH amplitude ratio	Stripmap 6m (polarimetry)	1.002 ( $\sigma=0.012$ )	41	$\leq 1 \pm 0.047$
	VV/HH phase difference [ deg. ]		-0.148 deg ( $\sigma=1.446$ )		$\leq 5$ deg
	Cross talk [dB]		-43.269 dB ( $\sigma=6.828$ ) [HV/HH] -42.941 dB ( $\sigma=5.699$ ) [VH/VV]		$\leq -30$ 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. 0.80 ( $\sigma=0.07$ ) Rg. 1.69 ( $\sigma=0.01$ )	7	Az. 1.00 x 1.1 Rg. 1.78
		Stripmap 3m	Az. 2.81 ( $\sigma=0.02$ ) Rg. 1.71 ( $\sigma=0.02$ )	141	Az. 2.75 x 1.1 Rg. 1.78
		Stripmap 6m	Az. 4.01 ( $\sigma=0.03$ ) Rg. 3.51 ( $\sigma=0.02$ )	70	Az. 3.75 x 1.1 Rg. 3.57
		Stripmap 10m	Az. 4.96 ( $\sigma=0.05$ ) Rg. 5.32 ( $\sigma=0.05$ )	74	Az. 5.00 x 1.1 Rg. 5.36
Sidelobe (dB)	PSLR	All	Az. -16.236 ( $\sigma=2.339$ ) Rg. -12.800 ( $\sigma=0.493$ )	292	$\leq -13.26+2.00$ dB
	ISLR	All	-9.205 ( $\sigma=1.724$ )		$\leq -10.16+2.00$ dB

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

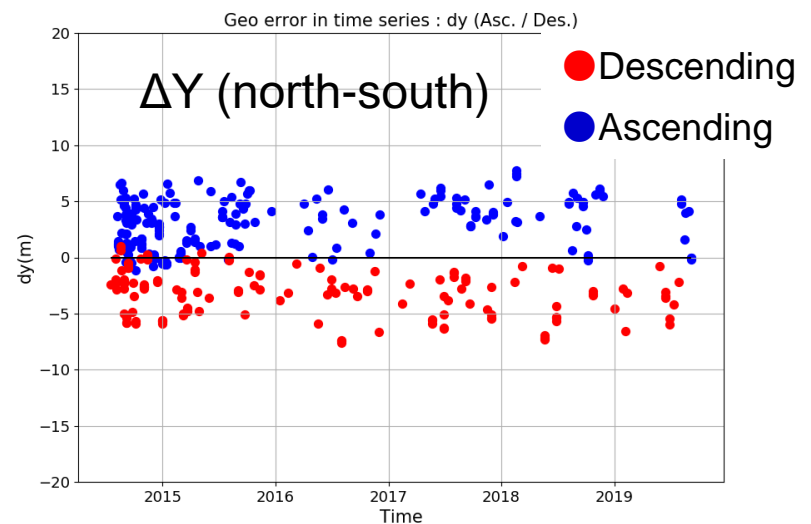
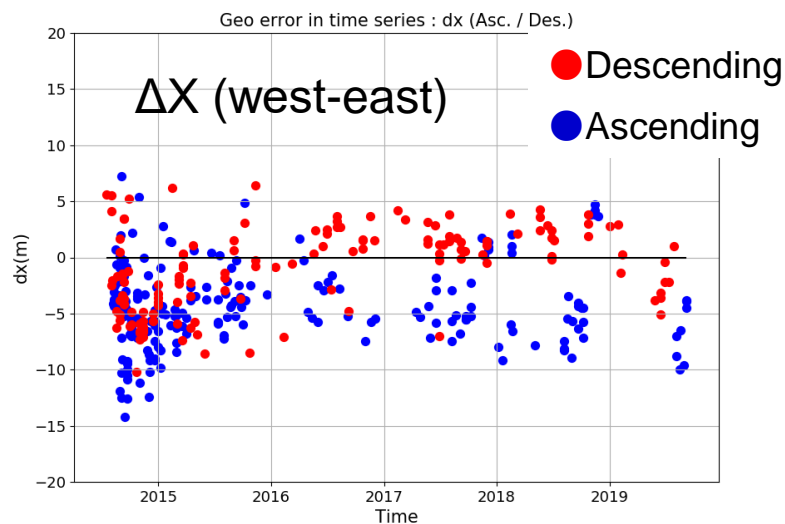
Items		Observation modes	Results	Number of data	Requirements
NESZ [dB]		Stripmap 3m (U2)	-36.6 (HH)	3	$\leq -24.0$ dB (scene center)
		Stripmap 6m (FP6-3~7)	-36.0 (HH) -46.0 (HV)	5	$\leq -28.0$ dB (scene center)
		Stripmap 10m (F2)	-41.1 (HH) -49.2 (HV)	3	$\leq -26.0$ dB (scene center)
Ambiguity [dB]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

# Evaluation results of geometric accuracy

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

Mode	$\Delta X$ (west-east) [m]			$\Delta Y$ (north-south) [m]			n
	mean (bias)	SD	RMS	mean (bias)	SD	RMS	
Spotlight	-5.423	4.278	7.140	2.540	2.439	3.622	10
Stripmap 3 m (U2-6~9, U3-10~14)	-0.818	3.642	3.733	-1.139	3.979	4.140	165
Stripmap 6 m (FP6-3~7)	-4.741	3.723	6.046	3.193	2.151	3.863	103
Stripmap 10 m (F2-5~7)	-5.169	2.563	5.802	-0.055	2.637	2.637	72

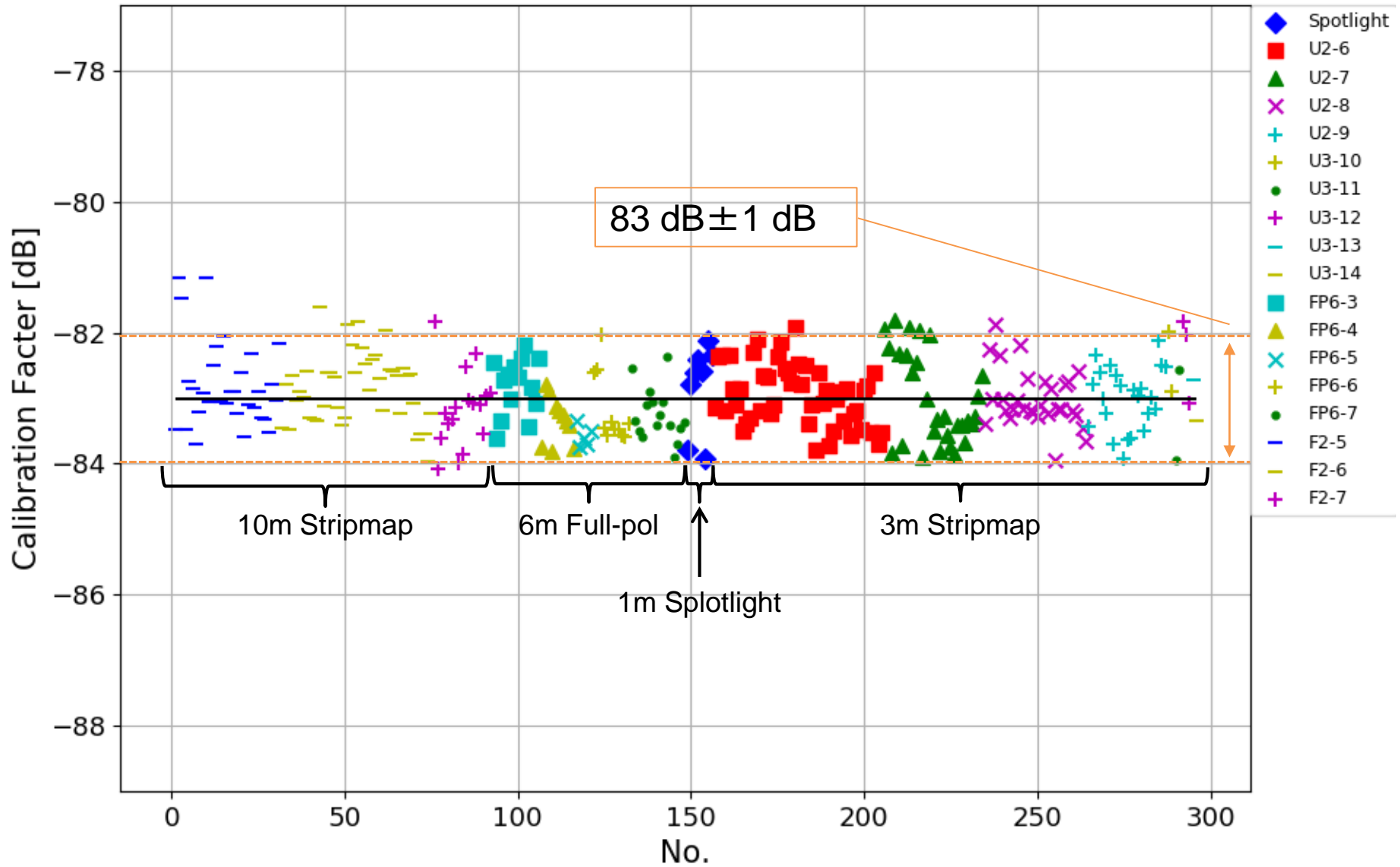
Timeseries plot of Stripmap 3 m, 6m, 10m and Spotlight 1m



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

Mode	Mean [dB]	SD [dB]	RMS to -83 dB [dB]	n
<b>Spotlight</b>	-82.821	0.667	0.694	8
<b>U2-6</b>	-82.948	0.466	0.469	49
<b>U2-7</b>	-83.055	0.672	0.674	28
<b>U2-8</b>	-83.047	0.393	0.396	29
<b>U2-9</b>	-82.999	0.478	0.478	23
<b>FP6-3</b>	-82.804	0.431	0.477	14
<b>FP6-4</b>	-83.335	0.357	0.502	10
<b>FP6-5</b>	-83.577	0.16	0.665	5
<b>FP6-6</b>	-83.19	0.532	0.569	11
<b>FP6-7</b>	-83.247	0.405	0.479	16
<b>F2-5</b>	-82.806	0.659	0.687	31
<b>F2-6</b>	-82.838	0.526	0.551	44
<b>F2-7</b>	-83.172	0.583	0.609	17
<b>ALL</b>	-82.994	0.539	0.539	285

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



# Evaluation results of polarimetric accuracy

