



# *ENVISAT Post-Launch Products*

## SCIAMACHY

### 1. Product Summary

The following SCIAMACHY sample products are included in this package:

Filename	PDS Name	Content
<b>L1B Product</b>		
SCI_NL_1PNPDK20020811_101227_000060042008_00280_02338_0678.N1	SCI_NL_1P	Full orbit NRT Radiance Product
<b>L1B Auxiliary Files</b>		
SCI_LK1_AXTSCI20020731_093155_20020731_093155_20991231_235959	SCI_LK1_AX	Leakage Current
SCI_SP1_AXTSCI20020731_101216_20020731_000000_20991231_000000	SCI_SP1_AX	Spectral Calibration
SCI_PE1_AXTD-P20020206_172737_20020206_172737_20991231_235959	SCI_PE_AX	PPG/Etalon Calibration
SCI_SU1_AXTSCI20020731_165548_20020731_165548_20991231_235959	SCI_SU1_AX	Sun Mean Ref.
SCI_KD1_AXVIEC20020809_093222_20020807_091458_20991231_235959	SCI_KD1_AX	Keydata
SCI_MF1_AXNIFE20010628_110000_20010801_000000_20991231_235959	SCI_MF1_AX	M-factor
AUX_FRO_AXTFOS19930412_215500_00000000A018_00062_09080_0000.N1	AUX_FRO_AX	Orbit state vector
SCI_LI1_AXVIEC20020809_095508_20020326_105621_20991231_235959	SCI_LI1_AX	Initialisation File for 0-1b proc.



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<b>L2 NRT Product</b>		
SCI_NL_2PNPDK20020811_101439_000057912008_00280_0238_0678.N1	SCI_NL_2P	Full orbit Level 2 NRT product
<b>L2 Auxiliary Files</b>		
SCI_BL2_AXVD-P20010716_135443_19990101_000000_20991231_235959	SCI_BL2_AX	Line by line absorption cross sections
SCI_CC2_AXVD-P20010716_161159_19990101_000000_20991231_235959	SCI_CC2_AX	PMD minimum reflectance library
SCI_CL2_AXVD-P20010716_135547_19990101_000000_20991231_235959	SCI_CL2_AX	Cloud data bases
SCI_CS2_AXVD-P20010716_135551_19990101_000000_20991231_235959	SCI_CS2_AX	Literature Reference cross sections
SCI_FM2_AXVD-P20020206_103117_19990101_000000_20991231_235959	SCI_FM2_AX	Flight model cross sections
SCI_MF2_AXVD-P20010716_135418_19990101_000000_20991231_235959	SCI_MF2_AX	Air Mass Factor look up table
SCI_PF2_AXVD-P20010716_135437_19990101_000000_20991231_235959	SCI_PF2_AX	BIAS slant path factor look up table
SCI_PR2_AXVD-P20010717_123812_19990101_000000_20991231_235959	SCI_PR2_AX	Atmospheric climatologies (profiles)
SCI_RC2_AXVD-P20020206_083229_19990101_000000_20991231_235959	SCI_RC2_AX	AAIA Rayleigh scattering correction look up table
SCI_SF2_AXVD-P20020206_103230_19990101_000000_20991231_235959	SCI_SF2_AX	Surface Data bases
SCI_UC2_AXVD-P20020206_103236_19990101_000000_20991231_235959	SCI_UC2_AX	Undersampling correction spectra
SCI_LI2_AXTD-P19980810_174532_19990101_000000_20991231_235959	SCI_LI2_AX	Initialisation file for the level 1b to 2 procesor
<b>Meteo-Product</b>		
SCI_RV_2PNPDK20020814_105702_000012712008_00323_0238_1_1097.N1	SCI_RV_2P	Meteo Product
<b>Level 2 Off line Product</b>		
SCI_OL_2PODPA20020730_132122_000000032999_77777_7777_7_7777.N1	SCI_OL_2P	Level 2 off line product



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## **1.1 Products Summary**

The ENVISAT SCIAMACHY products described here are limited to those included in this package. These consist of each, one level 1b, level 2 NRT, level 2 OL product and one so called Meteo product. The SCIAMACHY products follow the ENVISAT products structure including a Main Product Header (MPH), a Specific Product Header (SPH) and a number of Measurement and Annotation Data Sets. The CD also contains a set of Auxiliary Products, which are used to generate the SCIAMACHY Level 1b and Level 2 products.

### ***Instrument Overview***

The Scanning Imaging Absorption Spectrometer for Atmospheric Chartography (SCIAMACHY) will measure sun- and moonlight, which is either transmitted, reflected or scattered by the Earth atmosphere. The double spectrometer is designed for the ultraviolet, visible and near infrared wavelength region (240 nm – 2380 nm), covering that range with a resolution of 0.24 nm to 1.5 nm. It was conceived to improve knowledge and understanding of a variety of issues of importance to chemistry and physics of the Earth atmosphere (troposphere, stratosphere and mesosphere). This will be achieved by a combined limb, nadir and occultation observation strategy.

## The Level 1b product

The general structure of the SCIAMACHY level 1b product may be taken from the table, below.

ID	Product Component	Component Type
1	Main Product Header	MPH
2	Specific Product Header	SPH
3	Data Set Descriptor	DSD
4	Summary of Quality Flags	SQADS
5	Geolocation of the State	LADS
6	Static Instrument Parameters	GADS
7	Leakage Current Parameters (constant fraction)	GADS
8	Leakage Current Parameters (variable fraction)	GADS
9	PPG/Etalon Parameters	GADS
10	Precise Basis Array of Spectral Calibration	GADS
11	Spectral Calibration Parameters	GADS
12	Sun Reference Spectrum	GADS
13	Polarisation Sensitivity Parameters Nadir	GADS
14	Polarisation Sensitivity Parameters Limb/Occultation without ND	GADS
15	Polarisation Sensitivity Parameters Limb/Occultation with ND	GADS
16	Radiance Sensitivity Parameters Nadir	GADS
17	Radiance Sensitivity Parameters Limb/Occultation without ND	GADS
18	Radiance Sensitivity Parameters Limb/Occultation with ND	GADS
19	Errors on Key Data	GADS
20	Slit Function Parameters	GADS
21	Small Aperture Slit Function Parameters	GADS
22	States of the Product	ADS
23	PMD Data Packets	ADS
24	Auxiliary Data Packets	ADS
25	Leakage Current Parameters (newly calculated parts)	ADS
26	Average of the Dark Measurements per State	ADS
27	PPG/Etalon Parameters, newly calculated	ADS
28	Spectral Calibration Parameters, newly calculated	ADS
29	Sun Reference Spectrum, newly calculated	ADS
30	Nadir Measurement Data Set	MDS
31	Limb Measurement Data Set	MDS
32	Occultation Measurement Data Set	MDS
33	Monitoring Measurement Data Set	MDS

There is one SCIAMACHY level 1b product, that is the radiance product of a full orbit. Measurement Data Sets for Nadir, limb and Occultation, contain the signal in binary units, whereas information to calibrate these “raw” data, is covered by so called Annotation Data Sets (ADS). So, there is one major difference to other instruments level 1b product, namely that SCIAMACHY level 1b is not yet calibrated. Calibrated radiance of SCIAMACHY is a user specified product, the so called level 1c product, which can be generated by the current version of EnviView. Besides extraction of relevant 1b product information – also selection of single spectral clusters will be possible – various calibration parameters can be applied optionally. All this can be done via command line editing (allowing also batch processing) or a graphical user interface (GUI).

## ***The Level 2 product***

The general structure of the SCIAMACHY level 2 product may be taken from the table, below.

<b>ID</b>	<b>Product Component</b>	<b>Component Type</b>
1	Main Product Header	MPH
2	Specific Product Header	SPH
3	Data Set Descriptor	DSD
4	Summary of Quality Flags	SQADS
5	Geolocation of the State	LADS
6	States of the Product	ADS
7	Geolocation of the Ground Pixels	ADS
8	Clouds and Aerosol Data Set	MDS
9.a	DOAS Fitting Window Application Data Set 1	MDS
9.b	DOAS Fitting Window Application Data Set 2	MDS
...	...	...
9.u	DOAS Fitting Window Application Data Set 21 (19 planned and 2 spares)	MDS
10.a	BIAS Fitting Window Application Data Set 1	MDS
10.b	BIAS Fitting Window Application Data Set 2	MDS
...	...	...
10.j	BIAS Fitting Window Application Data Set 10 (8 planned and 2 spares)	MDS

The present SCIAMACHY level 2 product contains geo-located vertical and slant columns of species O<sub>3</sub>, NO<sub>2</sub>, H<sub>2</sub>O, CO<sub>2</sub>, N<sub>2</sub>O, CH<sub>4</sub>, CO, which have been exclusively derived from Nadir measurements. This information, sorted by the start time of a certain measurement data record, can be found in the DOAS respectively BIAS Fitting Window application data sets. Corresponding geolocation information has to be taken from the "Geolocation of Groundpixel" ADS, which is also sorted by the start time of measurement data record.

## ***The Meteo product***

The general structure of the SCIAMACHY Meteo product may be taken from the table, below.

<b>ID</b>	<b>Product Component</b>	<b>Component Type</b>
1	Main Product Header	MPH
2	Specific Product Header	SPH
3	Data Set Descriptor	DSD
4	Geolocation	ADS
5	Vertical Column of Ozone	MDS

The present SCIAMACHY meteo product exclusively contains geo-located vertical columns of O<sub>3</sub>, which have been derived from Nadir measurements. In that sense it is a child product of the SCIAMACHY level 2 NRT product. For the future, this product might be expanded to contain additional information about cloud coverage as well as vertical column of water vapour.

## **1.2 Sources of Data Products**

Present SCIAMACHY level 1b, level 2 near real time and meteo product are already in-flight data. In case of level 1b and level 2 NRT, they belong to orbit 2338 (11-AUG-2002), which passes large parts of western Europe and northern Africa before entering eclipse at about Antarctica. The meteo product sample has been taken 14-AUG-2002 and covers only a short part from Falkland islands to Antarctica. All data has been processed at the Kiruna ground station.

The level 2 off line product is the only one, containing synthetic data. It has been kindly provided by the German Remote Sensing Data Centre (DLR-Imf).

## **1.3 Limitations of the simulated products**

Although level 1b, level 2 NRT and meteo product are taken from in-flight, the main objective of these data sets still is to act as product format samples. So please note that ALL INFLIGHT DATA IS STILL PRELIMINARY AND IN THE PROCESS OF BEING VERIFIED.

Calibration of the instrument, especially the verification of all level 1b annotation data sets is work in progress. Any shortcomings on this complex matter of course translate to higher-level products such as the level 2 NRT. Cal/Val teams are working on this topic with highest priority to report first validation results in December 2002.

The level 2 off line product has to be seen as a pure product format sample, i.e. it contains no data, which could be interpreted physically. But of course it is well suited to develop routines for reading this most advanced SCIAMACHY data product, which will be available in the near future.