Phase 3 process overview and the ESO Science Data Products Standard

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Abstract: The ESO Phase 3 infrastructure provides a channel to submit reduced data products for publication to the astronomical community at large and long-term data preservation in the ESO science archive facility. The ESO archive serves as the central collection point for data reduced by ESO users but also for the products of in-house pipeline data processing.
One unique standard data format is associated to each type of product like image, spectrum, IFU cube, etc.
Here we present an overview of the Phase 3 process and its key features, the data types supported by the the ESO Science Data Products Standard and the data collections already served by the Phase 3 service.

PHASE 3 denotes the process of preparation, validation and ingestion of reduced data products for preservation in the ESO Science Archive Facility, and subsequent data publication to the scientific community.
Phase 3 is mandatory for **ESO Public Surveys** (VISTA, VST, Spectroscopic PS) and for **ESO Large Programmes**.
For other ESO programmes there is no obligation but PIs are invited to take advantage of the Phase 3.
Phase 3 also includes **pipeline-reduced data** for **UVES-Echelle**, **HARPS**, **XSHOOTER**, **GIRAFFE-MEDUSA** and more to come.

Overview of the Phase 3 Data Releases

- Data delivered by ESO Public Survey projects:
  - VISTA Surveys
  - VST Surveys
  - Spectroscopic Surveys
- Data reduced by ESO
- Data delivered by other programmes

http://www.eso.org/sci/observing/phase3/data_releases.html

Overview of the Phase 3 Process

1. Prepare the reduced data by making them Phase3 compliant

https://www.eso.org/sci/observing/phase3/p3sdpstd.pdf

Phase 3 data must comply to the ESO Science Data Product Standard regarding format and required metadata, i.e. relevant keywords for data characterization, quality, processing provenance (keyword PROVi) to trace back to the original (raw) data. It also allows to associate ancillary data files to the science data products.

1-D Spectra

in FITS binary table format: one primary header and one single extension (compliant to IVOA Spectral DM)
No data in the primary HDU → NAXIS= 0 / Length of data axes

Support for 2d spectral frames as ancillary files

Images

Astrometrically & photometrically calibrated FITS image with associated confidence/weight map;
Quality params. (limiting magnitude, PSF size, etc.)
Single image stored in the primary HDU.

MEF images

Multiple images stored in Multi-Extension FITS format.

Catalogues

Uniform tabular structure including content descriptors (employing UCDs)

Multi-file format supported: especially for large Survey catalogues, Tile-by-Tile fashion.

Served via a dedicated query interface

Source lists

Single-band source catalogues directly extracted from the image. They are associated to their originating image (via the provenance keyword PROVi)

IFU 3-D data cubes

The data cube should be stored in a FITS image extension,
No data in the primary HDU.

Sub-mm Flux Maps

Ex. APEX/LABOCA


European Organisation for Astronomical Research in the Southern Hemisphere
Organisation Européenne pour des Recherches Astronomiques dans l'Hémisphère Austral
Europäische Organisation für astronomische Forschung in der südlichen Hemisphäre
Accepted by ESO Technical Archive
Data Management and Operations Division
Phase 3 User Documentation
ESO Science Data Products Standard
Doc. No.: GEN-SPE-ESO-33000-5335
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Released: M. Romaniello
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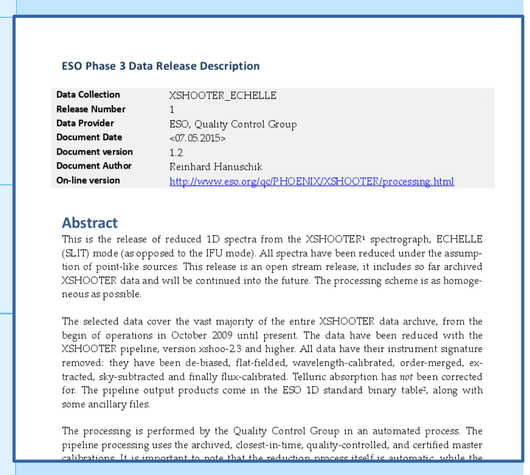
2. Prepare the data documentation

Following a standard template ('release-description.pdf'). It should provide short broad overview of the programme, with an overview/layout of the observations and a description of the data delivery in terms of contents, processing/calibration, quality, completeness, eventual issues...


ESO Phase 3 Data Release Description

Data Collection	XSHOOTER_ECHELLE
Release Number	1
Data Provider	ESO, Quality Control Group
Document Date	<07.05.2015>
Document version	1.2
Document Author	Reinhard Hanuschik
On-line version	http://www.eso.org/qc/PHOENIX/XSHOOTER/processing.html

Abstract

This is the release of reduced 1D spectra from the XSHOOTER[1] spectrograph, ECHELLE (SLIT) mode (as opposed to the IFU mode). All spectra have been reduced under the assumption of point-like sources. This release is an open stream release, it includes so far archived XSHOOTER data and will be continued into the future. The processing scheme is as homogeneous as possible.

The selected data cover the vast majority of the entire XSHOOTER data archive, from the begin of operations in October 2009 until present. The data have been reduced with the XSHOOTER pipeline, version xshoo-2.3 and higher. All data have their instrument signature removed: they have been de-biased, flat-fielded, wavelength-calibrated, order-merged, extracted, sky-subtracted and finally flux-calibrated. Telluric absorption has *not* been corrected for. The pipeline output products come in the ESO 1D standard binary table[2], along with some ancillary files.

The processing is performed by the Quality Control Group in an automated process. The pipeline processing uses the archived, closest-in-time, quality-controlled, and certified master calibrations. It is important to note that the reduction process itself is automatic, while the

3. Validate the data

Validate the data before submitting them to ESO using the Release Validator. Re-run it on the revised data till it returns no errors.

4. Define a new data release via the Release Manager

http://www.eso.org/rm/

As PI you can delegate the Phase 3 process for your ESO programme to one or more persons to distribute the effort of data submission and release preparation (user delegation).

5. Upload the data together with the release description

Example: `$ lftp -u username,password phase3ftp.eso.org`

6. Close the release

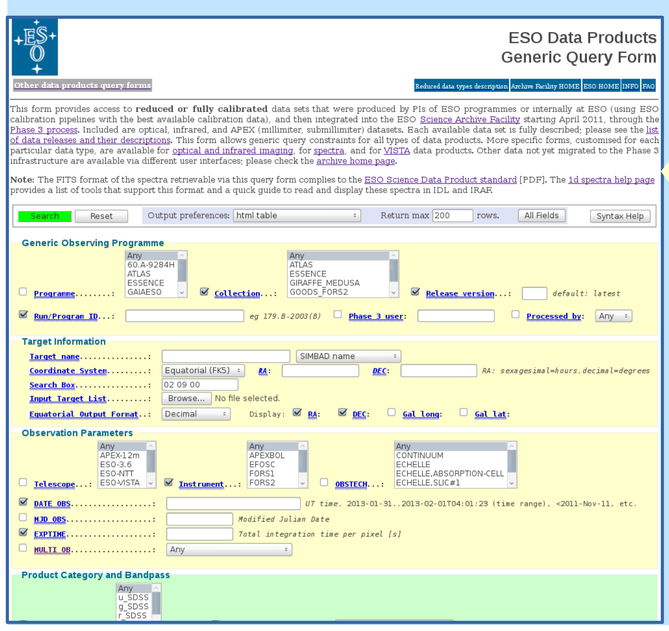
using the RM. The PI is responsible for the completeness and correctness of the submitted data and agrees to the publication. The FTP area becomes read-only and the uploaded files cannot be modified, nor it is possible to add any files to the release without intervention of an ESO operator.

7. ESO reviews the data

performing an extensive content validation to ensure consistency with the standard and with previous data releases (if any) and raw data. Between release description and the submitted data.
The outcome of the review process is a content validation report with RIXes to answer to and some iterations between Phase 3 helpdesk and the data provider take place.

For support contact usd-help@eso.org Subject: 'Phase 3'

8. ESO archives, publishes and advertises the new data release


ESO Data Products Generic Query Form

Other data products query forms | Reduced data types description | Archive Facility HOME | ESO HOME | INFO | FAQ

This form provides access to **reduced or fully calibrated** data sets that were produced by PIs of ESO programmes or internally at ESO (using ESO calibration pipelines with the best available calibration data), and then integrated into the ESO Science Archive Facility starting April 2011, through the Phase 3 process. Included are optical, infrared, and APEX (millimiter, submillimiter) datasets. Each available data set is fully described; please see the list of data releases and their descriptions. This form allows generic query constraints for all types of data products. More specific forms, customised for each particular data type, are available for optical and infrared imaging, for spectra, and for VISTA data products. Other data not yet migrated to the Phase 3 infrastructure are available via different user interfaces; please check the archive home page.

Note: The FITS format of the spectra retrievable via this query form complies to the ESO Science Data Product standard [PDF]. The 1d spectra help page provides a list of tools that support this format and a quick guide to read and display these spectra in IDL and IRAF.

Search | Reset | Output preferences: html table | Return max: 200 rows. | All Fields | Syntax Help

Generic Observing Programme

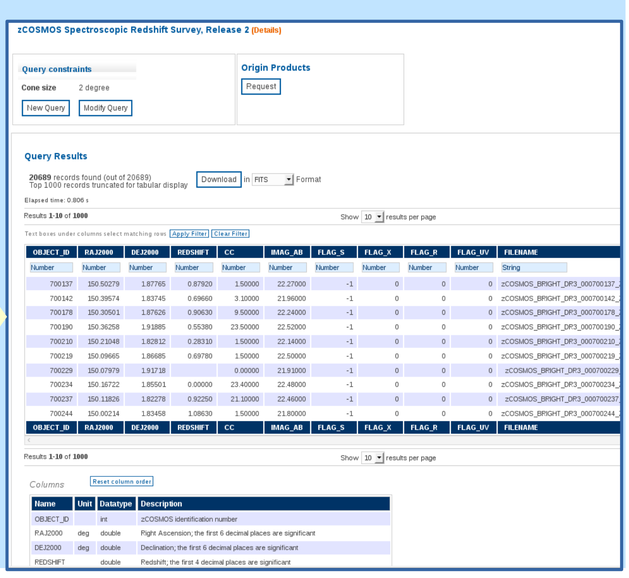
Target Information

Observation Parameters

Product Category and Bandpass

ESO Data Products Generic Query Form
http://archive.eso.org/wdb/wdb/adp/phase3_main/form
Thanks to standard Phase 3 keywords seamless access from a unique query form is provided independent of the original science programme.

Dedicated query interface for CATALOGUES:
ESO Catalogue Facility
http://www.eso.org/qi/


zCOSMOS Spectroscopic Redshift Survey, Release 2 (Details)

Query constraints
Cone size 2 degree
New Query | Modify Query

Origin Products
Request

Query Results
20689 records found (out of 20689)
Top 1000 records truncated for tabular display
Download in FITS Format
Elapsed time: 0.806 s
Results 1-10 of 1000 Show 10 results per page

OBJECT_ID	RAJ2000	DEJ2000	REDSHIFT	CC	IMAG_AB	FLAG_S	FLAG_X	FLAG_R	FLAG_UV	FILENAME
700137	150.50279	1.87765	0.87920	1.50000	22.27000	-1	0	0	0	zCOSMOS_BRIGHT_DR3_00070013
700142	150.39574	1.83745	0.69660	3.10000	21.96000	-1	0	0	0	zCOSMOS_BRIGHT_DR3_00070014
700178	150.30501	1.87626	0.90630	9.50000	22.24000	-1	0	0	0	zCOSMOS_BRIGHT_DR3_00070017
700190	150.36258	1.91885	0.55380	23.50000	22.52000	-1	0	0	0	zCOSMOS_BRIGHT_DR3_00070019
700210	150.21048	1.82812	0.28310	1.50000	22.14000	-1	0	0	0	zCOSMOS_BRIGHT_DR3_00070021
700219	150.09665	1.86685	0.69780	1.50000	22.50000	-1	0	0	0	zCOSMOS_BRIGHT_DR3_00070021
700229	150.07979	1.91718		0.00000	21.91000	-1	0	0	0	zCOSMOS_BRIGHT_DR3_00070022
700234	150.16722	1.85501	0.00000	23.40000	22.48000	-1	0	0	0	zCOSMOS_BRIGHT_DR3_00070023
700237	150.11826	1.82278	0.92250	21.10000	22.46000	-1	0	0	0	zCOSMOS_BRIGHT_DR3_00070023
700244	150.00214	1.83458	1.08630	1.50000	21.80000	-1	0	0	0	zCOSMOS_BRIGHT_DR3_00070024

Columns

Name	Unit	Datatype	Description
OBJECT_ID		int	zCOSMOS identification number
RAJ2000	deg	double	Right Ascension; the first 6 decimal places are significant
DEJ2000	deg	double	Declination; the first 6 decimal places are significant
REDSHIFT		double	Redshift; the first 4 decimal places are significant