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DestinE - System Framework - Data Portfolio

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Change Record

Version	Date	DCR* No. if applicable	Description of Changes
v1B	30/03/2022		Initial version of DTE-USR-002
v1C	12/05/2022		Version for Internal Preliminary Design Review
v1D	25/05/2022		Version of DTE-USR-002 (KO+4 Milestone)
V1E	05/07/2022		Version for ITT release <ul style="list-style-type: none"> - New federated Datasets from Copernicus Emergency Service - Data Governance section updated - Update of Acronym table
V1F	19/07/2022		Version for KO+6 Milestone
V1G	09/09/2022		Update of corrupted DEDL Data types image (Figure 2) Version for DE System Review
V1H	19/10/2022		Update of document header
V1I	12/04/2023		Correction of ISIMIP previously misspelled Update of Climate Change Datasets description Update of Climate Adaptation and on-demand Weather-induced and Geophysical Extremes Digital Twins outputs according the latest specifications provided by ECMWF (DE330_D330.5.5.1_202301 and DE_340_M340.2.1.3_202302 On-demand Digital Twin, new IDs : DTCC-OD-1 and DTEE-OD-1 Deletion of EO:MO:DAT:GLOBAL_ANALYSISFORECAST_PHY_CPL_001_015 as removed by CMEMS
V1J	26/10/2023		Version for System Checkpoint Update of section 2 and alignment with Data Governance document Adding Satellites data from EUMETSAT missions (section 3) Update of section 4 with table for Federated data providers Section 5 update with most recent information on DTs
V1K	25/06/2024		DT data: Added more details for the Digital Twin Outputs (Section 5.1, 5.2, 5.3)

Version	Date	DCR* No. if applicable	Description of Changes
			On-demand climate-dt removed Rename of Digital Twins collections ID Adding collections EO.ECMWF.DAT.SATELLITE_SEA_ICE_CONCENTRATION EO.ECMWF.DAT.SATELLITE_SEA_ICE_THICKNESS EO.ECMWF.DAT.SATELLITE_SEA_ICE_EDGE_TYPE EO.ECMWF.DAT.SIS_HYDROLOGY_METEOROLOGY_DERIVED_PROJECTIONS EO:EUM:DAT:MSG:LSA-LSTDE EO:EUM:DAT:MSG:LSA-LST-CDR EO:EUM:DAT:MSG:LSA-FRM EO:EUM:DAT:METOP:OSI-104 EO.EUM.DAT.SENTINEL-3.AOD EO.EUM.DAT.SENTINEL-3.FRP EO.ECMWF.DAT.CAMS_GLOBAL_FIRE_EMISSIONS_GFAS EO.ESA.DAT.LANDSAT8.OLI-TIRS_L1 replaced by EO.NASA.DAT.LANDSAT_C2_L1 EO.ESA.DAT.LANDSAT8_COL replaced by EO.NASA.DAT.LANDSAT_C2_L2 EO.CLMS.DAT.GLO.LAI300_V1 EO.CLMS.DAT.GLO.FAPAR300_V1 Rename IDs / Fixed typo error in IDs: EO.ECMWF.DAT.CAMS_EURO_AIR_QUAL_REANALYSIS by EO.ECMWF.DAT.CAMS_EURO_AIR_QUALITY_REANALYSES EO.HRVPP.DAT.VEGETATION-INDICES by EO:EEA:DAT:CLMS_HRVPP_VI EO.ESA.DAT.EODC-SENTINEL-1.L1_SLC by EO.ESA.DAT.SENTINEL-1.L1_SLC EO.ESA.DAT.EODC-SENTINEL-1.L1_GRD by EO.ESA.DAT.SENTINEL-1.L1_GRD EO.ECMWF.DAT.CAMS_EURO_AIR_QUALITY_REANALYSES by EO.ECMWF.DAT.CAMS_EUROPE_AIR_QUALITY_REANALYSES EO.ECMWF.DAT.CAMS_GLOBAL_GREENHOUSE_GAS_REANALYSIS EO.ECMWF.DAT.CAMS_GLOBAL_GREENHOUSE_GAS_REANALYSIS_MONTHLY_AV_FIELDS

Version	Date	DCR* No. if applicable	Description of Changes
			STAT.EUSTAT.DAT.SHARE_ENERGY_FROM_RENEWABLE EO.ESA.DAT.SENTINEL-3.SR_2_LAN____ EO.ESA.DAT.SENTINEL-3.SL_2_LST____ EO.EUM.DAT.SENTINEL-3.OL_2_WFR____ .EUM.DAT.SENTINEL-3.OL_2_WRR____ EO.ECMWF.DAT.CAMS_EUROPE_AIR_QUALITY_REANALYSES EO.MO.DAT.GLOBAL_ANALYSISFORECAST_PHY_001_024 EO.MO.DAT.GLOBAL_ANALYSISFORECAST_BCG_001_028 EO.MO.DAT.GLOBAL_ANALYSISFORECAST_WAV_001_027 EO.MO.DAT.GLOBAL_MULTIYEAR_PHY_ENS_001_031 EO.MO.DAT.INSITU_GLO_PHY_TS_OA_NRT_013_002 EO.MO.DAT.INSITU_GLO_PHY_TS_OA_MY_013_052 EO.MO.DAT.INSITU_GLO_PHY_UV_DISCRETE_NRT_013_048 EO.MO.DAT.MULTIOBS_GLO_BGC_NUTRIENTS_CARBON_PROFILES_MYNRT_015_009 EO.MO.DAT.MULTIOBS_GLO_PHY_MYNRT_015_003 EO.CLMS.DAT.SENTINEL-2.HRVPP.VI EO.CLMS.DAT.GLO.NDVI300_V1 by EO.CLMS.DAT.CGLS_GLOBAL_NDVI300_V1_333M EO.CLMS.DAT.GLO.NDVI_1KM_V2 by EO.CLMS.DAT.CGLS_GLOBAL_NDVI_V2_1KM EO.CLMS.DAT.GLO.FCOVER300_V1 EO.CLMS.DAT.GLO.DMP300_V1 EO.CLMS.DAT.GLO.GDMP300_V1 Decommissioned datasets: EO.ECMWF.DAT.WATER_QUALITY_INDICATOR_FOR_EUROPEAN_RIVERS EO.MO.DAT.OCEANCOLOUR_GLO_CHL_L3_REP_OBSERVATIONS_009_065 EO.MO.DAT.GLOBAL_REANALYSIS_PHY_001_026 EO.MO.DAT.MULTIOBS_GLO_PHY_REP_015_004 EO.ECMWF.DAT.WATER_QUANTITY_INDICATORS_FOR_EUROPEAN_CATCHMENTS Replaced by: EO:ECMWF:DAT:SIS_HYDROLOGY_VARIABLES_DERIVED_PROJECTIONS

<i>Version</i>	<i>Date</i>	<i>DCR* No. if applicable</i>	<i>Description of Changes</i>
			EO.MO.DAT.MULTIOBS_GLO_PHY_REP_015_004 EO.MO.DAT.OCEANCOLOUR_GLO_BGC_L3_NRT_009_101 URN.CGSL.GLOBAL.BA300_V1_333M URN.CGSL.GLOBAL.BA300_V3_333M Update of CMEMS datasets as per CMEES evolution Replacement of EO.DEM.DAT.COP-DEM in 4 datasets: EO.DEM.DAT.COP-DEM_GLO-30-DGED - EO.DEM.DAT.COP-DEM_GLO-30-DTED - EO.DEM.DAT.COP-DEM_GLO-90-DGED - EO.DEM.DAT.COP-DEM_GLO-90-DTED ISIMIP and IAGOS Datasets ID defined

*DCR = Document Change Request

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1 INTRODUCTION

The objective of Destination Earth initiative (DestinE) is to develop a very high precision digital model of the Earth to monitor and simulate natural and human activity, and to develop and test scenarios for more sustainable development and for achieving both the green (Green Deal) and digital (Digital Strategy) priorities of the EU.

DestinE is based on the following elements:

- DestinE Core Service Platform (DESP): A user-friendly platform that provides a large number of users with evidence-based policy and decision-making tools, applications and services, based on an open, flexible, scalable and evolvable secure cloud-based architecture.
- DestinE Data Lake (DEDL): fulfils the storage and access requirements for any data that is offered to DestinE users. It provides users with a seamless access to the datasets, regardless of data type and location. Furthermore, the DEDL supports near-data processing to maximize throughput and service scalability. The data lake is built upon existing data holdings such as Copernicus DIAS, ESA, EUMETSAT and ECMWF.
- The DestinE Digital Twins (DTs): initially, two Digital Twins are provided as part of Destination Earth.
 - DT on Weather-induced and Geophysical Extremes: provides capabilities and services to support decision making for rapid response to meteorological, hydrological and air quality extremes. The system combines weather, hydrology and air-quality observation and cutting-edge simulation capabilities into a unified framework to provide high-quality weather and impact-sector information from global to continental, to country and city scales for the assessment and prediction of environmental extremes on a timescale of a few days ahead. It has a global component, which produces regularly (daily) simulations on a time scale of 4 days ahead with a spatial resolution of about ~4 km. It also has an on-demand regional component, which produces simulations on a timescale of two days ahead with a spatial resolution of 500-750m over Europe and which is configurable (on-demand) for specific triggering and tailoring of the provision of information in terms of geographical region, extreme event type and related impact-sector needs, or what-if scenarios.
 - DT on climate change adaptation: provides capabilities and services to support planning activities and decision-making linked to climate change adaptation. The system combines cutting-edge Earth-system and impact-sector simulations and observations into a unified framework to provide global high-quality climate projections and impact-sector information on multi-decadal timescales (2020 to ~2050), at a very high spatial resolution (~5km). It produces updated climate information both regularly (yearly or less), operationalizing the capacity to

produce global multi-decadal projections, and on-demand allowing to test various scenarios, the impact of unprecedented events, or to explore how certain past extreme events will look in a future climate through a storyline approach.

The DestinE Data Portfolio (DEDP) lists the datasets offered via DestinE to users. Two kind of data are offered:

- DestinE generated data such as from the DTs or promoted DestinE User generated data
- Datasets from federated data holdings

1.1 Scope

The data portfolio identifies and details all data that DestinE users may access.

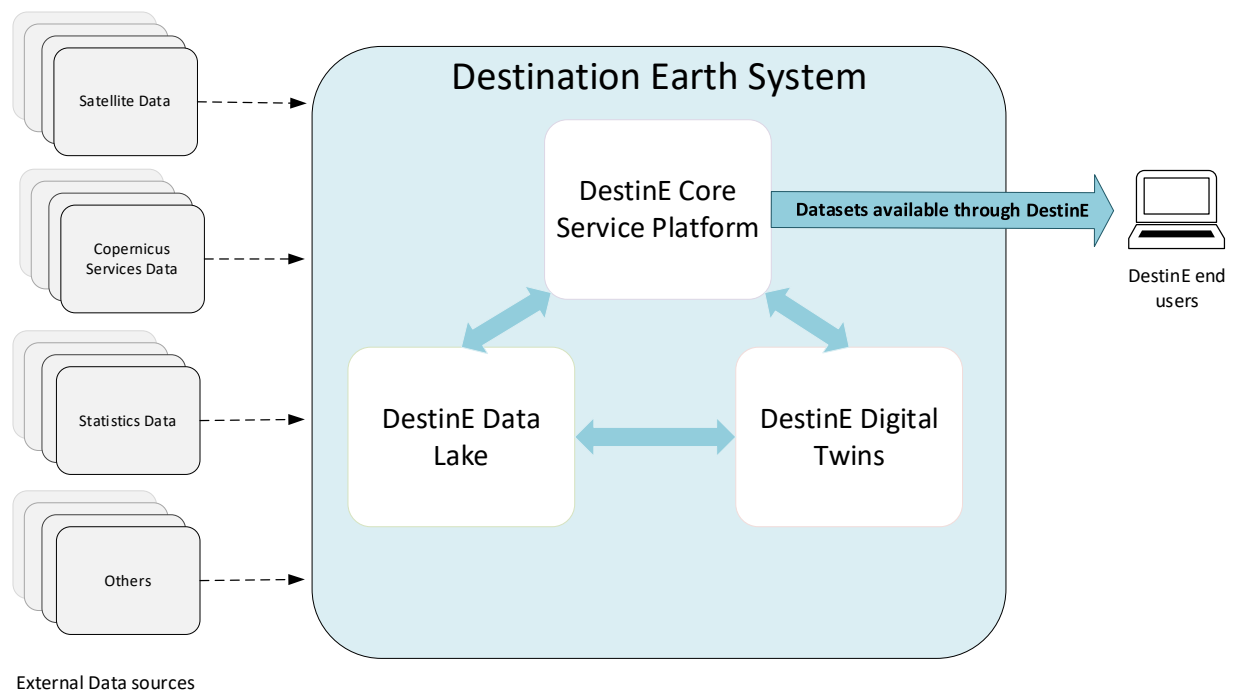


Figure 1: DestinE Data Portfolio access

This document allows to obtain an overview of the data portfolio available for DestinE Users.

All DestinE dataset are classified using the below maturity level.





In development: user level data under development. Limited data sets might be made available upon request for early evaluation purposes. There is no timeliness, quality monitoring and availability level imposed.

Experimental production: user level data routinely/on-demand generated and available upon request. There is no guarantee on availability. Quality is not necessarily monitored and timeliness is not necessarily within the target range.

Pre-operational: routinely/on-demand production of data. Expected timeliness and accuracy are as much in line with expected values as possible and are fully documented. The data retention time may be lower than the retention time for an operational dataset.

Operational: routinely/on-demand production of data. Expected timeliness, quality and availability level met expected values and are fully documented. Quality and timeliness are monitored and reported operationally.

The following table provides an overview of datasets characteristics according to their maturity level:

Maturity Level	Access	Timeliness	Quality Monitoring	Retention Time	Availability
In development	Restricted and temporary - access granted upon request		N/A	N/A	N/A
Experimental	Restricted and temporary - access granted upon request		Not mandatory	Set on-demand	N/A
Pre-operational	Routinely / On-demand production - discoverable			Can be lower than the retention time of OPE dataset	OPE SLA as much as possible
Operational	Routinely / On-demand production - discoverable			Agreed retention time documented in the Data portfolio	OPE SLA

The Data Portfolio document is an evolving document throughout the execution of the DestinE initiative. Also to note, described datasets list is an initial version at this stage. This as consequence means datasets might be added or removed. The target is to extend datasets diversity gradually to reflect the data space landscape as per Figure 2.

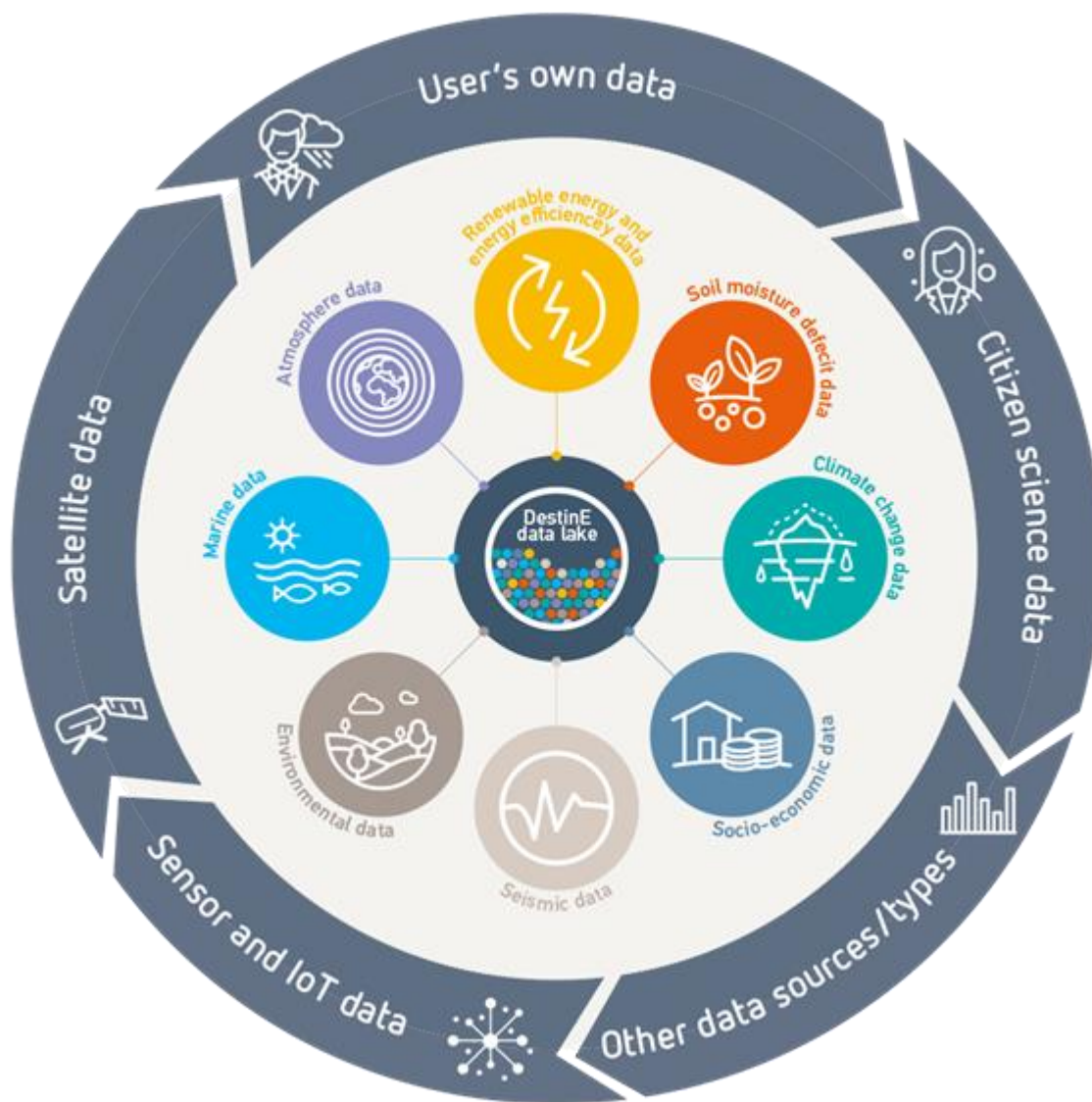


Figure 2: DEDL Data types

1.2 Structure of the document

This document is organized in four main chapters:

Chapter 1 Introduction: it describes the scope and the structure of the document, and lists the Applicable and Reference Documents

Chapter 2 Dataset Governance

Chapter 3 Overview of datasets available through DestinE

Chapter 4 External Data sources description

Chapter 5 DestinE Digital Twins generated datasets detailed description

Chapter 6 List of TBWs, TBDs, TBCs

1.3 Applicable Documents

	Document Title	Reference
AD-1	DestinE – System Framework High Level Description & Architecture	DTE-ADD-001, v1

1.4 Reference Documents

	Document Title	Reference
RD-1	DestinE - Data Lake - High Level Description & Architecture	DTE-ADD-100, v1
RD-2	DestinE - Digital Twins - High Level Description & Architecture	DTE-ADD-200, v1
RD-3	DestinE - Core Service Platform - High Level Architecture & Description	DTE-ADD-300, v1
RD-4	FAIR principles	https://www.go-fair.org/fair-principles/
RD-5	DestinE Data Governance	EUM/DSA/DOC/23/1352587
RD-6	STAC Specifications	https://stacspec.org/en/about/stac-spec/
RD-7	DestinE ClimateDT Parameters	https://confluence.ecmwf.int/display/DDCZ/DestinE+ClimateDT+Parameters
RD-8	DestinE ExtremeDT Parameters	https://confluence.ecmwf.int/display/DDCZ/DestinE+ExtremeDT+Parameters

1.5 Acronyms and Abbreviations

Acronym/Abbr.	Explanation
3E	ECMWF, ESA, EUMETSAT
ADS	Atmosphere Data Service
API	Application Programming Interface
CAMS	Copernicus Atmosphere Monitoring Service
CDS	Climate Data Service
CEMS	Copernicus Emergency Service
CSC	Copernicus Space Component
CLMS	Copernicus land monitoring service
CMEMS	Copernicus Marine Service
C3S	Copernicus Climate Change Service
DestinE	Destination Earth
DE	Destination Earth
DEDL	DestinE Data Lake
DEDP	DestinE Data portfolio
DESP	DestinE Core Service Platform
DIAS	Copernicus Data and Information Access Services
DT	Digital Twin
EC	European Commission
ECMWF	European Centre for Medium-Range Weather Forecasts
EO	Earth Observation
EODC	Earth Observation Data Centre
ESA	European Space Agency
EU	European Union
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
EWC	European Weather Cloud (EUMETSAT & ECMWF)
FAIR	Findability, Accessibility, Interoperability, and Reuse of digital assets
GSV	Generic State Vector
GUI	Graphical User Interface
HDA	Harmonised Data Access
HPC	High Performance Computing
IAGOS	In-service Aircraft for a Global Observing System
ISIMIP	The Inter-Sectoral Impact Model Intercomparison Project
REST	Representational State Transfer
SAF	EUMETSAT Satellite Application Facility
SSO	Single Sign On
TBC	To be confirmed
TBD	To Be Defined
TBW	To be written
WEKEO	DIAS Service implemented by EUMETSAT, ECMWF, EEA, and MOI

2 DATASETS GOVERNANCE

Data portfolio reviews

The DestinE Data portfolio will be reviewed regularly by the DestinE Joint Configuration Control Board (JCCB) as defined in [RD-5]. This board is responsible of defining the strategic guidelines.

- Data access policies
- Data retention
- Datasets catalogue

Data portfolio updates' request

The addition or removal of datasets can be requested by users to Destination Earth (via User Portal or via Use Case on-boarding request). DestinE JCCB will analyse the suitability and may accept the change.

Datasets management

- Retention time

The retention time is defined as the duration in time a dataset is stored, accessible, available in the DEDL. The maximum retention time cannot go beyond the duration of each Destination Earth Phase.

DestinE Digital Twins data retention is specified into the respective datasets detailed description in section 5 (see “*Availability Policy*” row).

The retention time of datasets accessed by federation (“*Federation access*” in Table 1) is set and managed by the external data provider and thus this is independent of DEDL data management.

For data kept in the DEDL Fresh Data Pool: either complete dataset or part of the dataset (e.g., “*DEDL Fresh Data Pool (Last 2 years rolling archive)*” in Table 1), retention time is managed as specified in section 3 of each dataset.

- Metadata

Datasets are catalogued using metadata following FAIR Data principles (Findable, Accessible, Interoperable, and Reusable) [RD-4] and is conformant at least STAC specification 1.0.0 [RD-6]. Metadata specifications available in TBD document.

Further information about DestinE Data Governance is available in [RD-5].

3 DATASETS OVERVIEW

The table below lists and provides high level information on datasets available within DestinE:

- DestinE data are DT output and DestinE User Generated Data which are promoted to be available to the entire community.
- External data are federated datasets available via DestinE.

The DE Data Lake maintains a data pool for a subset of data called also “DEDL Fresh Data Pool” built and maintained from federated data sources. This Fresh Data Pool offers immediate access to potentially often used data by DE users to facilitate immediate computation close to the data.

“DE dataset access” column lists from where data from one dataset can be accessed by DESP Users.

Below are the points of access:

- Federation Access - Access to external datasets via Federation
- DEDL Fresh Data Pool – Access to subset or entire dataset from the DEDL Fresh Data Pool.
- DT Data Warehouse – Access to DTs Data in DT Data Warehouse

DE dataset ID	Dataset description	Dataset provider	DE dataset access
DestinE Generated Datasets			
<u>DestinE Digital Twins Data</u>			
EO.ECMWF.DAT.DT_CLIMATE_A DAPTATION	Climate Change Adaptation DT data	Destination Earth	DT Data Warehouse (See Chapter 5.1.)
EO.ECMWF.DAT.DT_EXTREMES	Weather-induced and Geophysical Extremes DT data	Destination Earth	DT Data Warehouse (See Chapter 5.2.)
EO.ECMWF.DAT.DT_EXTREMES_ ONDEMAND	On-Demand Weather-induced and Geophysical Extreme DT data	Destination Earth	DT Data Warehouse (See Chapter 5.3)
<u>DestinE User Generated Data</u>			
XX.XX.XX	<placeholder> DE User dataset X	Destination Earth	Use Case specific – it will be defined when DE User dataset available for the public
DestinE referenced datasets			

DE dataset ID	Dataset description	Dataset provider	DE dataset access
<u>EuroStat</u>			
STAT.EUSTAT.DAT.POP_AGE_SEX_NUTS2	Population distribution: Population on 1 January by age, sex and NUTS 2 region	EC EUROPA Data Store	DEDL Fresh Data Pool (Complete dataset)
STAT.EUSTAT.DAT.POP_AGE_GROUP_SEX_NUTS3	Population distribution: Population on 1 January by age group, sex and NUTS 3 region	EC EUROPA Data Store	DEDL Fresh Data Pool (Complete dataset)
STAT.EUSTAT.DAT.POP_CHANGE_DEMO_BALANCE_CRUDE_RATES_NUTS3	Population change - Demographic balance and crude rates at regional level (NUTS 3)	EC EUROPA Data Store	DEDL Fresh Data Pool (Complete dataset)
STAT.EUSTAT.DAT.GREENHOUSE_GAS_EMISSION_AGRICULTURE	Greenhouse gas emissions from agriculture	EC EUROPA Data Store	DEDL Fresh Data Pool (Complete dataset)
STAT.EUSTAT.DAT.SHARE_ENERGY_FROM_RENEWABLE	Share of energy from renewable sources	EC EUROPA Data Store	DEDL Fresh Data Pool (Complete dataset)
<u>Metop satellites</u>			
EO.EUM.DAT.METOP.AMSUL1	AMSU-A Level 1B - Metop - Global	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.METOP.OSI-104	ASCAT Coastal Winds at 12.5 km Swath Grid - Metop	EUMETSAT Big Data Services	Federation access
EO:EUM:DAT:METOP:OSI-150-B	ASCAT L2 12.5 km Winds Data Record Release 1 - Metop	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.METOP.OSI-150-A	ASCAT L2 25 km Winds Data Record Release 1 - Metop	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.METOP.ASCSZF1B	ASCAT Level 1 Sigma0 Full Resolution - Metop - Global	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.METOP.ASCSZR1B	ASCAT Level 1 Sigma0 resampled at 12.5 km Swath Grid - Metop - Global	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.METOP.ASCSZO1B	ASCAT Level 1 Sigma0 resampled at 25 km Swath Grid - Metop - Global	EUMETSAT Big Data Services	Federation access

DE dataset ID	Dataset description	Dataset provider	DE dataset access
EO.EUM.CM.METOP.ASCSZFR02	ASCAT Level 1 SZF Climate Data Record Release 2 - Metop	EUMETSAT Big Data Services	Federation access
EO.EUM.CM.METOP.ASCSZOR02	ASCAT Level 1 SZO Climate Data Record Release 2 - Metop	EUMETSAT Big Data Services	Federation access
EO.EUM.CM.METOP.ASCSZRR02	ASCAT Level 1 SZR Climate Data Record Release 2 - Metop	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.METOP.SOMO12	ASCAT Soil Moisture at 12.5 km Swath Grid in NRT - Metop	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.METOP.SOMO25	ASCAT Soil Moisture at 25 km Swath Grid in NRT - Metop	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.METOP.AVHRRGAC R02	AVHRR GAC Atmospheric Motion Vectors Climate Data Record Release 2 - Multimission - Polar	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.METOP:AVHRR1	AVHRR Level 1B - Metop - Global	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.METOP.LSA-002	Daily Land Surface Temperature - Metop	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.METOP.GLB-SST-NC	Global L3C AVHRR Sea Surface Temperature (GHRSSST) - Metop	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.METOP.GOMEL1	GOME-2 Level 1B - Metop - Global	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.METOP.GOMEL1R03	GOME-2 Level 1B Fundamental Data Record Release 3 - Metop-A and -B	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.MULT.HIRSL1	HIRS Level 1B - Metop - Global	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.METOP.IASTHR011	IASI All Sky Temperature and Humidity Profiles - Climate Data Record Release 1.1 - Metop-A and -B	EUMETSAT Big Data Services	Federation access

DE dataset ID	Dataset description	Dataset provider	DE dataset access
EO.EUM.DAT.METOP.IASSND02	IASI Combined Sounding Products - Metop	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.METOP.IASIL1C-ALL	IASI Level 1C - All Spectral Samples - Metop - Global	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.METOP.MHSL1	MHS Level 1B - Metop - Global	EUMETSAT Big Data Services	Federation access
<u>Meteosat Second Generation satellites</u>			
EO.EUM.DAT.AMVR02	Atmospheric Motion Vectors Climate Data Record Release 2 - MFG and MSG - 0 degree	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.MSG.CLM	Cloud Mask - MSG - 0 degree	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.MSG.CLM-IODC	Cloud Mask - MSG - Indian Ocean	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.GSAL2R02	GSA Level 2 Climate Data Record Release 2 - MFG and MSG - 0 degree	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.MSG.HRSEVIRI	High Rate SEVIRI Level 1.5 Image Data - MSG - 0 degree	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.MSG.HRSEVIRI-IODC	High Rate SEVIRI Level 1.5 Image Data - MSG - Indian Ocean	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.MSG.RSS-CLM	Rapid Scan Cloud Mask - MSG	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.MSG.MSG15-RSS	Rapid Scan High Rate SEVIRI Level 1.5 Image Data - MSG	EUMETSAT Big Data Services	Federation access
EO:EUM:DAT:MSG:LSA-FRM	Fire Risk Map - Released Energy Based - MSG	EUMETSAT Big Data Services	Federation access
EO:EUM:DAT:MSG:LSA-LST-CDR	Land Surface Temperature Climate Data Record - MSG	EUMETSAT Big Data Services	Federation access
EO:EUM:DAT:MSG:LSA-LSTDE	Land Surface Temperature with Directional Effects - MSG	EUMETSAT Big Data Services	Federation access
<u>Copernicus Satellites</u>			

DE dataset ID	Dataset description	Dataset provider	DE dataset access
<i>Sentinel-1 Data</i>			
EO.ESA.DAT.SENTINEL-1.L1_SLC	Sentinel-1 Level 1 SLC	Copernicus	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.ESA.DAT.SENTINEL-1.L1_GRD	Sentinel-1 Level 1 GRD	Copernicus	Cloud Ferro Data Pool (complete dataset) Federation Access
<i>Sentinel-2 Data</i>			
EO.ESA.DAT.SENTINEL-2.MSI.L1C	Sentinel-2 Level 1C: Top-Of-Atmosphere reflectances in cartographic geometry	Copernicus	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.ESA.DAT.SENTINEL-2.MSI.L2A	Sentinel-2 Level 2A: Bottom-Of-Atmosphere reflectances in cartographic geometry	Copernicus	Cloud Ferro Data Pool (complete dataset) Federation Access
<i>Sentinel-3 Data</i>			
<u>Sentinel-3 Land</u>			
EO.ESA.DAT.SENTINEL-3.OL_2_LFR___	Sentinel-3 Level 2 OLCI Land Colour Full Resolution	Copernicus	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.ESA.DAT.SENTINEL-3.OL_2_LRR___	Sentinel-3 Level 2 OLCI Land Colour Reduced Resolution	Copernicus	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.ESA.DAT.SENTINEL-3.SL_2_LST___	Sentinel-3 Level 2 Land - Sea and Land Surface Temperature Radiometer (SLSTR)	Copernicus	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.ESA.DAT.SENTINEL-3.SR_2_LAN___	Sentinel-3 Level 2 Land	Copernicus	Cloud Ferro Data Pool (complete dataset)

DE dataset ID	Dataset description	Dataset provider	DE dataset access
			Federation Access
<u>Sentinel-3 Marine</u>			
EO.EUM.DAT.SENTINEL-3.OL_1_EFR___	Sentinel-3 L1B OLCI Full Resolution	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.SENTINEL-3.OL_1_ERR___	Sentinel-3 L1B OLCI Reduced Resolution	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.SENTINEL-3.OL_2_WFR___	Sentinel-3 Level 2 OLCI Ocean Color Full Resolution	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.SENTINEL-3.OL_2_WRR___	Sentinel-3 Level 2 OLCI Ocean Color Reduced Resolution	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.SENTINEL-3.SL_1_RBT___	Sentinel-3 L1B SLSTR Radiances and Brightness Temperatures	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.SENTINEL-3.SR_1_SRA___	Sentinel-3 L1B SRAL	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.SENTINEL-3.SR_2_WAT___	Sentinel-3 Level 2 SRAL Altimetry Global	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.SENTINEL-3.AOD	Sentinel-3 SLSTR Level 2 Aerosol Optical Depth	EUMETSAT Big Data Services	Federation access
EO.EUM.DAT.SENTINEL-3.FRP	Sentinel 3 SLSTR Level 2 Fire Radiative Power	EUMETSAT Big Data Services	Federation access
<u>Sentinel-5P Data</u>			
EO.ESA.DAT.SENTINEL-5P.TROPOMI.L1	Sentinel-5P Level 1	Copernicus	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.ESA.DAT.SENTINEL-5P.TROPOMI.L2	Sentinel-5P Level 2	Copernicus	Cloud Ferro Data Pool (complete dataset) Federation Access
<u>Copernicus Services</u>			
<i>Copernicus Climate Change Service (C3S)</i>			

DE dataset ID	Dataset description	Dataset provider	DE dataset access
<u>In-situ and Satellite observations</u>			
EO.ECMWF.DAT.SEASONAL_FOR ECAST_DAILY_DATA_ON_SINGLE LEVELS_2017_PRESENT	Seasonal forecast daily and subdaily data on single levels	Copernicus CDS	Federation access
EO.ECMWF.DAT.SEASONAL_FOR ECAST_DAILY_DATA_ON_PRESSU RE_LEVELS_2017_PRESENT	Seasonal forecast subdaily data on pressure levels	Copernicus CDS	Federation access
EO.ECMWF.DAT.SEASONAL_FOR ECAST_ANOMALIES_ON_SINGLE LEVELS_2017_PRESENT	Seasonal forecast anomalies on single levels	Copernicus CDS	Federation access
EO.ECMWF.DAT.SEASONAL_FOR ECAST_ANOMALIES_ON_PRESSU RE_LEVELS_2017_PRESENT	Seasonal forecast anomalies on pressure levels	Copernicus CDS	Federation access
EO.ECMWF.DAT.SEASONAL_FOR ECAST_MONTHLY_STATISTICS_O N_SINGLE_LEVELS_2017_PRESEN T	Seasonal forecast monthly statistics on single levels	Copernicus CDS	Federation access
EO.ECMWF.DAT.SEASONAL_FOR ECAST_MONTHLY_STATISTICS_O N_PRESSURE_LEVELS_2017_PRE SENT	Seasonal forecast monthly statistics on pressure levels	Copernicus CDS	Federation access
EO.ECMWF.DAT.CO2_DATA_FRO M_SATELLITE_SENSORS_2002_P RESENT	Carbon dioxide data from 2002 to present derived from satellite observations	Copernicus CDS	Federation access
EO.ECMWF.DAT.GLACIERS_DISTR IBUTION_DATA_FROM_RANDOL PH_GLACIER_INVENTORY_2000	Glaciers distribution data from the Randolph Glacier Inventory for year 2000	Copernicus CDS	Federation access
EO.ECMWF.DAT.GLACIERS_ELEV ATION_AND_MASS_CHANGE_DA TA_1850_PRESENT	Glaciers elevation and mass change data from 1850 to present from the Fluctuations of Glaciers Database	Copernicus CDS	Federation access
		Copernicus CDS	Federation access

DE dataset ID	Dataset description	Dataset provider	DE dataset access
EO.ECMWF.DAT.METHANE_DATA_SATELLITE_SENSORS_2002_PRESENT	Methane data from 2002 to present derived from satellite observations		
EO.ECMWF.DAT.REANALYSIS_UERRA_EUROPE_SINGLE_LEVELS	UERRA regional reanalysis for Europe on single levels from 1961 to 2019	Copernicus CDS	Federation access
EO.ECMWF.DAT.SEA_ICE_MONTHLY_AND_DAILY_GRIDDED_DATA_1978_PRESENT	Sea ice monthly and daily gridded data from 1978 to present derived from satellite sensors	Copernicus CDS	Federation access
EO.ECMWF.DAT.SEA_LEVEL_DAILY_GRIDDED_DATA_FOR_BLACK_SEA_1993_PRESENT	Sea level daily gridded data from satellite observations for the Black Sea from 1993 to 2020	Copernicus CDS	Federation access
EO.ECMWF.DAT.SEA_LEVEL_DAILY_GRIDDED_DATA_FOR_GLOBAL_OCEAN_1993_PRESENT	Sea level daily gridded data from satellite observations for the global ocean from 1993 to present	Copernicus CDS	Federation access
EO.ECMWF.DAT.SEA_LEVEL_DAILY_GRIDDED_DATA_FOR_MEDITERRANEAN_SEA_1993_PRESENT	Sea level daily gridded data from satellite observations for the Mediterranean Sea from 1993 to 2020	Copernicus CDS	Federation access
EO:ECMWF:DAT:SIS_HYDROLOGY_VARIABLES_DERIVED_PROJECTIONS	Hydrology-related climate impact indicators from 1970 to 2100 derived from bias adjusted European climate projections	Copernicus CDS	Federation access
EO.ECMWF.DAT.SATELLITE_SEA_ICE_CONCENTRATION	Sea ice concentration daily gridded data from 1979 to present derived from satellite observations	Copernicus CDS	Federation access
EO.ECMWF.DAT.SATELLITE_SEA_ICE_THICKNESS	Sea ice thickness monthly gridded data for the Arctic from 2002 to present derived from satellite observations	Copernicus CDS	Federation access
EO.ECMWF.DAT.SATELLITE_SEA_ICE_EDGE_TYPE	Sea ice edge and type daily gridded data from 1978 to present derived from satellite observations	Copernicus CDS	Federation access

DE dataset ID	Dataset description	Dataset provider	DE dataset access
EO.ECMWF.DAT.SIS_HYDROLOGY_METEOROLOGY_DERIVED_PROJECTIONS	Temperature and precipitation climate impact indicators from 1970 to 2100 derived from European climate projections	Copernicus CDS	Federation access
Reanalysis			
EO.ECMWF.DAT.REANALYSIS_ERA5_SINGLE_LEVELS	ERA5 hourly data on single levels from 1979 to present	Copernicus CDS	Federation access
EO.ECMWF.DAT.ERA5_HOURLY_VARIABLES_ON_PRESSURE_LEVELS	ERA5 hourly data on pressure levels from 1979 to present	Copernicus CDS	Federation access
EO.ECMWF.DAT.REANALYSIS_ERA5_SINGLE_LEVELS_MONTHLY_MEANS	ERA5 monthly averaged data on single levels from 1979 to present	Copernicus CDS	Federation access
EO.ECMWF.DAT.ERA5_MONTHLY_MEANS_VARIABLES_ON_PRESSURE_LEVELS	ERA5 monthly averaged data on pressure levels from 1979 to present	Copernicus CDS	Federation access
EO.ECMWF.DAT.ERA5_LAND_HOURLY	ERA5-Land hourly data from 1950 to present	Copernicus CDS	Federation access
EO.ECMWF.DAT.ERA5_LAND_MONTHLY	ERA5-Land monthly data from 1950 to present	Copernicus CDS	Federation access
Copernicus Atmosphere Monitoring Service Data (CAM5)			
EO.ECMWF.DAT.CAMS_GLOBAL_REANALYSIS_EAC4	CAMS global reanalysis (EAC4)	Copernicus ADS	Federation access
EO.ECMWF.DAT.CAMS_GLOBAL_EMISSION_INVENTORIES	CAMS global emission inventories	Copernicus ADS	Federation access
EO.ECMWF.DAT.CAMS_GLOBAL_REANALYSIS_EAC4_MONTHLY_AV_FIELDS	CAMS global reanalysis (EAC4) monthly averaged fields	Copernicus ADS	Federation access
EO.ECMWF.DAT.CAMS_GREENHOUSE_GAS_FLUXES	CAMS global inversion-optimised greenhouse gas fluxes and concentrations	Copernicus ADS	Federation access
EO.ECMWF.DAT.CAMS_EUROPE_AIR_QUALITY_REANALYSES	CAMS European air quality reanalyses	Copernicus ADS	Federation access
EO.ECMWF.DAT.CAMS_GLOBAL_RADIATIVE_FORCING	CAMS global radiative forcing	Copernicus ADS	Federation access

DE dataset ID	Dataset description	Dataset provider	DE dataset access
EO.ECMWF.DAT.CAMS_GLOBAL_RADIATIVE_FORCING_AUX	CAMS global radiative forcing - auxilliary variables	Copernicus ADS	Federation access
EO.ECMWF.DAT.CAMS_GLOBAL_GREENHOUSE_GAS_REANALYSIS	CAMS global greenhouse gas reanalysis (EGG4)	Copernicus ADS	Federation access
EO.ECMWF.DAT.CAMS_GLOBAL_GREENHOUSE_GAS_REANALYSIS_MONTHLY_AV_FIELDS	CAMS global greenhouse gas reanalysis (EGG4) monthly averaged fields	Copernicus ADS	Federation access
EO.ECMWF.DAT.CAMS_EUROPE_AIR_QUALITY_FORECASTS	CAMS European air quality forecasts	Copernicus ADS	Federation access
EO.ECMWF.DAT.CAMS_GLOBAL_ATMOSHERIC_COMPO_FORECAST	CAMS global atmospheric composition forecasts	Copernicus ADS	Federation access
EO.ECMWF.DAT.CAMS_SOLAR_RADIATION_TIMESERIES	CAMS solar radiation time-series	Copernicus ADS	Federation access
EO.ECMWF.DAT.CAMS_GLOBAL_FIRE_EMISSIONS_GFAS	CAMS global biomass burning emissions based on fire radiative power (GFAS)	Copernicus ADS	Federation access
Copernicus Marine Service (CMEMS)			
<i>Marine datasets are restricted to Global area in this initial version.</i>			
EO.MO.DAT.GLOBAL_ANALYSISFORECAST_PHY_001_024	Global Ocean Physics Analysis and Forecast	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.GLOBAL_ANALYSISFORECAST_BCG_001_028	Global Ocean Biogeochemistry Analysis and Forecast	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.GLOBAL_ANALYSISFORECAST_WAV_001_027	Global Ocean Waves Analysis and Forecast	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.GLOBAL_MULTIYEAR_BGC_001_033	Global ocean low and mid trophic levels biomass content hindcast	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access

DE dataset ID	Dataset description	Dataset provider	DE dataset access
EO.MO.DAT.GLOBAL_MULTIYEAR_WAV_001_032	Global Ocean Waves Reanalysis WAVERYS	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.GLOBAL_MULTIYEAR_PHY_ENS_001_031	Global Ocean Ensemble Physics Reanalysis	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.INSITU_GLO_PHY_TS_OA_NRT_013_002	Global Ocean- Real time in-situ observations objective analysis	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.INSITU_GLO_PHY_TS_OA_MY_013_052	Global Ocean- Delayed Mode gridded CORA- In-situ Observations objective analysis in Delayed Mode	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.INSITU_GLO_PHY_UV_DISCRETE_NRT_013_048	Global Ocean- in-situ Near real time observations of ocean currents	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.MULTIOBS_GLO_BIO_BGC_3D_REP_015_010	Global Ocean 3D Chlorophyll-a concentration, Particulate Backscattering coefficient and Particulate Organic Carbon	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.MULTIOBS_GLO_BIO_CARBON_SURFACE_REP_015_008	Global Ocean Surface Carbon	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.MULTIOBS_GLO_BGC_NUTRIENTS_CARBON_PROFILE_S_MYNRT_015_009	Nutrient profiles vertical distribution	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.MULTIOBS_GLO_PHY_MYNRT_015_003	Global Total (COPERNICUS-GLOBCURRENT), Ekman and Geostrophic currents at the Surface and 15m	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access

DE dataset ID	Dataset description	Dataset provider	DE dataset access
EO.MO.DAT.MULTIOBS_GLO_PHY_S_SURFACE_MYNRT_015_013	Multi Observation Global Ocean Sea Surface Salinity and Sea Surface Density	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.MULTIOBS_GLO_PHY_TSUV_3D_MYNRT_015_012	Multi Observation Global Ocean 3D Temperature Salinity Height Geostrophic Current and MLD	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.MULTIOBS_GLO_PHY_W_3D_REP_015_007	Global Observed Ocean Physics 3D Quasi-Geostrophic Currents (OMEGA3D)	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.OCEANCOLOUR_GLO_BGC_L3_NRT_009_101 EO.MO.DAT.OCEANCOLOUR_GLO_CHL_L3_NRT_OBSERVATIONS_009_032	Global Ocean Colour (Copernicus-GlobColour), Bio-Geo-Chemical, L3 (daily) from Satellite Observations (Near Real Time)	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.OCEANCOLOUR_GLO_BGC_L3_MY_009_103	Global Ocean Colour (Copernicus-GlobColour), Bio-Geo-Chemical, L3 (daily) from Satellite Observations (1997-ongoing)	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.OCEANCOLOUR_GLO_BGC_L4_NRT_009_102	Global Ocean Colour (Copernicus-GlobColour), Bio-Geo-Chemical, L4 (monthly and interpolated) from Satellite Observations (Near Real Time)	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.OCEANCOLOUR_GLO_BGC_L4_MY_009_104	Global Ocean Colour (Copernicus-GlobColour), Bio-Geo-Chemical, L4 (monthly and interpolated) from Satellite Observations (1997-ongoing)	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.OCEANCOLOUR_GLO_BGC_L3_MY_009_107	Global Ocean Colour Plankton and Reflectances MY L3 daily observations	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access

DE dataset ID	Dataset description	Dataset provider	DE dataset access
EO.MO.DAT.OCEANCOLOUR_GLO_BGC_L4_MY_009_108	Global Ocean Colour Plankton MY L4 monthly observations	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.SEAICE_GLO_SEAICE_L4_NRT_OBSERVATIONS_011_001	Global Ocean - Arctic and Antarctic - Sea Ice Concentration, Edge, Type and Drift (OSI-SAF)	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.SEAICE_GLO_SEAICE_L4_NRT_OBSERVATIONS_011_006	Global Ocean - High Resolution SAR Sea Ice Drift	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.SEAICE_GLO_SEAICE_L4_REP_OBSERVATIONS_011_009	Global Ocean Sea Ice Concentration Time Series REPROCESSED (OSI-SAF)	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.SEALEVEL_GLO_PHY_L4_NRT_008_046	GLOBAL OCEAN GRIDDED L4 SEA SURFACE HEIGHTS AND DERIVED VARIABLES NRT	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.SEALEVEL_GLO_PHY_MDT_008_063	GLOBAL OCEAN MEAN DYNAMIC TOPOGRAPHY8	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.SST_GLO_SST_L3S_NRT_OBSERVATIONS_010_010	Global Ocean - Sea Surface Temperature Multi-sensor L3 Observations	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.SST_GLO_SST_L4_NRT_OBSERVATIONS_010_001	Global Ocean OSTIA Sea Surface Temperature and Sea Ice Analysis	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.SST_GLO_SST_L4_REP_OBSERVATIONS_010_011	Global Ocean OSTIA Sea Surface Temperature and Sea Ice Reprocessed	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access

DE dataset ID	Dataset description	Dataset provider	DE dataset access
EO.MO.DAT.SST_GLO_SST_L4_REP_OBSERVATIONS_010_024	ESA SST CCI and C3S reprocessed sea surface temperature analyses	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.WAVE_GLO_WAV_L3_SPC_NRT_OBSERVATIONS_014_002	GLOBAL OCEAN L3 SPECTRAL PARAMETERS FROM NRT SATELLITE MEASUREMENTS	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.WAVE_GLO_PHY_SWH_L3_NRT_014_001	GLOBAL OCEAN L3 SIGNIFICANT WAVE HEIGHT FROM NRT SATELLITE MEASUREMENTS	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.WAVE_GLO_PHY_SWH_L4_NRT_014_003	GLOBAL OCEAN L4 SIGNIFICANT WAVE HEIGHT FROM NRT SATELLITE MEASUREMENTS	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.WIND_GLO_PHY_CLIMATE_L4_MY_012_003	Global Ocean Monthly Mean Sea Surface Wind and Stress from Scatterometer and Model	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.WIND_GLO_PHY_L3_NRT_012_002	Global Ocean Daily Gridded Sea Surface Winds from Scatterometer	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.WIND_GLO_PHY_L3_MY_012_005	Global Ocean Daily Gridded Reprocessed L3 Sea Surface Winds from Scatterometer	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.WIND_GLO_PHY_L4_NRT_012_004	Global Ocean Hourly Sea Surface Wind and Stress from Scatterometer and Model	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.MO.DAT.WIND_GLO_PHY_L4_MY_012_006	Global Ocean Hourly Reprocessed Sea Surface Wind and Stress from Scatterometer and Model	Copernicus Marine	Cloud Ferro Data Pool (complete dataset) Federation Access

DE dataset ID	Dataset description	Dataset provider	DE dataset access
<i>Copernicus Global Land Service (CLMS)</i>			
EO.DEM.DAT.COP-DEM_GLO-30-DGED	COPERNICUS Digital Elevation Model (DEM) 30 meters DGED	Copernicus Land	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.DEM.DAT.COP-DEM_GLO-30-DTED	COPERNICUS Digital Elevation Model (DEM) 30 meters DTED		
EO.DEM.DAT.COP-DEM_GLO-90-DGED	COPERNICUS Digital Elevation Model (DEM) 90 meters DGED		
EO.DEM.DAT.COP-DEM_GLO-90-DTED	COPERNICUS Digital Elevation Model (DEM) 90 meters DTED		
EO.CLMS.DAT.GLO.NDVI300_V1	Normalised Difference Vegetation Index 2014-2020 (raster 300 m), global, 10-daily – version 1	Copernicus Land	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.CLMS.DAT.GLO.NDVI_1KM_V2 EO.CLMS.DAT.CGLS_GLOBAL_NDVI_V2_1KM	Normalised Difference Vegetation Index 1998-2020 (raster 1 km), global, 10-daily – version 2	Copernicus Land	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.CLMS.DAT.SENTINEL-2.HRVPP.VI	Vegetation Indices, daily, UTM projection	Copernicus Land	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.CLMS.DAT.CORINE	CORINE Land Cover	Copernicus Land	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.CLMS.DAT.GLO.FCOVER300_V1	Fraction of Green Vegetation Cover 2014-present (raster 300 m), global, 10-daily – version 1	Copernicus Land	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.CLMS.DAT.GLO.DMP300_V1	Dry Matter Productivity 2014-present (raster 300 m), global, 10-daily - version 1	Copernicus Land	Cloud Ferro Data Pool (complete dataset) Federation Access
EO.CLMS.DAT.GLO.GDMP300_V1	Gross Dry Matter	Copernicus Land	Cloud Ferro Data Pool

DE dataset ID	Dataset description	Dataset provider	DE dataset access
	Productivity 2014-present (raster 300 m), global, 10-daily – version 1		(complete dataset) Federation Access
EO.CLMS.DAT.GLO.FAPAR300_V1	Fraction of Absorbed Photosynthetically Active Radiation 2014-present (raster 300 m), global, 10-daily – version 1	Copernicus Land	Federation Access
EO.CLMS.DAT.GLO.LAI300_V1	Leaf Area Index 2014-present (raster 300 m), global, 10-daily – version 1	Copernicus Land	Federation Access
Copernicus Emergency Service (CEMS)			
EO.ECMWF.DAT.CEMS_FIRE_HISTORICAL	Fire danger indices historical data from the Copernicus Emergency Management Service	Copernicus Emergency	Federation access
EO.ECMWF.DAT.CEMS_GLOFAS_FORECAST	River discharge and related forecasted data by the Global Flood Awareness System	Copernicus Emergency	Federation access
EO.ECMWF.DAT.CEMS_GLOFAS_HISTORICAL	River discharge and related historical data from the Global Flood Awareness System	Copernicus Emergency	Federation access
EO.ECMWF.DAT.CEMS_GLOFAS_REFORECAST	Reforecasts of river discharge and related data by the Global Flood Awareness System	Copernicus Emergency	Federation access
EO.ECMWF.DAT.CEMS_GLOFAS_SEASONAL	Seasonal forecasts of river discharge and related data by the Global Flood Awareness System	Copernicus Emergency	Federation access
EO.ECMWF.DAT.CEMS_GLOFAS_SEASONAL_REFORECAST	Seasonal reforecasts of river discharge and related data from the Global Flood Awareness System	Copernicus Emergency	Federation access
EO.ECMWF.DAT.EFAS_FORECAST	River discharge and related forecasted data by the European Flood Awareness	Copernicus Emergency	Federation access

DE dataset ID	Dataset description	Dataset provider	DE dataset access
	System		
EO.ECMWF.DAT.EFAS_HISTORICAL	River discharge and related historical data from the European Flood Awareness System	Copernicus Emergency	Federation access
EO.ECMWF.DAT.EFAS_REFORECAST	Reforecasts of river discharge and related data by the European Flood Awareness System	Copernicus Emergency	Federation access
EO.ECMWF.DAT.EFAS_SEASONAL	Seasonal forecasts of river discharge and related data by the European Flood Awareness System	Copernicus Emergency	Federation access
EO.ECMWF.DAT.EFAS_SEASONAL_REFORECAST	Seasonal reforecasts of river discharge and related data by the European Flood Awareness System	Copernicus Emergency	Federation access
<u>Global Surface Water Data</u>			
EO.GSW.DAT.CHANGE	Global Surface Water Occurrence Change Intensity 1984-2020	Global Surface Water	DEDL Fresh Data Pool (Complete dataset)
EO.GSW.DAT.EXTENT	Global Surface Water Maximum Water Extent 1984-2021	Global Surface Water	DEDL Fresh Data Pool (Complete dataset)
EO.GSW.DAT.OCCURRENCE	Global Surface Water Occurrence 1984-2021	Global Surface Water	DEDL Fresh Data Pool (Complete dataset)
EO.GSW.DAT.RECURRENCE	Global Surface Water Recurrence 1984-2021	Global Surface Water	DEDL Fresh Data Pool (Complete dataset)
EO.GSW.DAT.SEASONALITY	Global Surface Water Seasonality 2014-2020	Global Surface Water	DEDL Fresh Data Pool (Complete dataset)
EO.GSW.DAT.TRANSITIONS	Global Surface Water Transitions 1984-2021	Global Surface Water	DEDL Fresh Data Pool (Complete dataset)
<u>ISIMIP Data</u>			
EO.ISIMIP.DAT.CLIMATE-FORCING	Climate forcing data	ISIMIP	Federation access

DE dataset ID	Dataset description	Dataset provider	DE dataset access
EO.ISIMIP.DAT.SOCIO-ECONOMIC-FORCING	Socioeconomic forcing data	ISIMIP	Federation access
<u>IAGOS Data</u>			
EO.IAGOS.DAT.ATMOSPHERIC-COMPOSITION	Atmospheric composition	IAGOS	Federation access
<u>Landsat Data</u>			
EO.NASA.DAT.LANDSAT_C2_L1	Landsat Collection 2 Level-1	USGS - NSA	Federation access
EO.NASA.DAT.LANDSAT_C2_L2	Landsat Collection 2 Level-2	USGS - NASA	Federation access

Table 1: DestinE Data Lake datasets overview

4 EXTERNAL DATA PROVIDERS DESCRIPTION

This section lists data providers, Destination Earth federates with.

Data Sources	Contact
EC EUROPA Data Store	https://ec.europa.eu/eurostat
EUMETSAT Big Data Services	https://data.eumetsat.int
C3S	https://climate.copernicus.eu/
CMEMS	https://marine.copernicus.eu/
CAMS	https://atmosphere.copernicus.eu/
Joint Research Centre for Global water surface	https://data.jrc.ec.europa.eu/collection/id-0084 https://global-surface-water.appspot.com/
CREODIAS	https://creodias.eu
WEKEO	https://www.wekeo.eu
UGNS / Planetary Computer	https://www.usgs.gov/
Microsoft	https://planetarycomputer.microsoft.com/
ISIMIP	https://www.isimip.org
IAGOS	https://www.iagos.org/iagos-data

Table 2: Federated Data providers

5 DESTINE DIGITAL TWINS GENERATED DATASETS DETAILED DESCRIPTION

This section describes the DestinE datasets (Routine or On-Demand) generated per Digital Twin.

5.1 Climate Change Adaptation DT

ID	EO.ECMWF.DAT.DT_CLIMATE_ADAPTATION (DEDL Harmonised Data Access service) climate-dt (Polytope service0)
Status	Development
Description	Digital Twin Climate Change Adaptation (models: IFS-NEMO, IFS-FESOM, ICON)
Data family	Destination Earth - Climate Adaptation Twin
Documentation	RD-2, RD-6
Availability Policy	Default dataset is the latest scenario. Scenario data to be kept throughout Phase 1 and phase 2 unless other scenarios are made available, and subject to quality control decisions and storage requirements as production begins
Data access	DESP web site API
Geographical area	Global
Geometry	HEALPix
Vertical coordinate	Pressure levels
Vertical coverage	From surface to 1 hPa
Model configuration	activity ScenarioMIP experiment SSP3-7.0 simulated at 5km activity CMIP6 experiment historical simulated at 10km activity story-nudging experiment control, historical, Tplus2.0K
Output resolution	For each simulation, outputs are available multiple grids: resolution high 6.7 km, HEALPIX 1024* resolution standard 50 km, HEALPIX 128

	*12 km, HEALPIX 512 for simulations at 10 km (historical, storylines)	
Time coverage	1990-2020 historical, 2020-2040 scenario (only selected periods will be available initially)	
Time resolution	Hourly atmospheric model fields Daily mean ocean fields	
Update frequency	Daily (when DTs run, this is the synchronization frequency between the HPC FDB and the data bridge FDB)	
Dissemination	DESP web server	
Data format	GRIB2, cclds_packing	
Size	estimating 10PiB - 36PiB	
Initial variables	Name	Variable Type
Instantaneous encodings		
Hourly	2 metre temperature Total cloud cover 10 metre U wind component 10 metre V wind component 2 metre dewpoint temperature Skin temperature Total column cloud ice water Total column cloud liquid water Surface pressure Total column vertically-integrated water vapour Snow depth Charnock Mean sea level pressure Boundary layer height Low cloud cover Medium cloud cover High cloud cover Total precipitation rate	Single and Surface fields (Atmosphere)
Hourly	Geopotential Specific Humidity Relative Humidity Temperature U component of wind V component of wind Potential vorticity	Pressure levels 19 pressure levels: (1000, 925, 850, 700, 600, 500, 400, 300, 250, 200, 150, 100, 70, 50, 30, 20, 10, 5, 1)

	Vertical velocity Specific cloud liquid water content	
Hourly	Snow depth water equivalent	Model levels (Sea-ice/snow/soil) 5 model levels: (1, 2, 3, 4, 5)
Hourly	100 metre U wind component 100 metre V wind component	Height levels 100m
Mean encodings		
Daily	Time-mean sea ice thickness Time-mean sea ice area fraction Time-mean eastward sea ice velocity Time-mean northward sea ice velocity Time-mean X-component of sea ice velocity Time-mean Y-component of sea ice velocity Time-mean sea ice volume per unit area Time-mean snow volume over sea ice per unit area	Single and Surface fields (Sea Ice)
Daily	Time-mean sea surface temperature Time-mean sea surface height Time-mean sea surface practical salinity Time-mean vertically-integrated heat content in the upper 300 m Time-mean vertically-integrated heat content in the upper 700 m Time-mean ocean mixed layer depth defined by sigma theta 0.03 kg m ⁻³	Single and Surface fields (Ocean)
Daily	Time-mean northward sea water velocity Time-mean eastward sea water velocity Time-mean sea water potential temperature Time-mean sea water practical salinity Time-mean upward sea water velocity	Model Levels (Ocean, model dependent, Lev=75 (NEMO), Lev=70 (Fesom), Lev=64 (ICON), available (1 to Lev)
Accumulated encodings		
Hourly	Total precipitation Snowfall Surface sensible heat flux Surface latent heat flux Surface short-wave (solar) radiation downwards Surface net long-wave (thermal) radiation Surface net short-wave (solar) radiation TOA incident short-wave (solar) radiation Surface long-wave (thermal) radiation downwards Top net long-wave (thermal) radiation Top net short-wave (solar) radiation	Single and Surface fields (Atmosphere)

	Evaporation Surface runoff Sub-surface runoff Time-integrated eastward turbulent surface stress Time-integrated northward turbulent surface stress Time-integrated eastward turbulent surface stress due to surface roughness Time-integrated northward turbulent surface stress due to surface roughness	
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5.2 Weather-induced and Geophysical Extremes DT

ID	EO.ECMWF.DAT.DT_EXTREMES (DEDL Harmonised Data Access service) extremes-dt (Polytope service)
Status	Development
Description	Digital Twin forecast for Weather-induced and Geophysical Extremes
Data family	Destination Earth - Weather-induced and Geophysical Extremes Digital Twin
Documentation	RD-2, RD-7
Availability policy	Daily global forecast data. The most recent 15 days of forecasts are made available subject to HPC and storage constraints
Data access	DESP website API
Geographical area	Global
Geometry	Globally gridded data, formatting is the octahedral Gaussian grid O2560
Vertical coordinate	Pressure levels
Vertical coverage	From surface to 1 hPa
Horizontal resolution	Approx. 4.4 km
Time coverage	4 days
Time resolution	Hourly atmospheric model and wave model fields Six hourly mean for total lightning flash density
Update frequency	Daily

Dissemination	DESP web server	
Data format	GRIB2, ccsds_packing	
Size	215 TiB – 655 TiB TBD	
Initial variables	Name	Variable Type
Instantaneous encodings		
Hourly	10 metre U wind component 10 metre V wind component 2 metre temperature Mean sea level pressure Surface pressure Total column water 2 metre dewpoint temperature Most unstable CAPE Convective rain rate Instantaneous 10 metre wind gust Large scale rain rate Precipitation type Sea ice area fraction Sea surface temperature Total column cloud liquid water Total column vertically-integrated water vapour Visibility Instantaneous total lightning flash density Large scale snowfall rate water equivalent	Single and Surface fields (Atmosphere)
Hourly	Mean zero-crossing wave period Mean wave direction Mean wave period Peak wave period Significant wave height of combined wind waves and swell	Single and Surface fields (Wave)
Hourly	Divergence Geopotential Specific humidity Relative humidity Temperature U component of wind V component of wind Vorticity (relative)	Pressure levels 21 pressure levels: (1, 2, 3, 5, 7, 10, 20, 30, 50, 70, 100, 150, 200, 250, 300, 400, 500, 700, 850, 925, 1000)
Hourly	Eta coordinate vertical velocity Fraction of cloud cover Specific cloud ice water content	Model levels (Atmosphere) 137 model levels (1 to 137)

	Specific cloud liquid water content Specific humidity Specific rain water content Specific snow water content Temperature U component of wind V component of wind Vertical velocity	NOT AVAILABLE EXTERNALLY – FIELDS TO BE PASSED TO on-demand-extremes-dt
Hourly	100 metre U wind component 100 metre V wind component	Height levels 100m
Mean encodings		
6 hourly mean	<u>Averaged total lightning flash density in the last 6 hours</u>	Single and Surface fields (Atmosphere)
Accumulated encodings		
Hourly	Runoff Total precipitation Accumulated freezing rain Time-integrated eastward turbulent surface stress Large-scale precipitation Time-integrated northward turbulent surface stress Snowfall Surface net short-wave (solar) radiation Surface net long-wave (thermal) radiation Surface short-wave (solar) radiation downwards Surface long-wave (thermal) radiation downwards Top net short-wave (solar) radiation Top net long-wave (thermal) radiation	Single and Surface fields (Atmosphere)

5.3 On-Demand Weather-induced and Geophysical Extremes DT

ID	DTEE-OD-02 (DEDL Harmonised Data Access service) on-demand-extremes-dt (Polytope service)
Status	Development
Description	On-Demand Digital Twin forecast for Weather-induced and Geophysical Extremes within Europe
Data family	Destination Earth - On-Demand Weather-induced and Geophysical Extremes

	Digital Twin	
Documentation	RD-2, RD-7	
Availability Policy	On-Demand regional extreme forecast data. Tagged past dates remain available throughout Phase 1 and Phase 2, by default only events within the past 15 days, subject to quality control decisions and storage requirements as production begins	
Data access	DESP website API	
Geographical area	Regional over Europe	
Geometry	Lambert conical tangent projection, up to 2000x2000x90 (x,y,z) grid points	
Vertical coordinate	Hybrid levels, numbers of levels up to 90	
Vertical coverage	From surface to 10 hPa	
Horizontal resolution	500-750m	
Time coverage	48-72 hours	
Time resolution	5 minutes to hourly	
Update frequency	On-Demand	
Dissemination	DESP web server	
Data format	GRIB2, ccsds_packing to be used where possible	
Size	1.6 GB per output step every 5 min x 72h ~1.4TB max. Output often reduced to 0.35 GB for 5 minute frequency.	
Instantaneous encodings		
15 minutes to hourly	10m U wind component 10m V wind component 2 metre temperature Surface pressure Mean sea level pressure 2m Relative Humidity 2m Specific Humidity Rain precipitation rate Precipitation type (most frequent) in the last 1 hour	Single and surface fields

	Precipitation type (most severe) in the last 1 hour Snow depth water equivalent Total cloud cover Low cloud cover Medium cloud cover High cloud cover Mixed layer depth Most-unstable CAPE Most-unstable CIN Sea surface temperature Sea ice area fraction Sea ice temperature on top sea ice layer Sea ice thickness Lake surface temperature Lake mix-layer temperature Lake bottom temperature Lake total layer temperature Lake mix-layer depth Lake ice total depth Lake ice temperature Skin temperature Boundary layer height Cloud base height Pressure at cloud base Cloud ceiling height Geometric height of adiabatic condensation level above ground Geometric height of adiabatic condensation level above ground Geometric height of neutral buoyancy level above ground Geometric height of atmospheric isothermal level above ground Top road temperature Outer wall temperature Top roof temperature Street canyon air temperature Street canyon air humidity Surface emissivity Surface runoff	
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	Percolation Drag coefficient Drag thermal coefficient Drag evaporation coefficient Surface roughness length Surface roughness length for heat Surface roughness length for moisture	
15 minute to hourly	Temperature U wind component V wind component Specific humidity Specific cloud liquid water content Specific cloud ice water content Specific graupel Specific rain water content Specific snow water content Turbulent Kinetic Energy Geopotential Relative humidity Fraction of cloud cover Geometrical vertical velocity	Pressure levels: 50,100,150,200,250, 300,400,500,600,700,7 50,800, 850,900,925,950,975,1 000 hPa
15 minute to hourly	Temperature U wind component V wind component Specific humidity Specific cloud liquid water content Specific cloud ice water content Specific graupel Specific rain water content Specific snow water content Turbulent Kinetic Energy Relative humidity Fraction of cloud cover Geometrical vertical velocity	Height levels: 15, 30, 50, 75, 100, 130, 150, 200, 250, 300, 400, 500, 1000, 1500, 2000, 3000, 4000 m
15 minute to hourly	Tile fractions <u>Tile for forest grouping:</u> 2 metre temperature 2 metre specific humidity 2 metre relative humidity 10m wind speed Soil temperature (levels 1,2,3,5,8) Volumetric soil moisture (levels 1,2,3,5,8) Volumetric soil ice (levels 1,2,3,5,8)	Tiled fields (Experimental for Phase 1)

	<p>Snow depth water equivalent</p> <p><u>Tile for non-forest grouping:</u> 2 metre temperature 2 metre specific humidity 2 metre relative humidity 10m wind speed Soil temperature (levels 1,2,3,5,8) Volumetric soil moisture (levels 1,2,3,5,8) Volumetric soil ice (levels 1,2,3,5,8) Snow depth water equivalent</p> <p><u>Tile for nature grouping:</u> 2 metre temperature 2 metre specific humidity 2 metre relative humidity 10m wind speed Snow depth water equivalent</p> <p><u>Tile for inland water grouping:</u> 2 metre temperature 2 metre specific humidity 2 metre relative humidity 10m wind speed</p> <p><u>Tile for urban grouping:</u> 2 metre temperature 2 metre specific humidity 2 metre relative humidity 10m wind speed</p> <p><u>Tile for sea & ocean (UNMOD) grouping:</u> 2 metre temperature 2 metre specific humidity 2 metre relative humidity 10m wind speed</p> <p><u>Tile for sea & ocean (ICE) grouping:</u> 2 metre temperature 2 metre specific humidity 2 metre relative humidity 10m wind speed</p>	
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Constant fields	Surface geopotential Land sea mask	Single and surface fields
Accumulated encodings		
15 minutes to hourly	Total snow precipitation Graupel precipitation Evaporation Time-integrated surface latent heat net flux due to evaporation Rain precipitation Time-integrated total lightning flash density Surface net radiation (SW and LW) Surface net long-wave (thermal) radiation Surface long-wave (thermal) radiation downwards Top net long-wave (thermal) radiation Surface net short-wave (solar) radiation Surface short-wave (solar) radiation downwards Top net short-wave (solar) radiation Surface net short-wave (solar) radiation, clear sky Surface net long-wave (thermal) radiation, clear sky Surface heat flux Surface sensible heat flux Surface latent heat flux Global (horizontal) irradiance Direct normal irradiance Global radiation flux	Single and surface fields
15 minutes to hourly	<u>Tile for forest grouping:</u> Surface sensible heat flux Surface latent heat flux Surface net radiation (SW and LW) <u>Tile for non-forest grouping:</u> Surface sensible heat flux	Tiled fields (Experimental, may be unavailable by end of Phase 1)

	Surface latent heat flux Surface net radiation (SW and LW) <u>Tile for nature grouping:</u> Surface sensible heat flux Surface latent heat flux Surface net radiation (SW and LW)	
Maximum encodings		
15 minutes to hourly	10m Max Gust, u-component 10m Max Gust, v-component 2 metre Maximum Temperature Maximum total column integrated graupel (snow pellets)	Single and surface fields
15 minutes to hourly	<u>Tile for forest grouping:</u> 2 metre Maximum Temperature Maximum 10 metre wind gust <u>Tile for non-forest grouping:</u> 2 metre Maximum Temperature Maximum 10 metre wind gust <u>Tile for nature grouping:</u> 2 metre Maximum Temperature Maximum 10 metre wind gust <u>Tile for inland water grouping:</u> 2 metre Maximum Temperature Maximum 10 metre wind gust <u>Tile for urban grouping:</u> 2 metre Maximum Temperature Maximum 10 metre wind gust <u>Tile for sea & ocean (UNMOD) grouping:</u> 2 metre Maximum Temperature Maximum 10 metre wind gust <u>Tile for sea & ocean (ICE) grouping:</u> 2 metre Maximum Temperature Maximum 10 metre wind gust	Tiled fields (Experimental, may be unavailable by end of Phase 1)
Minimum encodings		
15 minutes to hourly	2m Minimum Temperature Minimum visibility	Single and surface fields

15 minutes to hourly	<p><u>Tile for forest grouping:</u> 2 metre Minimum Temperature</p> <p><u>Tile for non-forest grouping:</u> 2 metre Minimum Temperature</p> <p><u>Tile for nature grouping:</u> 2 metre Minimum Temperature</p> <p><u>Tile for inland water grouping:</u> 2 metre Minimum Temperature</p> <p><u>Tile for urban grouping:</u> 2 metre Minimum Temperature</p> <p><u>Tile for sea & ocean (UNMOD) grouping:</u> 2 metre Minimum Temperature</p> <p><u>Tile for sea & ocean (ICE) grouping:</u> 2 metre Minimum Temperature</p>	Tiled fields (Experimental, may be unavailable by end of Phase 1)
Phase 2 (planned)		
	<p>Additional projections – Polar stereographic or Mercator projection depending on the latitude</p> <p>Total precipitation – currently computed offline as a sum of components provided above.</p> <p>Total solid precipitation – currently computed offline as a sum of components provided above.</p> <p>Risk of icing at height level</p> <p>Additional tile variables – Canopy air temperature, intercepted snow</p> <p>Air quality variables in FDB – NO₂, O₃, PM10, PM2.5, SO₂</p> <p>Hydrology variables in FDB – Discharge from rivers or streams, Water runoff and drainage rate, Snow depth water equivalent</p> <p>Renewables in FDB – Number of turbines, hub height, rotor diameter, power production capacity, instantaneous wind power production, accumulated wind power production, global irradiance on tilted surfaces, accumulated PV yield</p> <p>Uncertainty estimation in FDB – Probabilistic predictions in terms of quantiles O(10), threshold probabilities and/or scenarios of</p> <ul style="list-style-type: none"> ● wind speed at 10m, and wind power turbine height ● gust at 10m 	

	<ul style="list-style-type: none">• precipitation for various accumulation periods (1h, 3h, 6h, 12h, 24h)• Power production <p>These may (likely) also be maximised in time/space. Pure deterministic post-processing may also be provided.</p>	
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6 LIST OF TBWS, TBCS AND TBDS

SECTION	DESCRIPTION	DUE DATE
SECTION 3, CMEMS DATASETS	Interface of CMEMS datasets is, at the end of Phase I, operational by federation only. Direct Interface to DestinE Data Pool is under implementation	Phase II
SECTION 5.3	EO.ECMWF.DAT.DT_EXTREMES_ONDEMAND collection is intended for Phase II	Phase II