EnMAP Frequently Asked Questions

Content

1. EnMAP Data Access

1.1 Q: How do I get started with accessing EnMAP data?

A: There are several platforms available depending on your needs:

- **EnMAP Instrument Planning Portal (IPS):** Designed for users who wish to submit acquisition requests or access the full EnMAP mission archive. This portal allows users to task new observations and download data across all processing levels (L1B, L1C, and L2A) via the EOWEB GeoPortal.
- **EOC Geoservice**: A fast and convenient web interface for downloading individual Level-2A (Analysis Ready) products. It is ideal for users who need quick access to validated, atmospherically corrected data for direct scientific use.
- **EO-Lab Platform**: A beginner-friendly access point that provides an intuitive interface for exploring and downloading Level-2A products. This platform is particularly well-suited for researchers, educators, and users who prefer visual, guided navigation without needing to submit acquisition proposals.
- **STAC Bulk Download**: Intended for advanced users and developers, this option enables large-scale, programmatic data access through the STAC API and Jupyter Lab. It supports automated workflows and bulk downloading of EnMAP scenes.

1.2 Q: What is the EnMAP Instrument Planning Portal (IPS)?

A: The IPS is the central access point for users who want to submit acquisition proposals, manage mission planning, or access all EnMAP data levels (L1B, L1C, L2A). It also provides a linked sub-account for accessing the EOWEB GeoPortal, where the full data archive is available.

1.3 Q: How do I register and get started in IPS?

A: VTo register, visit the IPS homepage at https://planning.enmap.org/ and click **Sign In**, then **Register**. You will need to enter your full name and postal address, which are required to comply with EU regulations. Next, create a username that is different from your email, and keep it safe, as it will be needed for all future logins.

After completing registration, log in to the User Portal. In the **Available Roles** section, select the roles you need and submit your request. Requests are typically reviewed and approved within 24 hours. Once approved, your roles will appear under **Granted Roles**, and you will be ready to access the portal and submit acquisition proposals or download data

1.4 Q: How can I update my registration data?

A: You can update your registration data, by logging into the EnMAP Instrument Planning Portal. In the User Portal you find the “Update Registration” button.

1.5 Q: I have trouble logging into the EnMAP Instrument Planning Portal

A: You should be sure to use the right User Name and User password. The user name is the name you inserted at the registration form.

1.6 Q: Which User Role should I choose?

A: For access to the EnMAP Data archive you should go to the User Portal and assign to the user role **Catalogue User (Cat-1 Distributor)**. For proposal submission and future observations requests please assign to the role **Cat-1,** for commercial use assign to the role **Cat-2.**

Role	Description
Cat-1 Distributor (Catalogue)	Grants access to the full EnMAP data archive via EOWEB
Cat-1 (Scientific)	Grants archive access and enables submission of tasking proposals with high priority
Cat-2 (Commercial)	Grants archive access and proposal submission via email (only for German companies)

1.7 Q: How do I access the EnMAP Archive via IPS?

A: Once your role is granted, log into the IPS User Portal and navigate to **Granted Roles**. You will see your sub-account listed, for example, *user name-cat1distributor*. Selecting this sub-account and clicking **Login** will open the EOWEB GeoPortal with the correct permissions. Use your IPS password for login.

It is important to always use the IPS portal login link, as direct access to EOWEB will not provide EnMAP data permissions. If the portal has recently been updated or maintained, clearing your browser cache can ensure the interface loads properly. Remember that your sub-account is tied to your IPS role and serves as your access credential.

1.8 Q: How do I order products in EOWEB (EGP)?

A: In EOWEB, you can define your area of interest by drawing a polygon on the map and selecting the desired time range and collection filters. Preview images and availability indicators help you choose the scenes you want. Once you have selected your scenes, you can add them to your cart, choose the appropriate product levels (L1B, L1C, L2A), accept the terms, and submit your order.

After processing, which usually takes about 6 business days, you will receive an email with instructions for downloading your data via FTP. Recommended FTP clients include FileZilla, WinSCP, Cyberduck, and lftp, depending on your operating system and workflow preferences.

1.9 Q: What should I know for troubleshooting IPS or EOWEB access?

A: Always log in using your registered username, not your email. If you forget your password, use the reset option on the login page. Usernames cannot be changed once registered. After any IPS maintenance or updates, clear your browser cache to ensure the updated interface loads correctly.

1.10 Q: What is the EOC Geoservice?

A: The EOC Geoservice provides direct download of individual EnMAP Level-2A (CEOS Analysis Ready) products, which are atmospherically corrected surface reflectance datasets ready for immediate scientific analysis and modelling workflows. This platform is ideal for users who need quick access to single scenes or small volumes of validated data without going through proposal or tasking workflows.

The EnMAP L2A archive is hosted directly on the Geoservice platform at ge-oservice.dlr.de/eoc/ogc/stac/v1/collections/ENMAP_HSI_L2A and users can search and filter available products using metadata parameters including scene ID, geographic location, acquisition date, and processing version. Before downloading, check the processing version and review coverage and quality flags to ensure the data suits your workflow.

1.11 Q: What is the EO-Lab Platform?

EO-Lab at offers beginner-friendly access to Level-2A (CEOS Analysis Ready) products via an interactive Data Explorer. It is suitable for educational purposes, research, or quick-look analysis. Users can download multiple scenes (more than 20) without submitting tasking proposals.

To get started, create an EO-Lab account at https://eo-lab.org/de/ and assign yourself to an organization, such as your university, to unlock data download permissions. You can then define your area of interest by drawing a polygon or uploading a spatial file.

1.12 Q: What is the STAC Bulk Download?

STAC Bulk Download at https://geoservice.dlr.de/web/maps/enmap:l0 allows advanced users to programmatically access and download large volumes of EnMAP data using Jupyter Lab and the STAC API. This approach is suitable for machine learning, large-scale studies, or integration into automated processing pipelines. It is designed for developers, analysts, and researchers who need to extract data in bulk efficiently.

2. EnMAP Product Levels

2.1 Q: What Product Levels are available?

A: EnMAP data products follow the **CEOS Analysis Ready Data (ARD)** convention and are delivered at the following levels:

Level	Name	Key Features
L1B	Radiometrically corrected	**Top-of-atmosphere (TOA) radiance**: radiometrically corrected, spectrally- and geometrically characterized, quality controlled, and annotated with preliminary pixel classification (usability mask)
L1C	Georeferenced	**Geocoded TOA radiance**, derived from the Level 1B product, which is subsequently geometrically corrected (orthorectified) and re-sampled to a specified grid.
L2A	Atmospherically corrected	**Surface reflectance** derived from L1C using separate land and water correction algorithms, including advanced atmospheric correction procedures

2.2 Q: How are Analysis Ready Data (ARD) defined and where can I download them?

- EnMAP **L2A products** (Land product) are considered **Analysis Ready Data**
- These are **immediately accessible** via:
  - EOC Geoservice – for direct download
  - EO-Lab – for exploration and analysis in a cloud-based environment

3. EnMAP Data Archive

3.1 Q: I have trouble logging into the EOWEB Geoportal

A: To access the EnMAP data archive via the Eoweb Geoportal (EGP) you need a dedicated EnMAP account, a standard EOWEB account registered at EGP won't work here.

To get this account please login with your EnMAP IPP account at https://planning.enmap.org/and apply for an EnMAP role that includes access to EnMAP archive data at EGP (**Catalogue User (Cat-1 Distributor)**).

If such a role is granted, a dedicated sub-account is created with role-specific access rights. Within the IPP User Portal you will then find a "login "button that allows you to login to EGP with that dedicated sub-account including access to EnMAP data in EGP. The EOWEB accounts available to you are shown in the User Portal of IPP (near the bottom), together with direct links to the EGP login.

We strongly recommend not to directly go to EGP with this account. The way to access EnMAP data at EGP is to log into EnMAP Instrument Planning Portal, go to User Portal and at the bottom of the page you see your role-specific sub-accounts, e.g. **Melanie.Mustermann-cat1distributor**. For each sub-account there is a login-button with jumps into EGP.

The password remains the same as for your IPP account.

3.2 Q: How can I access the EnMAP Data Archive?

A: To access the EnMAP Data Archive you should go to the User Portal in the Instrument Planning portal and assign for the User Role **Catalogue User (Cat-1 Distributor)**. If such a role is granted, a

specific EOWEB account for EGP is created with role-specific access rights (you may consider them sub-accounts to your EnMAP IPP accounts).

EOWEB accounts available to you are shown in the User Portal of IPP (near the bottom), together with direct links to login to EGP. The password is the same as for your IPP account.

3.3 Q: How can I order L1B, L1C and L2A Products in EOWEB, I only see L0?

A: EOWEB archive generally stores all data in L0 for search and browse, so that the user can order different levels of processing (L1B, L1C, L2A) individually on request.

Once you found a scene (or several scenes) in the catalogue you would like to order, please select the scene(s) and go to the “shopping basket” sign. The order will go to the order request flow, where you will be able to choose different processing levels (L1B, L1C, L2A land.)

3.4 Q: What should be done after an IPS maintenance to ensure that the new software is loaded by the browser?

A: Please delete the cache of the browser.

4. Tasking EnMAP: Proposal Submission and Observation Requests

4.1 Q: How can I submit a Proposal?

A: You should first assign to the User Portal for the Role **Cat-1**. You should also choose which of the Announcements of Opportunities (here: A00001) is appropriate for your proposal.

A proposal can be submitted by entering the Proposal Portal within the Instrument planning portal

You should select the A0 you are assigned to, click on “Create Proposal “and fill out the proposal information. Please don’t forget to also add an observation to your proposal, otherwise the proposal submission is not finalized. Also, don’t forget to press the final “submit” button. Your proposal should now have the status **NEW.**

Status **SUB** indicates, that your proposal is still in submission in progress and cannot be reviewed.

After successful submission, your proposal will then go through a review process, and once approved you will be able to submit future orders through the Observation Request Portal.

4.2 Q: How can I submit a proposal as Cat-2?

A: You should begin by requesting the Cat-2 user role through the User Portal. Shortly afterward, you will receive a welcome email. Once you have received it, complete this form and send it to enmap_cat2_users@dlr.de, together with the information of the welcome e-mail which you have received. Currently, only German companies are granted the Cat-2 access.

4.3 Q: Is there a deadline for Proposal submission?

A: There is currently no deadline for proposal submission. The general AO (A00001) will be open for the entire mission life time, so you are most welcome to submit your proposal here any time.

4.4 Q: How can I submit an Observation Request?

A: The Observation Request Portal can be used as planning support for future orders or future orders can be submitted. It calculates real visibility contacts over a certain time period, which gives you the opportunity to check possible acquisitions for your area of interest. It also gives you the information about how many numbers of tiles per acquisition are needed to cover your area of interest.

Once your proposal is reviewed and accepted, you will receive full access to the observation request portal to submit own future orders.

4.5 Q: How do I know if the Foreground Mission is covering my area of interest

A: The monthly updates about date and location of Foreground Mission orders acquiring 1000 km long flightlines during the vegetation period (from March to November) can be found on https://www.enmap.org/data_tools/foreground_mission

Data that have been successfully acquired are accessible to all registered users and can be requested approximately six days after the acquisition date through the EnMAP Data Archive on the EOWEB Geoportal.

5. EnMAP Data Processing and Data Quality

5.1 Q: What is the reason for the apparent noise in some EnMAP L1C and L2A products in the spectral range between 900 and 1000 nm?

A: The EnMAP instrument consists of two separate spectrometers, one covering the visible and near-infrared (VNIR) and the other covering the shortwave infrared (SWIR). The spectrometers overlap in the spectral range between 900 nm and 1000 nm with 12 VNIR and 10 SWIR bands. Since EnMAP L1C/L2A products contain a single spectral data cube with all bands ordered by wavelength (not separated by sensor), the spectra have interleaved VNIR and SWIR bands between 900 nm and 1000 nm. Therefore, any slight signal mismatch between the sensors is seen as a zig-zag (spectral noise) pattern in the overlapping spectral range. This is most obvious in low-radiance and/or inhomogeneous regions.

There are two main reasons for the effect. First, the two spectrometers, which are independently calibrated in orbit, have distinct sensor responses in the overlapping range. The differences are especially important for low signals as they usually occur, for instance, in water bodies or forests. Second, the different lines of sight of VNIR and SWIR and any slight errors in the co-registration performed at L1C level will contribute to the mismatch between the sensors. Pixels in inhomogeneous regions or at the border between different surfaces are particularly affected.

Overall, the mismatch is a feature of operating two independent spectrometers with a spectral overlap and providing L1C/L2A spectra ordered by wavelength. For spectral visualization and specific application algorithms, the user can remove one of the two sensors in the overlapping wavelength domain or arrange L1C/L2A data cubes sensor-wise and decide how to handle the overlapping VNIR and SWIR bands. In particular, the user can identify the indices of VNIR and SWIR bands within L1C/L2A products by reading the items “vnirProductQuality/expectedChannelsList” and “swirProductQuality/expectedChannelsList” in the corresponding product metadata or by using available reader routines (e.g., EnMAP-Box plug-in for QGIS). The VNIR and SWIR wavelengths may also be identified by reading the items “smileCorrection.VNIR.wavelengths” and “smileCorrection.SWIR.wavelengths” in the product metadata.

5.2 Q: What is the spectral response function of the EnMAP VNIR and SWIR instruments?

A: All the required information for the estimation of the spectral response functions can be found in the product metadata file. The basic information on band center wavelength and full width at half maximum (FWHM) assuming a Gaussian response function are given in the structure bandCharacterisation in units of nm:

```
<bandCharacterisation>
 <bandID number="1">
  <wavelengthCenterOfBand>418.416</wavelengthCenterOfBand>
  <FWHMOfBand>6.99561</FWHMOfBand>
  <GainOfBand>0.0001</GainOfBand>
  <OffsetOfBand>0</OffsetOfBand>
 </bandID>
...
```

In many push-broom sensors the band center wavelengths change very slightly across the sensor field of view. This effect is called “spectral smile”. For EnMAP, this effect is small and within specifications, so there is no smile corrected needed in the processing chain. For expert users, the full smile specification as a 4th order polynomial is also provided in the metadata within the following structure:

```
<smileCorrection applied="no" parametrization="polynomial">
 <VNIR>
  <bandID number="1">
   <wavelength unit="nm">418.42</wavelength>
   <coeff0 unit="nm">-2.17157E-01</coeff0>
   <coeff1 unit="nm">4.65630E-04</coeff1>
   <coeff2 unit="nm">-1.23312E-08</coeff2>
   <coeff3 unit="nm">-4.46007E-11</coeff3>
   <coeff4 unit="nm">-7.96608E-16</coeff4>
  </bandID>
  …
```

All details are documented in Ch. 5.9 in the L2A Processor Land ATBD (EN-PCV-TN-6007). A description of the EnMAP pre-flight calibration and characterization results can be found in Baur et al 2022.

5.3 Q: Are the spectral properties of EnMAP VNIR and SWIR instruments constant over time?

A: In general, the spectral properties of EnMAP VNIR and SWIR instruments are stable over time and monitored with frequent spectral calibrations. The spectral characterization of the instruments is only updated at rare intervals and always documented in the metadata.
There was one exception: as requested by the science segment, the SWIR band configuration did change on July 5, 2023. In all EnMAP products after that date, one band was added at 1450 nm, two bands were added at 1770 nm and 1780 nm, and three bands at 1939 nm, 1948 nm and 1958 nm were removed. The total number of SWIR bands remains constant since launch. Consequently, when addressing the data by band number (and not by wavelengths), SWIR bands #45 to #75 (full cube bands #136 to #167) are shifted by one band between the periods before and after 05.07.2023. It is highly recommended to always use the band center wavelengths as documented in the metadata.

5.4 Q: The radiance spectra look unexpected – am I doing something wrong? What are the units of the radiance products?

A: The EnMAP L1B and L1C products contain at-sensor radiances in units of W m^{-2} sr^{-1} nm^{-1}, but a bandwise scaling factor has to be applied to the spectral image files. These bandwise gain and offset factors are documented in the metadata in the following structure:

```
<bandCharacterisation>
 <bandID number="1">
  <wavelengthCenterOfBand>418.24</wavelengthCenterOfBand>
  <FWHMOfBand>6.99561</FWHMOfBand>
  <GainOfBand>3.39022404391e-06</GainOfBand>
  <OffsetOfBand>0.0603759994494</OffsetOfBand>
 </bandID>
 …
```

5.5 Q: Why is there a feature in the O2-A absorption band (around 760 nm) in some EnMAP L2A products (bottom-of-atmosphere reflectances)?

A: The oxygen concentration simulated for the atmospheric correction is constant. It is scaled with the digital elevation model (DEM), but a residual feature around the O_2-A absorption band can remain in EnMAP L2A spectra due to DEM errors, clouds, or deviations from the assumed theoretical O_2 profile. In addition, pixel-to-pixel fluctuations in this wavelength range could be also due to the across-track wavelength variations. In fact, the O_2 band absorption line is quite narrow (only one band in EnMAP) and the atmospheric correction assumes the same central wavelength for all pixels across-track.

5.6 Q: The geometric accuracy of some EnMAP L1C and L2A products from 2022 and 2023 has been considerably improved. What is the reason for this and how to ensure the best available geometry accuracy in any given EnMAP L1C or L2A product?

A: The geometric accuracy of the EnMAP products has been significantly improved since the launch of the satellite on April 1st, 2022. This was achieved in several geometric calibration steps and by improving and bugfixing the L1C processing software. In detail, the following steps have been performed during the commissioning phase (CP) and the operational phase (OP):

- 01.08.2022 (CP) Fix of attitude processing
  - Improvement of absolute geolocation (w/o matching)
- 20.09.2022 (CP) Boresight Calibration
  - Improvement of absolute geolocation (w/o matching)
- 03.11.2022 (end of CP) 1st Geometric Calibration
  - Improvement of absolute geolocation (w/o matching)
  - Improvement of VNIR/SWIR co-registration (~0.8 pix -> ~0.4 pix)
- 11.02.2023 (OP) 2nd Geometric Calibration
  - Improvement of VNIR/SWIR co-registration (~0.4 pix -> ~0.15 pix)
- 29.03.2023 (OP) Processor update (v01.02.00)
  - Improvement of VNIR/SWIR co-registration (~0.15 pix -> ~0.06 pix)
- 05.05.2023 (OP) Processor update (v01.03.01)
  - Improvement of geolocation accuracy

A large part of the geometric processing of EnMAP products is performed on datatake level to ensure the geometric consistency within all tiles of one datatake. Therefore, these parts of the processing are executed during L0 processing.

Note that this means that it is possible to get a L1C/L2A product processed with the latest version of the L1C/L2A processor, while the L0 product from which it was generated was processed with an earlier

version of the processor and thus with lower geometric accuracy. Users should see the tag *archivedVersion* in the metadata file to determine which processor version was used for the L0 processing of their data. Version 01.03.01 or higher ensures the best possible geometric accuracy for any given product. Currently, the whole EnMAP L0 archive is being reprocessed (including data from commissioning phase).

5.7 Q: What is the difference between the processing mode options (land mode, water mode, combined mode) for EnMAP L2A products?

A: There are three possible processing options when you order L2A products: combined, land and water mode. If you are interested only in water surfaces, you should choose the water mode, which converts the top-of-atmosphere radiances (level L1B or L1C) into “underwater reflectance” and “normalized water leaving reflectance”. More details on these products can be found in Ch. 2.5 in the L2A Processor Water ATBD (EN-PCV-TN-6008). Should you be interested in the land surface, you are advised to order the data in land mode. The combined mode can be used if you are interested in both land surface and water bodies within one datatake: L2A atmospheric correction is then performed through different algorithms depending if the pixel is in a land or water surface. For further details on the land and combined mode, please refer to Ch. 4.2 in the L2A Processor Land ATBD (EN-PCV-TN-6007).

5.8 Q: How are the "across off nadir" und "along off nadir" angles in the metadata defined?

A: The along/acrossOffNadirAngle values are the viewing angle relative to nadir (in the LTS coordinate system, see here in in chapter 13.3).

This applies:
- acrossOffNadirAngle:
- > 0: scene on the right of satellite in flight direction (sensor roll to the left)
- < 0: scene on the left of satellite in flight direction (sensor roll to the right)
- alongOffNadirAngle:l
- > 0: scene ahead of satellite in flight direction (sensor pitch backwards)
- < 0: scene behind of satellite in flight direction (sensor pitch forwards)

If the angles are all 0, the scene should therefore be exactly below the satellite.

5.9 Q: How can the satellite viewing angles be computed/retrieved?

A: The computation of the satellite viewing angles from the off-nadir angles and scene azimuth angle is not straight forward. Therefore, the viewing zenith and azimuth angles are now provided directly in the metadata of EnMAP L1B, L1C and L2A products (since processor version 01.05.00, installed on 11.10.2024). The corresponding fields in the metadata are called viewingZenithAngle and viewingAzimuthAngle (see Figure 5-1). More detailed definitions can be found in the L1C ATBD (see in particular Secs. 10.3 and 10.4) and in the Product Specification Document. To retrieve the viewing angles for scenes processed with a processor version older than 01.05.00, the easiest way is to re-order the scene in EOWEB.

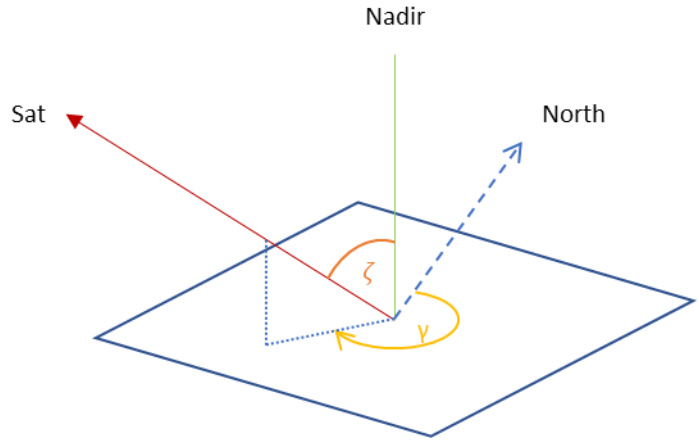


Figure 5-1: Viewing zenith and azimuth angle

5.10 Q: What is the difference between the EnMAP product collections "EnMAP-HSI (L0)" and "EnMAP-HSI (L0), Low Quality" in the EOWEB GeoPortal?

A: The quality rating of EnMAP products is based on image parameters, such as illumination conditions (i.e., sun elevation angle) and image defects, and on possible anomalies in the image data or instrument telemetry. These parameters are retrieved during the pre-processing and are added to the metadata and quality layers for every archived L0 product. In EOWEB GeoPortal two collections of EnMAP L0 products are available: "EnMAP-HSI (L0)" and "EnMAP-HSI (L0), Low Quality". An L0 product is assigned to the low-quality collection if the corresponding metadata item qualityFlags.overallQuality is equal to 2 (low quality). This happens for products with a significant number of striping, saturation, artefact or dead pixels, when the screening of data and instrument indicates non-nominal behavior or, in the majority of cases, when the sun elevation angle is less than or equal to 0 (e.g., night scenes). A detailed definition of qualityFlags.overallQuality is given in Sec. 4.4.9 in the L1B ATBD (EN-PCV-TN-4006).

5.11 Q: Is there a change log of the EnMAP processor?

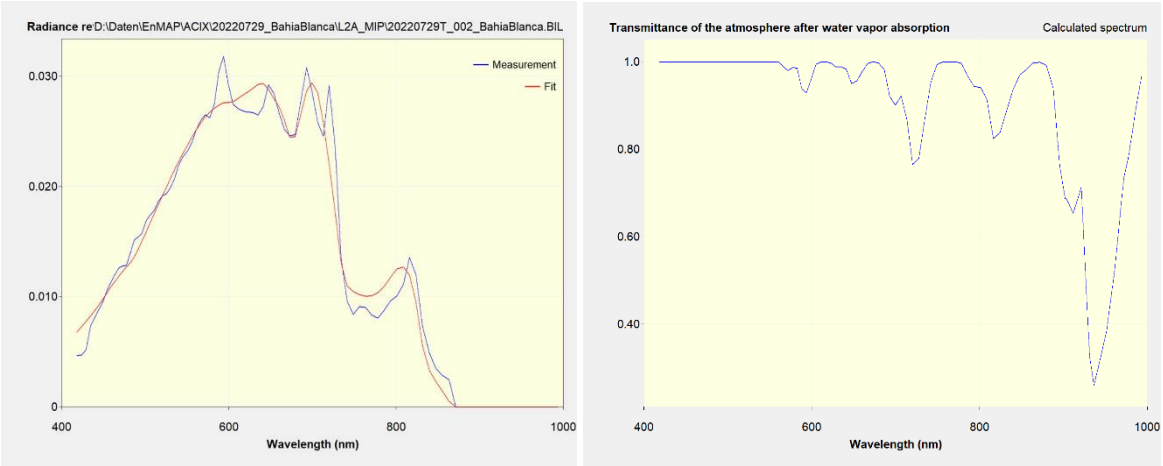
A: Yes. A simplified change log with the main improvements introduced in the different versions of the software can be found here. A more detailed description of each EnMAP processor version is given in the mission quarterly reports, which are provided regularly here.

5.12 Q: Why are some bands set to background value in L2A land products?

A: The bands 1331.0–1448.0 nm and 1796.0–1938.0 nm are affected by water vapor absorption, resulting in very low measured radiance values. The uncertainty of the atmospheric correction for these bands could be of the order of magnitude of the calculated reflectance at these wavelengths, producing large fluctuations ("spikes") in the final spectra. Therefore, these bands are always set to background value in the L2A products. In addition to that, the bands within the absorption regions around 940nm, 1130 nm, 725 nm, 760 nm and 820 nm can also be set to background value by setting the processing option "Band Interpolation" to "Yes" during the ordering process.

5.13 Q: Why are there persistent peaks (or valleys) in EnMAP L2A water products in the range 550–850 nm in some scenes?

A: The EnMAP atmospheric correction over water (MIP software) does not retrieve water vapor per pixel, but uses instead a fixed value in the atmospheric model. Therefore, whenever the actual water vapor content in the scene deviates significantly from the fixed valued in the atmospheric model, the resulting reflectance in EnMAP L2A water products shows peaks (or valleys) for bands located close to the water vapor absorption maxima, in particular around 590, 650, 690, 720 and 820 nm. The figure below (courtesy of Peter Gege) illustrates a typical EnMAP L2A water reflectance spectrum in a scene where the mentioned peaks occur (left panel, blue line) and the water vapor transmittance in the VNIR range for comparison (right panel).



The presence of the water vapor peaks in some water scenes does not prevent the user from using the corresponding EnMAP L2A water product for his/her application. In fact, in scenes where this situation occurs, we recommend the user to remove bands close to 590, 650, 690, 720 and 820 nm from the EnMAP L2A water product before performing the analysis.

5.14 Q: What is the exact definition of the reflectances offered in EnMAP L2A water products, and how do they compare with other scientific reflectance products?

A: Users may choose between two different water reflectance products when ordering EnMAP L2A water products: “Normalized_Rrs” and “Subsurface_RE”.

When selecting “Normalized_Rrs”, the product delivers normalized water-leaving reflectances:

$$\rho = \pi \, R_{rs}(0,0) \ ,$$

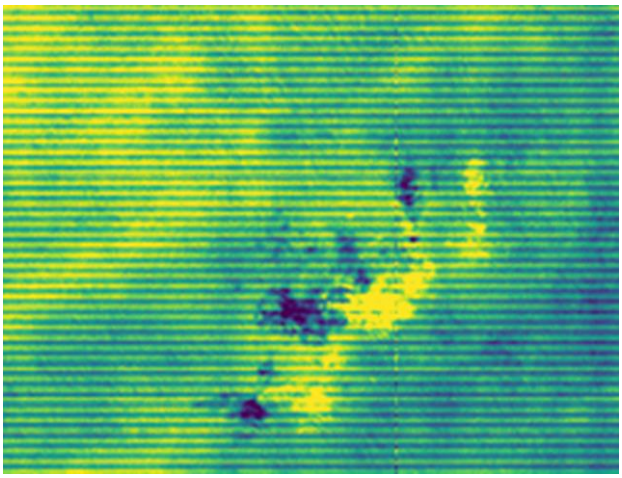
where $R_{rs}(\theta_{\text{Sun}}, \theta_{\text{view}})$ is the remote sensing reflectance defined as the ratio between upwelling radiance and downwelling irradiance for given Sun and view zenith angles θ_{Sun} and θ_{view}. The provided normalized water-leaving reflectance is π times the remote sensing reflectance of the water body if observed from nadir with the Sun at the zenith.

When selecting “Subsurface_RE”, the product delivers subsurface irradiance reflectance defined as the ratio between upwelling irradiance and downwelling irradiance.

More details about EnMAP L2A water products can be found in Sec. 2.5 in L2A water ATBD (EN-PCV-TN-6008).

5.15 Q: What is the reason for the along-track (horizontal) striping present in some scenes in certain SWIR bands?

A: This effect is attributed to microvibrations of the SWIR compressor. The observed along-track oscillation pattern has a characteristic period of 4-5 frames (matching the main frequency of the SWIR compressors), is present in all SWIR bands but is mostly visible in those of high spectral slope and in bright homogeneous scenes like deserts (see figure below). Several correction algorithms were tested by the EnMAP team, but it was decided not to perform an automatic correction for this effect in EnMAP products since none of the tested algorithms can effectively correct the effect in all scenes without introducing other artifacts. Note that although there is a dominant frequency of microvibrations (45 Hz corresponding to 4-5 frames) other frequencies are also present, which makes the correction non-trivial. The users are advised to consider whether the effect (present in SWIR bands of high spectral slope especially in homogeneous scenes) hinders their applications. If necessary, an optional correction for horizontal striping will be implemented in EnMAP-Box, but the performance of the correction algorithm is scene-dependent and thus it is strongly recommended to check if the corrected image is acceptable.



Detail of SWIR band 39 (~1340 nm) in tile 1 of datatake 1932 (PICS Niger 2 site, 23.07.2022). A non-linear image stretch with an artificial color map was selected here to highlight the effect.

Please refer to the Portals User Manual or the EnMAP Collaboration Contract for further details.