D8.10
Portfolio of subdomain added-value products

Work Package	WP8
Lead partner	CNRS
Status	Final
Deliverable type	Report
Dissemination level	Public
Due date	31/12/2022
Submission date	20/12/2022

Deliverable abstract

This report presents the portfolio of Atmospheric subdomain added-value products which have been developed for the ENVRI-FAIR catalogue of services.

not yet approved by EC

ENVRI-FAIR (www.envri-fair.eu) has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824068

DELIVERY SLIP

	Name	Partner Organization	Date
Main Author	Damien Boulanger	CNRS	19/12/2022
Contributing Authors	Cathrine Lund Myhre Markus Fiebig Léonard Rivier Alex Vermeulen Ingemar Häggström Anders Tjulin Lara Ferrighi	NILU NILU UVSQ ULUND EISCAT EISCAT METNO	19/12/2022
Reviewer(s)	Gullaume Brissebrat	CNRS	19/12/2022
Approver	Andreas Petzold	FZJ	20/12/2022

DELIVERY LOG

Issue	Date	Comment	Author
V 0.1	19/12/2022		Damien Boulanger

DOCUMENT AMENDMENT PROCEDURE

Amendments, comments and suggestions should be sent to the Project Manager at manager@envri-fair.eu.

GLOSSARY

A relevant project glossary is included in Appendix A. The latest version of the master list of the glossary is available at http://doi.org/10.5281/zenodo.4471374.

PROJECT SUMMARY

ENVRI-FAIR is the connection of the ESFRI Cluster of Environmental Research Infrastructures (ENVRI) to the European Open Science Cloud (EOSC). Participating research infrastructures (RI) of the environmental domain cover the subdomains Atmosphere, Marine, Solid Earth and Biodiversity / Ecosystems and thus the Earth system in its full complexity.

The overarching goal is that at the end of the proposed project, all participating RIs have built a set of FAIR data services which enhances the efficiency and productivity of researchers, supports innovation, enables data- and knowledge-based decisions and connects the ENVRI Cluster to the EOSC.

This goal is reached by: (1) well defined community policies and standards on all steps of the data life cycle, aligned with the wider European policies, as well as with international developments; (2) each participating RI will have sustainable, transparent and auditable data services, for each step of data life cycle, compliant to the FAIR principles. (3) the focus of the proposed work is put on the implementation of prototypes for testing pre-production services at each RI; the catalogue of prepared services is defined for each RI independently, depending on the maturity of the involved RIs; (4) the complete set of thematic data services and tools provided by the ENVRI cluster is exposed under the EOSC catalogue of services.

not yet approved by EC

TABLE OF CONTENTS

not yet approved by EC

D8.10 - Portfolio of subdomain added-value products

1. Introduction

The ENVRI-FAIR project's objective is to implement "FAIRness" for data produced in the European Research Infrastructures (RIs) organised in the Environmental Research Infrastructures (ENVRI) community, Having FAIR data also helps RIs connecting to the European Open Science Cloud (EOSC). In this context, "FAIR" is an acronym comprising the aspects of "Findable", "Accessible", "Interoperable", and "Reusable" as specified by the FORCE11 community.
ENVRI-FAIR WP8 organises and conducts this implementation work for the community of ENVRI RIs in the atmospheric subdomain, comprising the RIs ACTRIS, EISCAT-3D, IAGOS, ICOS, and SIOS.

This deliverable constitutes a list of added-value products implemented by all Atmosphere RIs. Added-value or elaborated data products propose features to enhance the user experience. They are composite datasets that are results of the derivation of observational datasets combined with other datasets (from the RI or external).

This list of products has been compiled in the frame of the Task 8.5 for demonstration of interoperability within the Atmosphere subdomain. This list will also be used for the initialization of the ENVRI Catalogue of Services and the registration of RI's resources in the EOSC Marketplace.

2. Portfolio

For each RI a table presents the list of added-value products with descriptions and a link to access the products.

The status of implementation of the products are also described as some products aren't yet in an operational phase. The links aren't available for the products that are planned or in progress. Some products are developed but not available yet as some support is necessary to publish them.

not yet approved by EC

2.1. ACTRIS

Name of the data product	Description	Variables	Status O=in operation S=support needed P=planned	Link
Climatology products for ACTRIS in situ variables @ ACTRIS National Facilities across Europe	Monthly and seasonal means @ ACTRIS National Facilities based on observations of aerosol and trace gas in situ level 2 data.	reactive traces gases, aerosol optical, physical and chemical properties	P	N/A
Single Scattering Albedo @ACTRIS National Facilities	Single Scattering Albedo @ ACTRIS and potentially GAW sites. The variable provides information on the distribution of absorbing and scattering particles.		P	N/A
Calculated particle light extinction coefficient	Closure product for Particle light scattering and backscattering coefficients.		O	https://ebas-data.nilu.no/DataSets.aspx?projects=ACTRIS_NRT&InstrumentTypes=dmps,smps&components=aerosol_light_backscattering_coefficient,aerosol_light_scattering_coefficient&fromDate=1970-01-01&toDate=2022-

not yet approved by EC

Name of the data product	Description	Variables	Status O=in operation S=support needed P=planned	Link
				12-31
Integrated full-range particle number size distribution	Estimated from separate fine and coarse size range particle number size distributions		P	N/A
Source apportionment of submicron organic aerosols in Europe	Time-resolved variations (e.g., daily, seasonal and long-term trends) of organic aerosol major sources in Europe		S	N/A
Volatile Organic Compounds (VOC) source attribution across Europe	Long-term trend of most important VOC source signatures in Europe using PMF		S	N/A
Cloud occurrence at cloud in situ observational platforms	Indicates whether a cloud in situ observation platform (station) is inside fog or cloud		S	N/A
Aerosol columnar properties	ACTRIS Variable produced with AERONET Level 1 (Synergy or Single), Spectral refractive indexes, spectral extinction/absorption AOD, single scattering albedo, spectral lidar ratio, Angström exponent, volume size distribution, spherical fraction: Synergy & single - GARRLiC / GRASP-AOD Algorithm – Daytime + Nighttime when available		S	N/A
ReOBS	Long-term (> 10 years) multi-parameter (all available) homogenised and harmonised dataset: Re-calibrated, Re-quality controlled, Re-expertized, Re-averaged, Re-formatted, Re-nomenclatured.	Aerosol / Cloud / Trace gas	O	https://reobs.aeris-data.fr/

not yet approved by E

Name of the data product	Description	Variables	Status O=in operation S=support needed P=planned	Link
Aerosol profile microphysical and optical properties	ACTRIS Variable produced with AERONET-ACTRIS Level 1 and ACTRIS LiDAR Level 1 (Synergy), Aerosol Volume Centration, Spectral Extinction AOD, Spectral Absorption AOD, Spectral Extinction coefficient, Spectral backscatter coefficient , Spectral Single Scattering Albedo, Spectral LiDAR ratio, Spectral Aerosol linear depolarization ratio, Extinction Ansgtröm Exponent , Backscatter Ansgtröm Exponent, Aerosol Phase Matrix: Synergy products -GARRLiC Algorithm – Daytime		S	N/A
Monthly averaged trace gases remote sensing climatologies	Actris variables produced with AERIS level 2 Lidar, UV-Vis and FTIR data.		P	N/A
Rate constants for gas-phase reactions	Rate constants for gas-phase reactions - obtained at room temperature or as a function of temperature	Trace gas	O	https://data.eurochamp.org/data-access/gas-phase-rate-constants
Rate constants for condensed phase reactions	Rate constants for condensed-phase reactions - obtained at room temperature or as a function of temperature	Aerosol/cloud	O	https://data.eurochamp.org/data-access/condensed-phase-rate-constants
Secondary organic aerosol yields	Yield of aerosol produced by the degradation of volatile organic compounds	Aerosol	O	https://data.eurochamp.org/data-

not yet approved by E

Name of the data product	Description	Variables	Status O=in operation S=support needed P=planned	Link
				access/soa-yields
Photolysis frequencies	Rate constant of photolysis reactions for trace gas compounds	Aerosol/cloud	O	https://data.eurochamp.org/data-access/photolysis-frequencies-quantum-yields
Quantum yields	Quantum yields of trace gas compounds	Trace gas/Aerosol	O	
Vapor pressures	Vapor pressures of trace gas compounds	Trace gas	O	https://data.eurochamp.org/data-access/vapor-pressures-henry-constants
Henry's constants	Henry's constants of trace gas compounds	Trace gas	O	
Mass extinction coefficients	Aerosol mass extinction coefficients	Aerosol	O	https://data.eurochamp.org/data-access/optical-properties
Mass absorption coefficients	Aerosol mass absorption coefficients	Aerosol	O	
Mass scattering coefficients	Aerosol mass scattering coefficients	Aerosol	O	
Complex refractive index	Aerosol complex refractive index	Aerosol	O	
Growth factors	Aerosol growth factors	Aerosol	O	https://data.eurochamp.org/data-access/growth-factors

not yet approved by E

2.2 EISCAT-3D

Name of the data product	Description	Variables	Status O=in operation S=support needed P=planned	Link
Madrigal predefined parameters	Derived data using basic derived physical parameters and possibly atmospheric models	Ionospheric/thermospheric parameters, plots	O	https://madrigal.eiscat.se/madrigal
Spectral data	Animations of spectral data	Returned echoes	O	https://portal.eiscat.se/schedule/
Gated spectral data	Semi-manufactured data for user supplied software	Power spectra, user defined	O	https://portal.eiscat.se/schedule/
Reanalysis of L2 data	Derived data using basic derived physical parameters and possibly atmospheric models	Ionospheric/thermospheric parameters, plots	O	https://portal.eiscat.se/schedule/

not yet approved by EC

2.3 IAGOS

Name of the data product	Description	Variables	Status O=in operation S=support needed P=planned	Link
IAGOS Carbon Monoxide contribution and interpolated modelled data from ECMWF	Source attribution using FLEXPART and carbon monoxide emission inventories (SOFT-IO version 1.0 ; Sauvage et al., 2017). Simulates the global contributions of anthropogenic and biomass burning emissions. Also provides calculated variables and ECWMF variables interpolated along flight trajectories.	carbon monoxide, PV, PBL, orog, geopotential height at 500 hPa, surface pressure, potential temp., vertical wind speed	O	https://doi.org/10.25326/3
IAGOS footprints	Pre-calculated footprints over airports visited by the IAGOS fleet at two pressure levels. Implementation in progress in the frame of ATMO-ACCESS.		P	N/A
Climatologies	Global climatologies over two decades (2001-2020). Two types of climatologies are available: with 10 fixed pressure levels (from 288 hPa to 186 hPa) or with 4 dynamic pressure levels (lower stratosphere, upper stratosphere, tropopause, upper troposphere).	carbon monoxide, ozone, water vapor	O	https://doi.org/10.25326/08
IAGOS Planetary boundary layer referenced profiles of Ozone and Carbon Monoxide	The climatological vertical stratification of ozone (O3) and carbon monoxide (CO) within the planetary boundary layer (PBL) and at the interface with free troposphere (FT) was derived using all IAGOS (In-service Aircraft for a Global Observing System) and WOUDC (World Ozone and Ultraviolet Radiation		O	https://doi.org/10.25326/4

not yet approved by

Name of the data product	Description	Variables	Status O=in operation S=support needed P=planned	Link
	Data Centre) vertical profiles available at northern mid-latitudes (25°N-60°N) between August 1994 and December 2016 (Petetin et al., 2018).			
IAGOS-DM-MOCAGE L4	Consists in IAGOS data distributed on the MOCAGE (MOdélisation du Climat À Grande Échelle) CTM grid configured for the REF-C1SD reference simulation, averaged through each month and each sampled grid cell, for the following observed quantities: ozone, carbon monoxide, temperature, and for the following quantities derived from observations: O3/CO ratio and potential temperature.		O	https://doi.org/10.25326/80
Lightning contribution	Quantification of lightning influence on IAGOS NOx. Implementation in progress.	NOx	P	N/A

not yet approved by E

2.4 ICOS

Name of the data product	Description	Variables	Status O=in operation S=support needed P=planned	Link
Historic Observational Time Series CO2	Recalibrated data over historical record prior to ICOS	CO2	O	https://www.icos-cp.eu/data-products
Historic Observational Time Series methane	Recalibrated data over historical record prior to ICOS	CH4	O	https://www.icos-cp.eu/data-products
Drought-2018 atmospheric CO2 Mole Fraction product for 48 stations (96 sample heights)	This is the release of the observational data product for eddy covariance fluxes at 52 stations in the ecosystem domain, part of them outside the ICOS network, from the Drought-2018 team and covering the period 1989-2018. The data are in the standard format used for the ICOS L2 ecosystem products and also used by other regional networks like AmeriFlux.	CO2, CH4	O	https://www.icos-cp.eu/data-products/ERE9-9D85
Global anthropogenic CO2 emissions for 2006-2019 based on EDGARv4.3 and BP statistics 2019	Anthropogenic CO2 emissions for Europe adjusted for the impact of the COVID-19 pandemic by using daily factors based on sector- and country-specific emissions read from https://carbonmonitor.org	CO2	O	https://www.icos-cp.eu/data-products/GFNT-5Y47
Project EUROCOM inversion results for CO2 biogenic fluxes from seven inversion models	Ensemble of inverse modelling estimates of European CO2 fluxes for 2006-2015 as part of the EUROCOM inversion intercomparison; monthly fluxes; 0.5 deg. x 0.5 deg.; Supplementary material for Monteil et al., 2019, https://doi.org/10.5194/acp-	CO2	O	https://www.icos-cp.eu/data-products/G068-1T09

not yet approved by

Name of the data product	Description	Variables	Status O=in operation S=support needed P=planned	Link
	2019-1008			
Time series API	Direct extraction of time series data using python library	all variables	O	https://www.icos-cp.eu/data-products
dashboard servlet	NRT data for any station and variable, day, month and yearly value, link to data chart	all atmosphere variables	O	https://www.icos-cp.eu/data-products
Footprint data	Atmospheric and flux footprint data	atmosphere variables + ecosystem fluxes	O	https://www.icos-cp.eu/data-products
NetCDF preview	Preview of CF NetCDF data	all variables	O	https://www.icos-cp.eu/data-products
Emission prior fluxes	From DGVM, fossil fuel inventories, etc.	all variables	O	https://www.icos-cp.eu/data-products
Trajectory forecasts	For all ICOS atmosphere+selected other stations	all variables	O	https://www.icos-cp.eu/data-products

not yet approved by E

2.5 SIOS

Name of the data product	Description	Variables	Status O= in operation S=support needed P=planned	Link	Comment
Observations from weather stations	Quality controlled time series from Norwegian weather stations. Data are climate consistent following a number of automated and manual quality control routines.	air_pressure_at_sea_level, surface_air_pressure, air_temperature, wind_speed, wind_from_direction, relative_humidity	O	https://thredds.met.no/thredds/catalog/met.no/observations/stations/catalog.html	Searchable on the data portal: https://sios-svalbard.org/metsis/search?fulltext=%22Observations%20from%22&f[0]=organisation%3ANorwegian%20Meteorological%20Institute
SYNOP data from stations	Synoptic meteorological measurements extracted from the WMO Global Telecommunication System (GTS). Data are not quality controlled after extraction from GTS.	air_pressure_at_sea_level, air_temperature, dew_point_temperature, precipitation_amount, relative_humidity, sea_surface_temperature, thickness_of_snowfall_amount, wind_from_direction, wind_speed, wind_speed_of_gust	O	https://thredds.met.no/thredds/arcticdata/obssynop.html	searchable on the data portal: https://sios-svalbard.org/metsis/search?fulltext=SYNOP&f[0]=organisation%3ANorwegian%20Meteorological%20Institute

not yet approved by

Name of the data product	Description	Variables	Status O= in operation S=support needed P=planned	Link	Comment
Climate Change Tower Meteorological Data	Air temperature, relative humidity, air pressure, wind speed and direction measured at 4 different heights	air_temperature, relative_humidity, air_pressure, wind_speed, wind_from_direction	O	https://data.iadc.cnr.it/erddap/tabledap/cct_meteo_d2.html	Searchable on the data portal: https://sios-svalbard.org/metsis/search?search_api_fulltext_op=and&fulltext=Climate+change+tower+meteorological+data&start_date=&end_date=&is_parent=All&platform_ancillary_cloud_coverage=All&f%5B0%5D=dataset_level%3ALevel-1
Climate Change Tower Turbulence Data	Turbulent parameters are measured at the Amundsen-Nobile Climate Change Tower (CCT) by means of a Gill R3 sonic anemometer installed at 7.5 m from the ground since 2010	wind_speed, wind_from_direction, friction_velocity_in_air, sensible_heat_flux_in_air, surface_roughness_length	O	https://data.iadc.cnr.it/erddap/tabledap/turbulence_cct.html	Searchable on the data portal: https://sios-svalbard.org/metsis/search?search_api_fulltext_op=and&fulltext=Climate+change+tower+turbulence+data&start_date=&end_date=&is_parent=All&platform_ancillary_cloud

not yet approved by

Name of the data product	Description	Variables	Status O= in operation S=support needed P=planned	Link	Comment
					_coverage=All&f%5B0%5D=dataset_level%3ALevel-1
Climate Change Tower Radiation Data	Incoming/outgoing SW and LW radiation. Instrument Kipp e Zonen CNR1. Reflected SW and emitted LW. Instruments Kipp&Zonen CMP11 and CG4	downwelling_longwave_flux_in_air, upwelling_longwave_flux_in_air, downwelling_shortwave_flux_in_air, upwelling_shortwave_flux_in_air	O	https://data.iadc.cnr.it/erddap/tabledap/iadc_d1_5_radiazione_cct.html	Searchable on the data portal:___https://sios-svalbard.org/metsis/search?search_api_fulltext_op=and&fulltext=Climate+change+tower+radiation+data&start_date=&end_date=&is_parent=All&platform_ancillary_cloud_coverage=All&f%5B0%5D=dataset_level%3ALevel-1

not yet approved by