ALOS PALSAR Frequently Asked Questions
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Prepared by
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Additional questions/answers added.

ABSTRACT

This document is a repository for all of the common questions raised concerning the PALSAR instrument on the ALOS platform.

DISTRIBUTION

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3	IDEAS Knowledge Tree	

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1 INTRODUCTION

1.1 Purpose and Scope

The purpose of this FAQ is to act as a repository for all of the common questions raised concerning the PALSAR instrument on the ALOS platform.

The information contained within this document is supplementary to that provided by ESA [RD.1] on ALOS PALSAR product for ADEN users at:

http://earth.esa.int/download/alos/PALSAR_info_users_v1.1.pdf

Frequent updates to this FAQ are expected as new questions arise and feedback on existing questions is collected from readers of the document. Any comments and questions on the document should be addressed to eohelp@esa.int .

1.2 Referenced Documents

RD.1 ESA Document ALOS-GSEG-EOPG-TN-07-0001, “Information on ALOS PALSAR products fro ADEN Users”, v1.1, 2007-12-06

RD.2 Shimada, M., Rosenqvist, A., Watanabe, M. & Tadono, T., 'The Polarimetric and Interferometric Potential of ALOS Palsar' Proceedings of the ESA Polinsar 2005 conference (http://earth.esa.int/workshops/polinsar2005/).

2 GENERAL INFORMATION

2.1 If this FAQ does not answer my question, what should I do?

All queries from ADEN users regarding PALSAR should be directed to the ESA Earth Observation Help Desk Team (EOHelp@esa.int) in the first instance.

2.2 Where can I find information on PALSAR baselines for interferometry?

JAXA provide a PALSAR baseline calculation tool at:
http://www.eorc.jaxa.jp/ALOS/doc/tool.htm

2.3 Where can I find information on the PALSAR observation strategy?

The PALSAR observation strategy is explained at:

http://www.eorc.jaxa.jp/ALOS/obs/palsar_guide.htm

2.4 Where can I find information on scheduled instrument or platform changes?

Information on scheduled instrument and platform changes is given in the PALSAR cyclic reports:

http://earth.esa.int/pcs/alos/palsar/reports/cyclic/

2.5 Why are the ALOS track numbers not consecutive at the ascending node?

Unlike ENVISAT and ERS, where track numbering is temporally consecutive, the ALOS track numbering is spatially consecutive. This means that two consecutive orbits do not have two consecutive track numbers but are separated by 46 steps. Two ALOS adjacent tracks do have a consecutive numbering.

2.6 Where can I find information on PALSAR data quality?

Information on PALSAR data quality is provided in the cyclic reports:

http://earth.esa.int/pcs/alos/palsar/reports/cyclic/

2.7 What is the mapping of PALSAR to ERS SAR and ENVISAT ASAR products?

Product type	ERS SAR	ENVISAT ASAR	ALOS PALSAR
Standard swath (SS) raw	RAW	IM_0, APC_0, APH_0, APV_0	H1.0
SS single look complex	SLC/IMS	IMS or APS	H1.1
SS detected ground range multi-looked	PRI/IMP	IMP or APP	H1.5
SS geocoded	GEC/IMG	IMG or APG	H1.5G
Wide swath (WS) raw		WS_0	W1.0
WS single look complex		WSS	W1.1
WS detected ground range multi-looked		WSM	W1.5
WS geocoded			W1.5G
Polarimetric (P) raw			P1.0
P single look complex			P1.1
P detected ground range multi-looked			P1.5
P geocoded			P1.5G

2.8 Where can I find information on changes to PALSAR calibration constants

Changes to calibration constants are given at:
https://auig.eoc.jaxa.jp/auigs/en/doc/an/20090109en_3.html

Note that the calibration constant has changed for data processed with PALSAR processor version 5.02 and earlier versions. Note that for ADEN processed PALSAR imagery, the change from version 5.02 to 5.04 occurred on 11th March 2009 (and not 8th/9th January 2009). The

processor upgrade from 5.02 to 5.04 has not resulted in changes to the wideswath mode calibration constant.

3 PRODUCT SPECIFIC QUESTIONS

3.1 Why can't I register my interferometric image pairs in azimuth?

The ALOS yaw axis is aligned with the centre of the Earth rather than being aligned to maintain local orthogonality. A consequence of this type of yaw steering is that the Doppler frequency is not set to zero and changes as a function of latitude and beam number [RD.2].

The ground range Level 1.5 JAXA products are processed to zero Doppler but the Level 1.1 products are not. Consequently, the localisation of Level 1.1 products needs to be corrected for the azimuth shift introduced by the data not being processed to zero Doppler. The expression for the azimuth shift, δy, in m, at a given range pixel is:

$$\delta y = \frac{-R \cdot f_D \cdot \lambda}{2V_s}$$

Where:

R = slant range (m)

f_d = Doppler frequency (Hz)

λ = radar wavelength (m)

V_s = spacecraft velocity (m/s).

Note that for a negative azimuth shift the expected position of a pixel is at an earlier azimuth time. The R and f_d are to be calculated for each range pixel position.

3.2 How do I calculate the radar backscatter coefficient from L1.5 PALSAR products?

The equations used for calculation of PALSAR Normalised Radar Cross Section (NRCS) are slightly different from other sensors in that the usual sine term has already been included in the digital number (DN) values. Thus for the ground range detected Level 1.5 products, the equation for NRSC is (for distributed scatterers):

$$NRCS = 10 \cdot \log_{10}(DN^2) + CF$$

3.3 Will the ADEN processor produce level 4.1and level 4.2 products?

The JAXA processor does not produce level 4.1 and 4.2 products. These are produced by the Earth Remote Sensing Data Centre (ERSDAC).

For information on its products go to: http://www.palsar.ersdac.or.jp/e/guide/index.html.

As the level 4 products are not produced by the JAXA processor, there are no plans to produce them in the ADEN processor. The user can produce 4.1 products themselves by cross correlation of the polarimetric SLC data (level 1.1) and then ortho-rectification of the results.

3.4 Which PALSAR products should be used to provide similar functionality to Radarsat scanSAR and ASAR wide-swath mode data?

WB products are similar to the scanSAR and wide-swath products (in terms of resolution and swath size). WB products have 350km swaths and approximately 100m resolution. WB1 is the default acquisition mode for PALSAR. WB2 has higher resolution (x2) than WB1, but is not routinely collected.

3.5 What is the difference between GER and GEC product types

GER (geo-referenced) processed products are orientated in the original acquisition coordinate frame. Thus the GER x and y product coordinates are in range and azimuth respectively. GEC (geocoded) processed products have been orientated to that of a map projection (UTM or UPS). Thus the GEC x and y product coordinates are in easting and northing respectively.

3.6 Point target analysis

JAXA have recommended that only their PALSAR Level 1.1 (i.e. complex) products be used for point target analysis (and hence not their Level 1.5 products). The only exception to this is for wide-swath Level 1.1 imagery where there is no complex version alternative available.

3.7 Calibration mode data

Some of the PALSAR acquisitions in the EOLI catalogue include calibration mode data which cannot be processed into Level 1.1 or Level 1.5 SAR products. Thus users are able to order acquisitions which cannot be delivered as the JAXA processor cannot process calibration mode data. If a user orders Level 1.0 raw data a product will be delivered but the user cannot process it into a higher level product. An exercise to remove scenes from the EOLI PALSAR catalogue containing only calibration mode data has been performed; however it is possible that some scenes containing a portion of calibration mode data are still available for order. If you suspect that your scene contains calibration mode data you can verify this by examining the workreport file included with the product. You will observe comments similar to those shown below in italics should your product contain calibration data. In this event, please contact EOHelp providing details of the scene you have received. If you are able to attach a copy of the workreport to your correspondence with EOHelp this will allow the PALSAR QC Team to more quickly verify the data quality.

Ach_CalFlagCheck = "NG"
Rst_PSR10PrcWarning02 = "Start_CalStartLineNo:1"
Rst_PSR10PrcWarning03 = "Start_CalEndLineNo:27741"
Rst_PSR10PrcWarning04 = "End_CalStartLineNo:0"
Rst_PSR10PrcWarning05 = "End_CalEndLineNo:0"

4 GLOSSARY

ERSDAC	Earth Remote Sensing Data Centre
DN	Dynamic Number
JAXA	Japan Aerospace Exploration Agency
NRSC	Normalised Radar cross Section
UTM	Universal Transverse Mercator
UPS	Universal Polar Stereographic