RCM Compact-Pol Calibration Status Update – 2022-05-12

Since the beginning of RCM operations, several updates took place to improve the compact-pol calibration. The following table summarizes those updates.

Effective from (processing date)[1]	Description
2021-01-25	Correction of a 3 dB offset in the radiometry. To apply the correction to older products, the CH and CV amplitudes should be multiplied by $1/\sqrt{2}$ (equivalent to a reduction of 3 dB).
2021-03-16	Correction of a 90 degrees phase offset (non effective for ScanSAR modes until 2021-09-09). To apply the correction to older products, 90 degrees should be subtracted from the phase of the CV channel data (or equivalently -jCV should be used instead of CV).
2021-05-27	Compact-pol calibration refinement for the beams used in Medium Resolution 50 m (except High Incidence SC50MCPE), Low Resolution 100 m and Low Noise modes. Compact-pol phase calibration is not effective for ScanSAR modes before 2021-09-09.
2021-08-11	Compact-pol calibration refinement for the beams used in Medium Resolution 30 m. Compact-pol phase calibration is not effective for ScanSAR modes before 2021-09-09.
2021-09-09	Correction of a processor issue preventing the calibration of the compact-pol phase for ScanSAR modes.
2021-10-08	Compact-pol calibration refinement for the beams used in High Resolution 5 m and Medium Resolution 16 m.
2021-12-16	Compact-pol calibration refinement for the beams used in Very High Resolution 3 m and Spotlight.

The baseline RCM compact-pol calibration method is approximate. According to NRCan's updated assessment, it is deemed of sufficient accuracy when the non-circularity of the transmitted signal is not too high, which is currently expected to occur for the beams between approximately 20 and 46 degrees of incidence angles. The following tables show in green the swath positions within that range. For the modes with wider swaths (e.g. Medium Resolution 50 m and Low Resolution 100 m), there is no single swath position completely within this range. The beams outside this range of incidence angle should be used with caution, even for applications with low cross-pol signal, which are now expected to be affected in radiometry by the non-circularity according to NRCan's updated analysis. To be noted that the beams at very high resolution (3 m and Spotlight) have not been assessed for non-circularity.

[1] Processing date can be found in the *product.xml* file in the *metadata* folder of the product, under the parameter *<processingTime>.*

Medium Resolution 30 m

Beam Mode Mnemonic	Incidence Angle Near (deg)	Incidence Angle Far (deg)
SC30MCPA	17.30 (to 20)	(20 to) 28.84
SC30MCPB	26.09	36.30
SC30MCPC	33.89	42.75
SC30MCPD	40.67 (to 46)	(46 to) 48.30

Medium Resolution 16 m

Beam Mode Mnemonic	Incidence Angle Near (deg)	Incidence Angle Far (deg)
16MCP2	20.18	23.01
16MCP3	22.26	25.02
16MCP4	24.30	26.98
16MCP5	26.28	28.89
16MCP6	28.20	30.73
16MCP7	30.07	32.52
16MCP8	31.88	34.26
16MCP9	33.63	35.93
16MCP10	35.33	37.55
16MCP11	36.97	39.12
16MCP12	38.56	40.63
16MCP13	40.09	42.09
16MCP14	41.57	43.50
16MCP15	42.99	44.86
16MCP16	44.37	46.17
16MCP17	45.70	47.43

High Resolution 5 m

Beam Mode Mnemonic	Incidence Angle Near (deg)	Incidence Angle Far (deg)
5MCP1	19.02	21.89
5MCP2	20.18	23.01
5MCP3	22.26	25.02
5MCP4	24.30	26.98
5MCP5	26.28	28.89
5MCP6	28.20	30.73
5MCP7	30.07	32.52
5MCP8	31.88	34.26

5MCP9	33.63	35.93
5MCP10	35.33	37.55
5MCP11	36.97	39.12
5MCP12	38.56	40.63
5MCP13	40.09	42.09
5MCP14	41.57	43.50
5MCP15	42.99	44.86
5MCP16	44.37	46.17
5MCP17	45.70	47.43
5MCP18	46.98	48.65
5MCP19	48.21	49.83
5MCP20	49.40	50.96
5MCP21	50.56	52.06
5MCP22	51.67	53.12
5MCP23	52.74	54.14