ASA_WVI_1P Level 1B Processor

Documentation

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1.0	2024/09/01	Robin Marquart and Alexis Mouche : Initial version

Contents

1

Summary

This document presents an overview of the available ASA_WVI_1P data from ENVISAT Active Synthetic Aperture Radar (ASAR) on datarmor as well as the code that was developed in order to produce IFREMER Level 1B files, containing in particular cross spectra data.

2

Introduction

3

Data and methods

3.1. Data

3.1.1. ASA_WVI_1P

ASA_WVI_1P data contains Wave Mode (WV) Single Look Complex (SLC) imagette and imagette cross-spectra. The data was acquired from march 2002 to april 2012. It is available in two polarizations, VV and HH (ESA).

An ASA_WVI_1P product can include up to 400 SLC imagettes, along with their corresponding power spectra. Additionally, it contains the auxiliary parameters used during the processing from level 0 to level 1B data. Figure 3.1 illustrates a sample of the digital numbers for a given imagette within a file, while figure 3.2 shows the corresponding cross spectrum generated by the ESA algorithm.

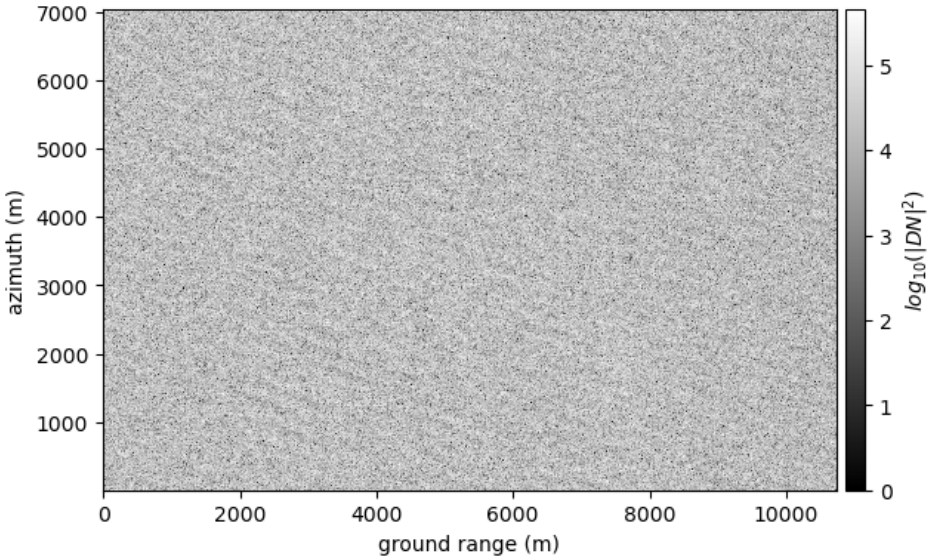


Figure 3.1: Digital numbers example from imagette 003 of file ASA_WVI_1PNPDK20110108_145524_000007653098_00183_46318_5828.N1.

This section presents the data available on datarmor as it stands on August 2024. Among the 175114 files stored in datarmor, 1848 files are corrupted and 722 files are broken symbolic link. The Table 3.1 describes how the other 172544 files are distributed between the two polarizations.

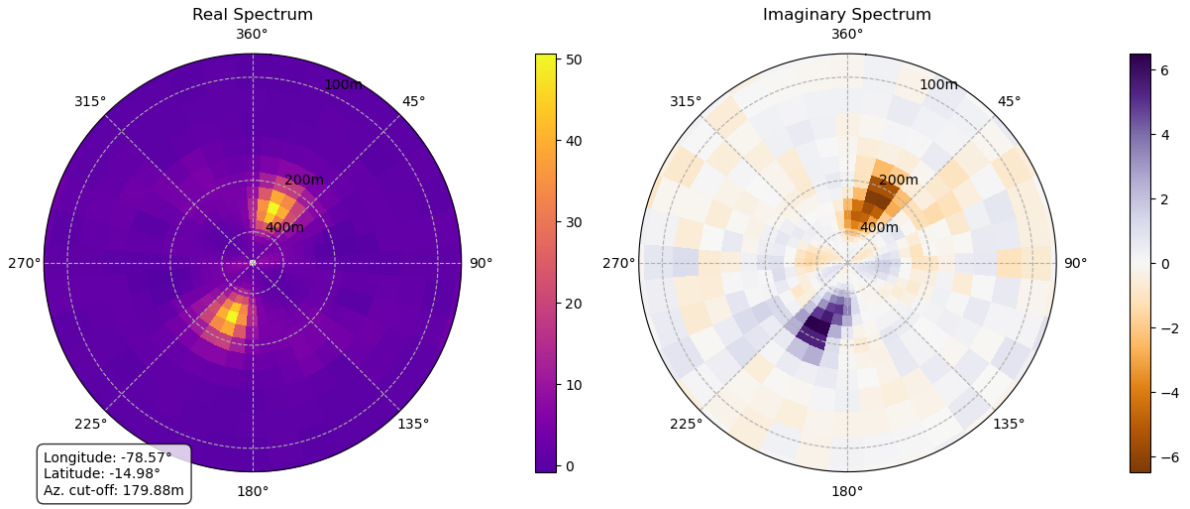


Figure 3.2: Cross-spectrum example from imagette 003 of file ASA_WVI_1PNPDK20110108_145524_000007653098_00183_46318_5828.N1.

Polarization	VV	HH
Number of files	170478	2066
Number of imagettes	8333149	69332
Percentage of imagettes on ocean	95.3%	98.8%

Table 3.1: Number of imagettes per polarization. An imagette is considered on ocean when its center longitude and latitude is on ocean.

The figures below present the temporal and geographic distributions of ASA_WVI_1P data, specifically in VV polarization.

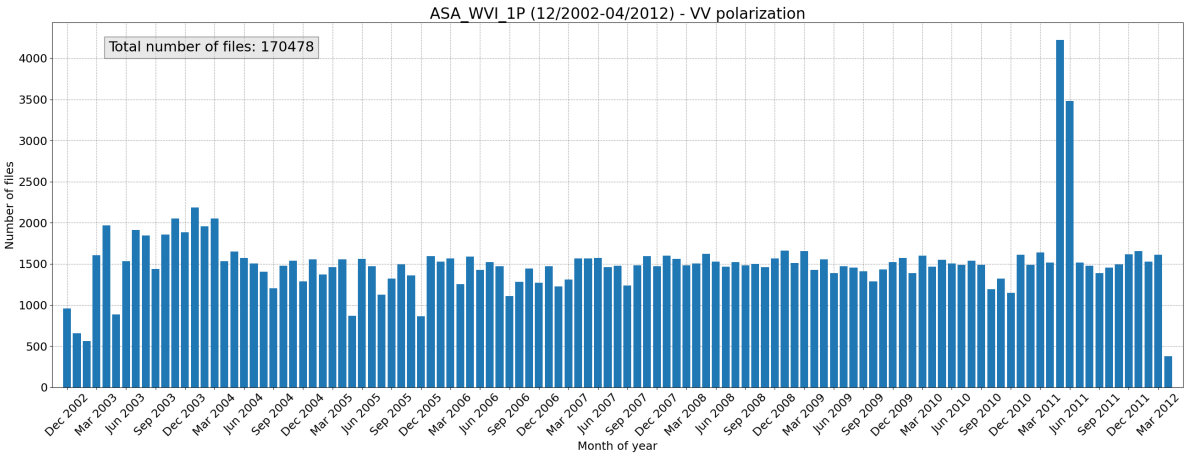


Figure 3.3: ASA_WVI_1P file temporal distribution in VV polarization.

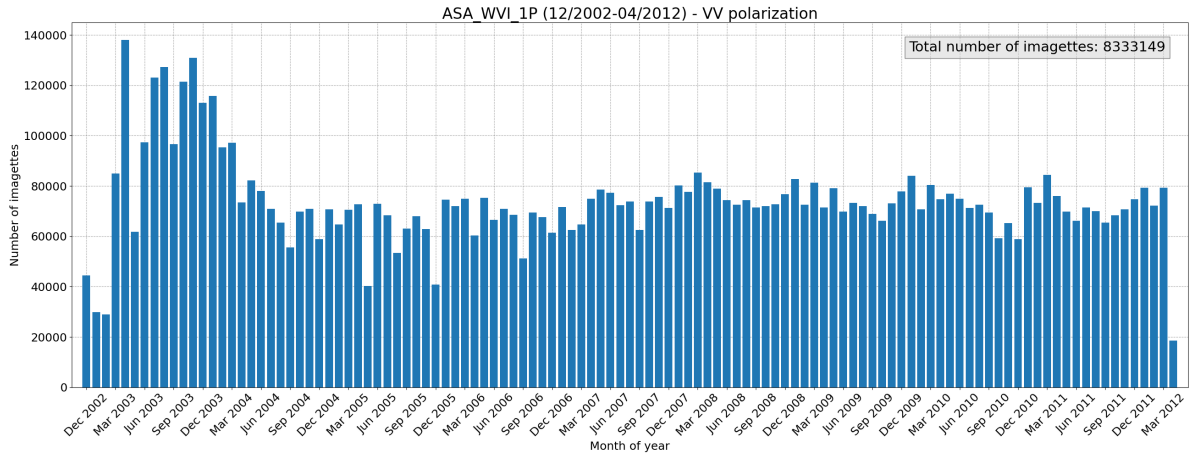


Figure 3.4: ASA_WVI_1P imagette temporal distribution in VV polarization.

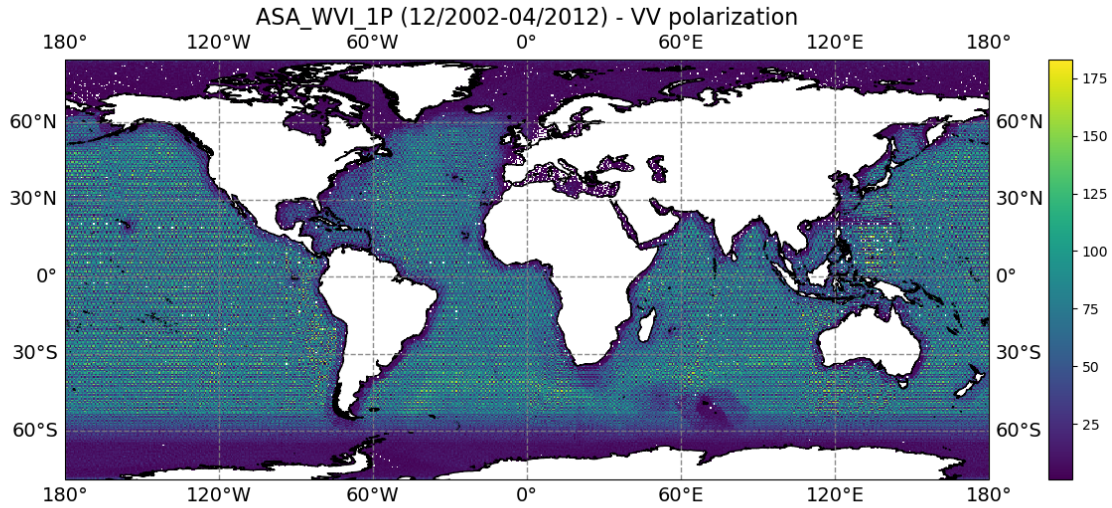


Figure 3.5: ASA_WVI_1P imagette geographic distribution in VV polarization. Only the points falling in ocean are displayed.

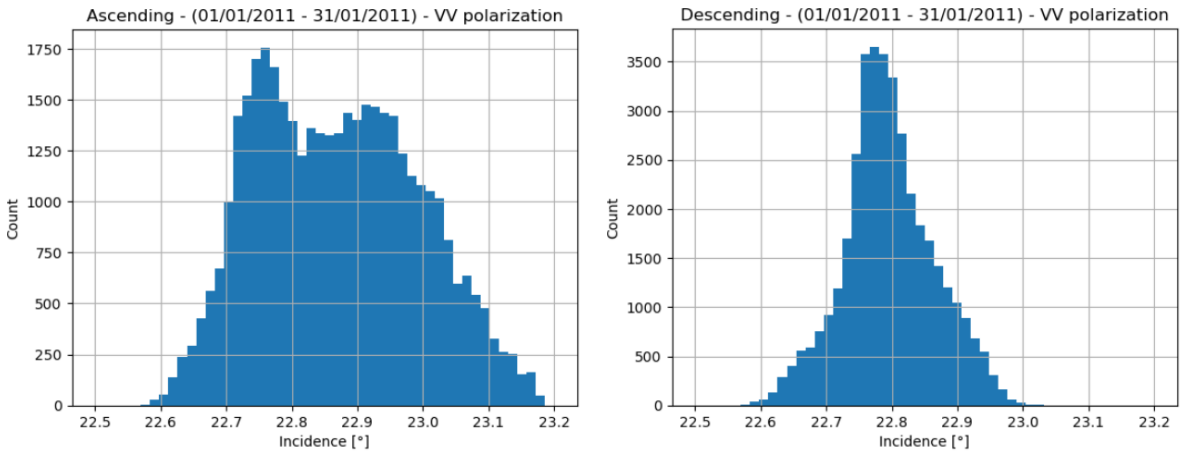
4

Product specification

This section presents the results of the code validation. The main objective of this validation was to assess the correlation between the spectra calculated using the ESA ASA_WVI_1P algorithm and those generated by our implementation, as well as a comparison between the computed Normalized Radar Cross Section (NRCS) and the CMOD5 NRCS.

4.1. Data presentation

In order to validate the results obtained with the L1B processor, ASA_WVI_1P data from January 2011 was selected for analysis. The section below presents the incidence angles and geographic distributions of the data, grouped by ascending and descending orbit passes.



(a) (b)

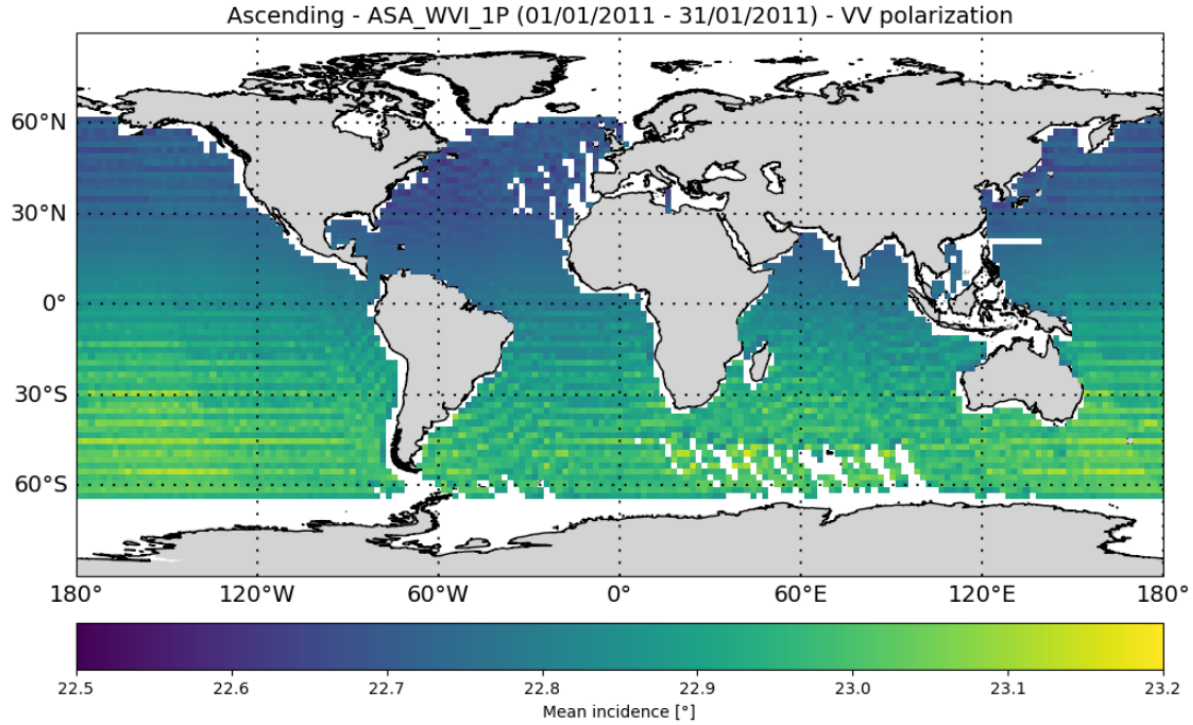
Figure 4.1: ASA_WVI_1P imagette incidence distribution for ascending and descending orbit passes.

4.2. NRCS validation

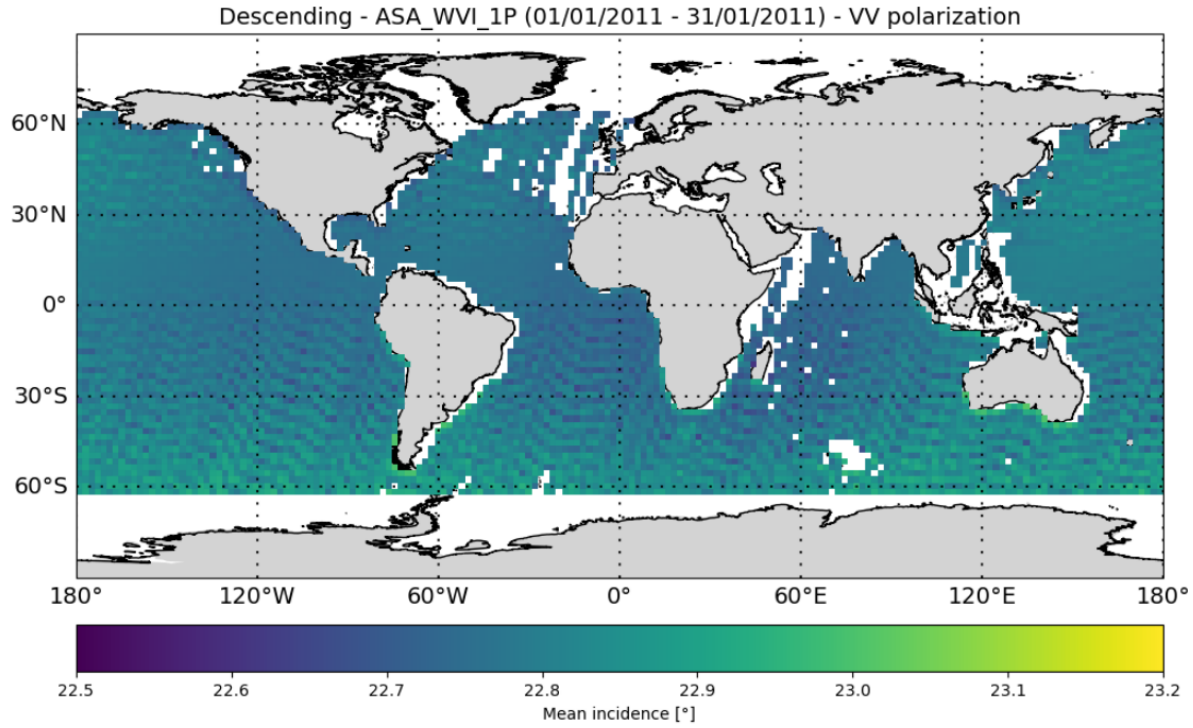
4.3. Cross spectra validation

4.3.1. Azimuth cut-off

4.3.2. CWAVES parameters

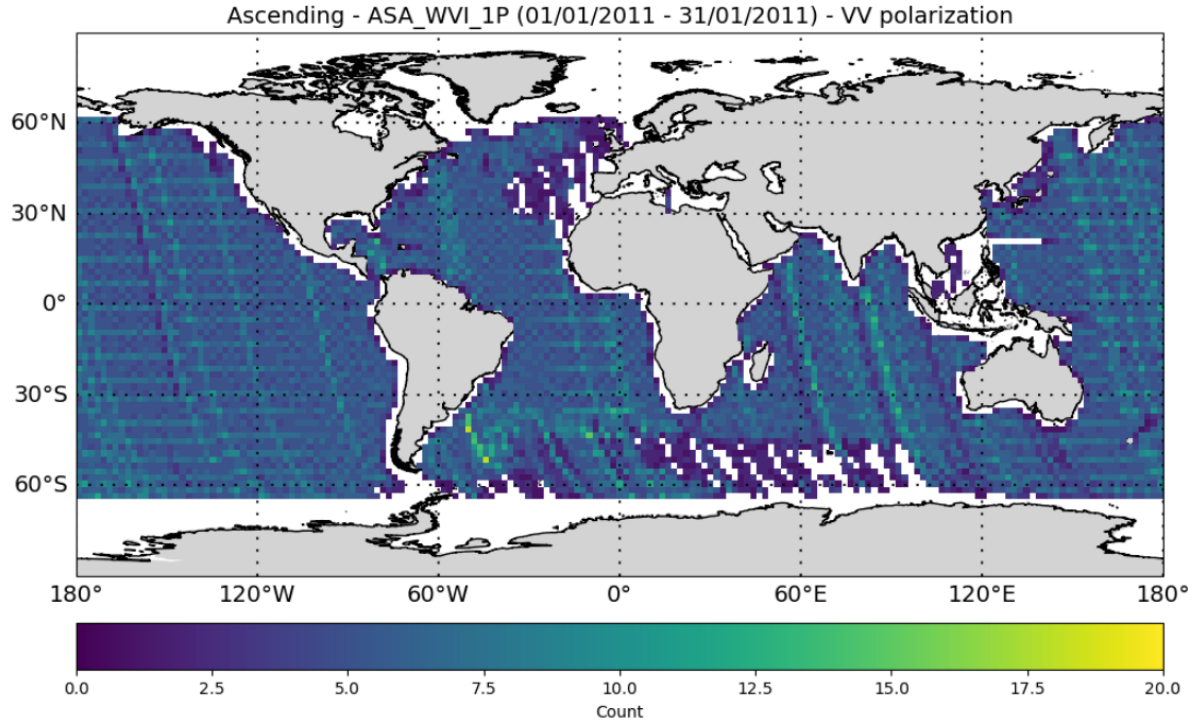


(a)

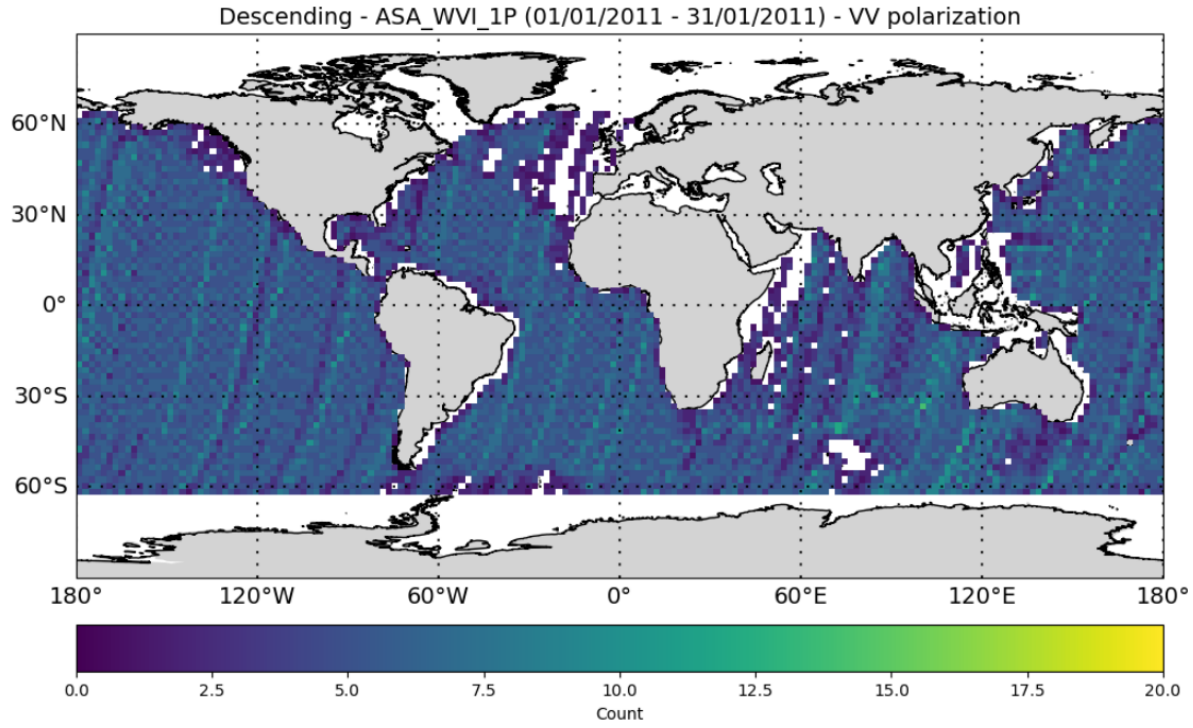


(b)

Figure 4.2: ASA_WVI_1P imagette incidence geographic distribution for ascending and descending orbit passes.



(a)



(b)

Figure 4.3: ASA_WVI_1P imagette geographic distribution for ascending and descending orbit passes.

Bibliography

[ESA] ESA. Envisat ASAR Wave SLC and Cross-Spectra Imagettes L1 [ASA_WVI_1P]. https://earth.esa.int/eogateway/catalog/envisat-asar-wave-slc-and-cross-spectra-imagettes-l1-asa_wvi_1p- - Accessed on July 2024.