



The PITHIA e-Science Centre

Prof Tamas Kiss

University of Westminster

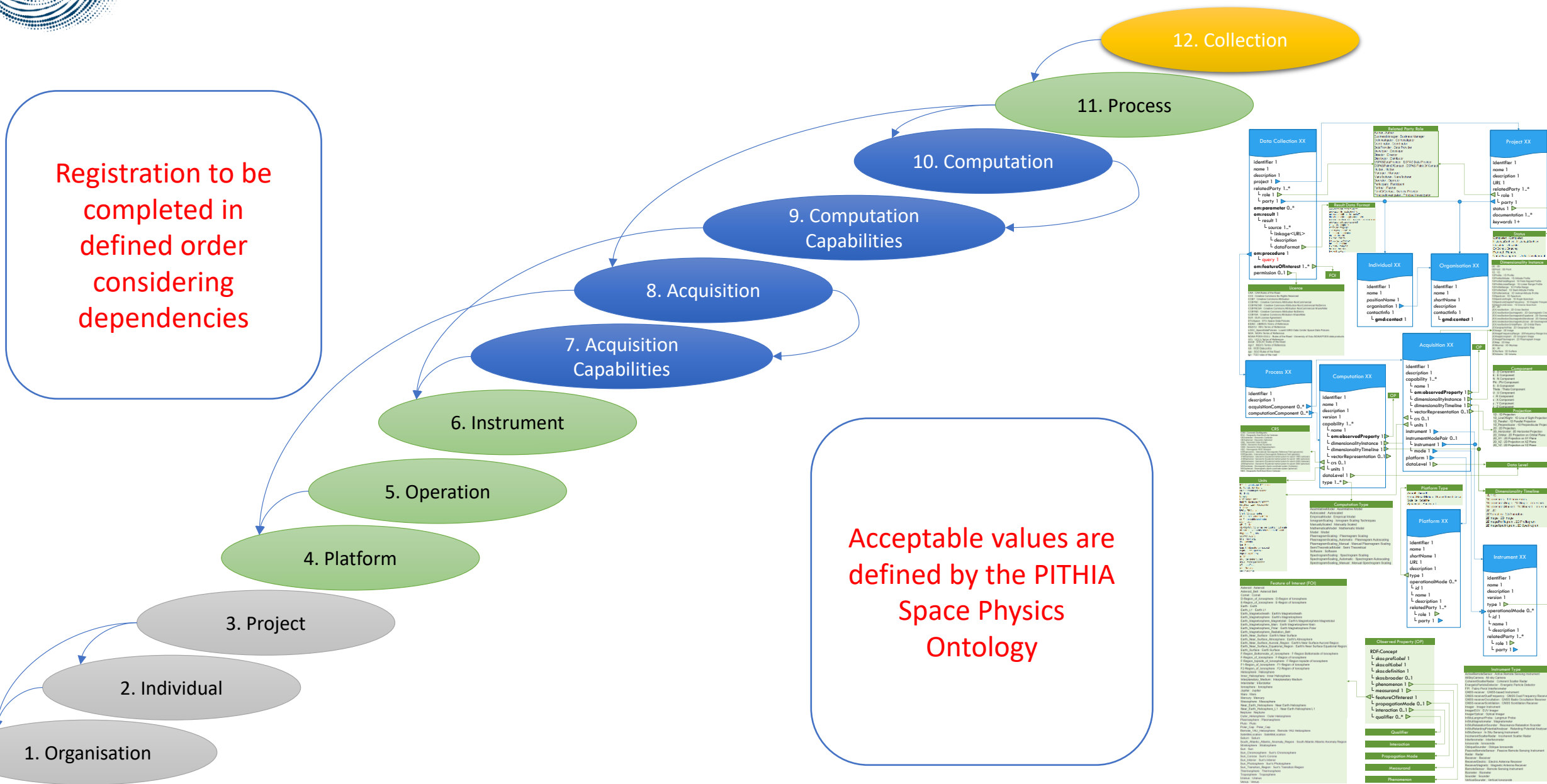


What is the PITHIA e-Science Centre?

- A central web portal to provide a single point of entry to heterogeneous and distributed resources (Data Collections)
 - Datasets
 - Models
 - Catalogues
 - Workflows
- Standardised metadata and ontology-based search
- Seamless interaction with all registered resources
- Usage is free and available for everyone – <https://esc.pithia.eu>



PITHIA Ontology and Metadata Structure



Registration to be completed in defined order considering dependencies

Acceptable values are defined by the PITHIA Space Physics Ontology





eSC Generic Structure



PITHIA
e-Science Centre

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[Search Data Collections](#) ▾


[Scientific Metadata](#) ▾


[Space Physics Ontology](#)


[Manage Registrations](#)


PITHIA e-Science Centre


Scientific Metadata


 ?
Search Data Collections by
Content

 ?
Data Collection Simple
Search

 ?
Data Collections


Catalogues


Workflows

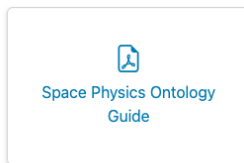
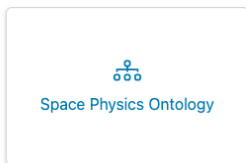

All Scientific Metadata

Open for everyone



eSC Generic Structure

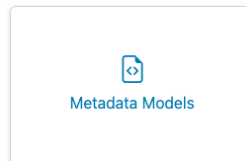
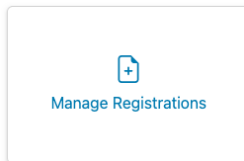
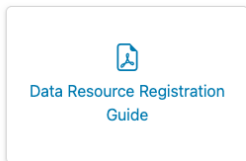
Space Physics Ontology



Open for everyone

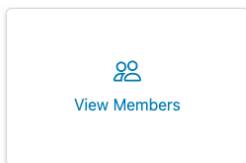
University of Westminster

Data Registration

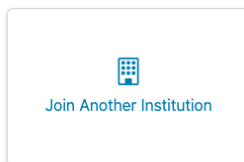
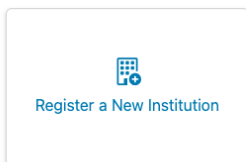


Only after logging in

Members



My Institutions





eSC Highlights – Search for Data Collections

Browse Data Collections

Data Collections

Top-level definition of a collection of the model or measurement data, with CollectionResults pointing to its URL(s) for accessing the data. Unlike [Catalogues](#), data collections do not include begin and end times.

62 data collections

Activity Indicators

[EIS current ionospheric conditions at each ionosonde location](#)

[Hp30 and ap30 indices](#)

[Hp60 and ap60 indices](#)

[Kp, ap, and Ap indices, F10.7 radio flux and sunspot number](#)

[PCN \(Polar Cap North\) index](#)

[TechTIDE LSTID activity index](#)

[T-FORS MSTID Climatology](#)

Sensor Measurements

[AWDA VLF collection of Equatorial Electron Density in the Plasmasphere](#)

[DIDBase: Digital Ionogram DataBase, autoscaled records](#)

In This Page

[Activity Indicators](#)

[Sensor Measurements](#)

[Computational Models](#)

[Mixed](#)

Main categories of Data Collections

Relevant Data Collections per category



eSC Highlights – Search for Data Collections

Simple keyword-based search



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Help & Support | Tamas ▾

Search Data Collections ▾ Scientific Metadata ▾ Space Physics Ontology

Manage Registrations

Home > Data Collection Simple Search

Results

kp index

Exact match ?

This simple search tool does a basic text search on Data Collections registered with the e-Science Centre, and any other registrations referred to by them. To search for specific scientific terms, we recommend using the [Search Data Collections by Content tool](#) instead.

Found 7 results for "kp index".

Hp30 and ap30 indices

No description

Hp60 and ap60 indices

No description

Kp, ap, and Ap indices, F10.7 radio flux and sunspot number

No description

The 1D EDD version of the TaD Model

The TSM-assisted Digisonde (TaD) Profiler (TaD model) is a topside profiler for the electron density profile based on empirical equations derived from topside sounding data of the Alouette/ISIS database and ingests the Digisonde observations at the height of the maximum electron density and the TEC parameters to adjust the profiler with the actual conditions of the ionosphere. The model has three components: (a) the Topside Sounders Model (TSM) subroutine (Kutiev and Marinov 2007; Kutiev et al. 2006) that provides the...

Search text / keyword

All data collections relevant to that keyword



eSC Highlights – Search for Data Collections

Content-based search using Space Physics Ontology

Input Selection

Terms that are not used in any registered data collection metadata have been disabled.

Features of Interest ^

|

- All 29
 - ▶ Asteroid
 - Comet
 - ▶ Earth
 - ▶ Heliosphere
 - Interplanetary Medium
 - Interstellar
 - Jupiter
 - Mars
 - Mercury
 - Neptune
 - Pluto
 - Saturn
 - ▶ Sun
 - Uranus
 - Venus

Computation Types, Instrument Types and Annotation Types

Observed Properties

Define Features of Interest, Computation, Instrument or Annotation Type, and Observed Property based on the PITHIA Space Physics Ontology

Search for Data Collections relevant to the defined content



eSC Highlights – Interact with Data Collections

Get direct access to a Data Collection hosted externally

Index of /upc_ionex_GPSonly-RINEXv3

<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
Parent Directory		-	
1996/	2022-10-09 15:56	-	
1997/	2020-04-08 10:56	-	
1998/	2020-04-08 10:56	-	
1999/	2020-04-08 10:56	-	
2000/	2020-04-08 10:56	-	
2001/	2020-04-08 10:56	-	
2002/	2022-10-09 16:23	-	
2003/	2020-04-08 10:56	-	
2004/	2020-04-08 10:56	-	
2005/	2020-04-08 10:56	-	
2006/	2022-10-09 16:22	-	
2007/	2020-04-08 10:56	-	
2008/	2020-04-08 10:56	-	
2009/	2020-04-08 10:56	-	
2010/	2020-04-08 10:56	-	
2011/	2020-04-08 10:56	-	
2012/	2020-04-08 10:56	-	

Access Data Collection
on remote site



eSC Highlights – Interact with Data Collections

Run model or access data directly from the eSC (using API)

BSPM: 3D-Kinetic plasmasphere model

Last modified at Nov 6th, 2023, 08:10 UTC

Point of contact **Data Provider**
Edith Botek Royal Belgian Institute for
Space Aeronomy (BIRA-IASB)

Description

The BSPM (Belgian SWIFF Plasmasphere Model) is a 3D-Kinetic semiempirical model of the plasmasphere developed by the Solar Wind Division of the Royal Belgian Institute for Space Aeronomy (Pierrard et al., 2021 for the last version). Based on physical mechanisms for the plasmopause formation and trajectories of particles trapped in the Earth's magnetic field, it provides the number density and the temperature of the electrons and protons inside and...

Show more

How to Access the Data

API Access

[PITHIA e-Science Centre Access](#) →
Online service responding to a parametrized data request using OpenAPI standard
Interact with the BSPM model through an API.

Permissions

► Creative Commons Attribution-NonCommercial-ShareAlike
Show full description

► Further Information and Resources

► Related Metadata

Type

Model

Permissions

► [Creative Commons Attribution-NonCommercial-ShareAlike](#)

Page Suggestions & Support

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Find basic information about the Data Collection

Find link to execute model

Find more specific information about the Data Collection



eSC Highlights – Interact with Data Collections

Run model or access data directly from the eSC (using API)

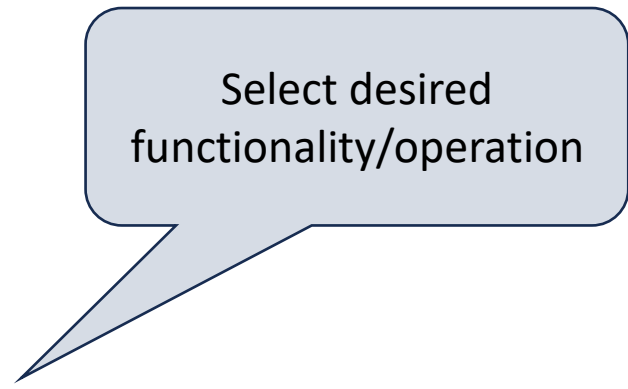
BSPM API: 3D-Kinetic plasmasphere model

<https://bspm.pithia.eu/openapi.json>

The BSPM is a 3D-Kinetic semiempirical model of the plasmasphere developed by the Solar Wind Division of the Royal Belgian Institute for Space Aeronomy.

Start typing to filter sections...

Execute	Run/Returns the status of execution by date: year-month-day	^
Execute the BSPM by passing the date.		v
Retrieve Executions	Returns a list of executions completed by the user	^
Retrieve a list of user executions.		v
Plot	Returns the plot image	^
Plot the output image by passing the execution date and hour.		v
Download	Returns the ZIP file of all outputs, including .png and .csv files.	^
Download all the outputs by passing the execution date.		v





eSC Highlights – Interact with Data Collections

Run model or access data directly from the eSC (using API)

Plot Returns the plot image ^

Plot the output image by passing the execution date and hour. ^

Returns the plot image.

Parameters Cancel

Name	Description
date * required string (query)	<input type="text" value="2017-09-08"/>
hour * required integer (query)	<input type="text" value="16"/>

Run /plot

Download Returns the ZIP file of all outputs, including .png and .csv files. ^

Download all the outputs by passing the execution date. v

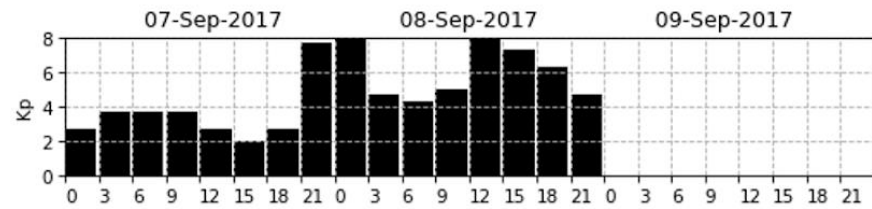
Provide input parameters



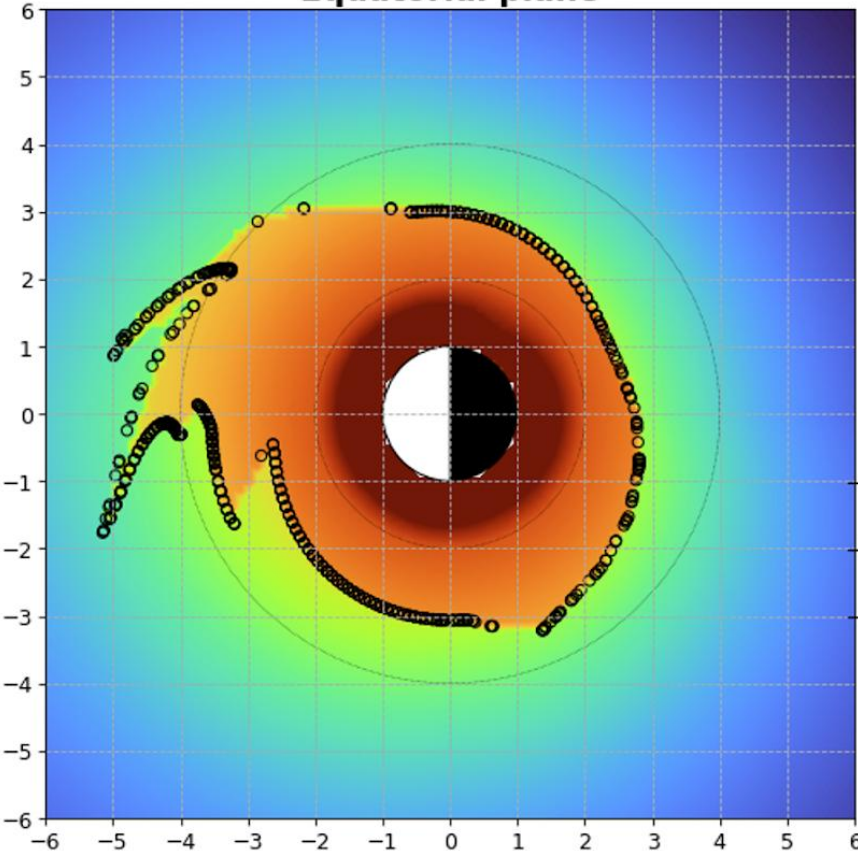
eSC Highlights – Interact with Data Collections

Run model or access data directly from the eSC (using API)

2017-09-08_16h00m



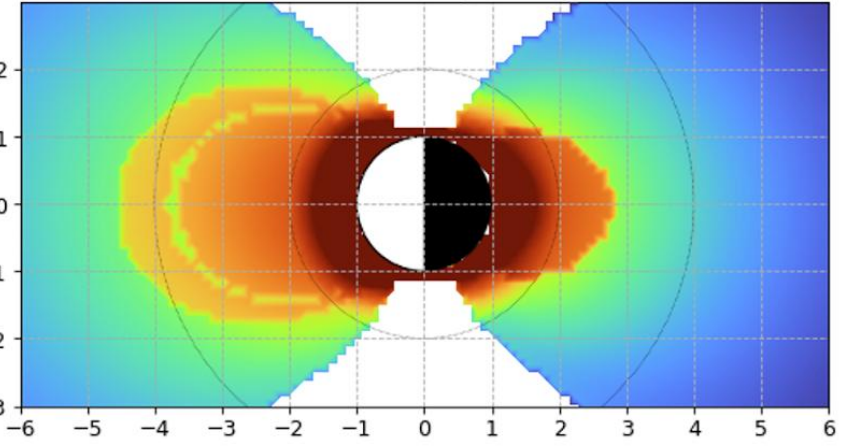
Equatorial plane



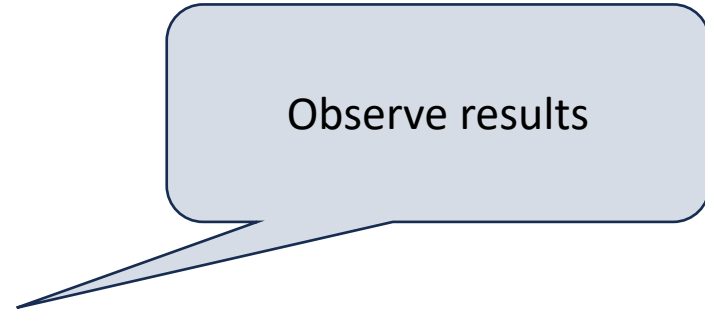
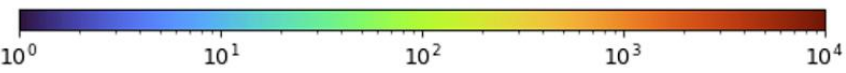
Belgian SWIFF Plasmasphere Model v.2021

Axes units in Re

Meridian plane



Electron density [1/cm³]

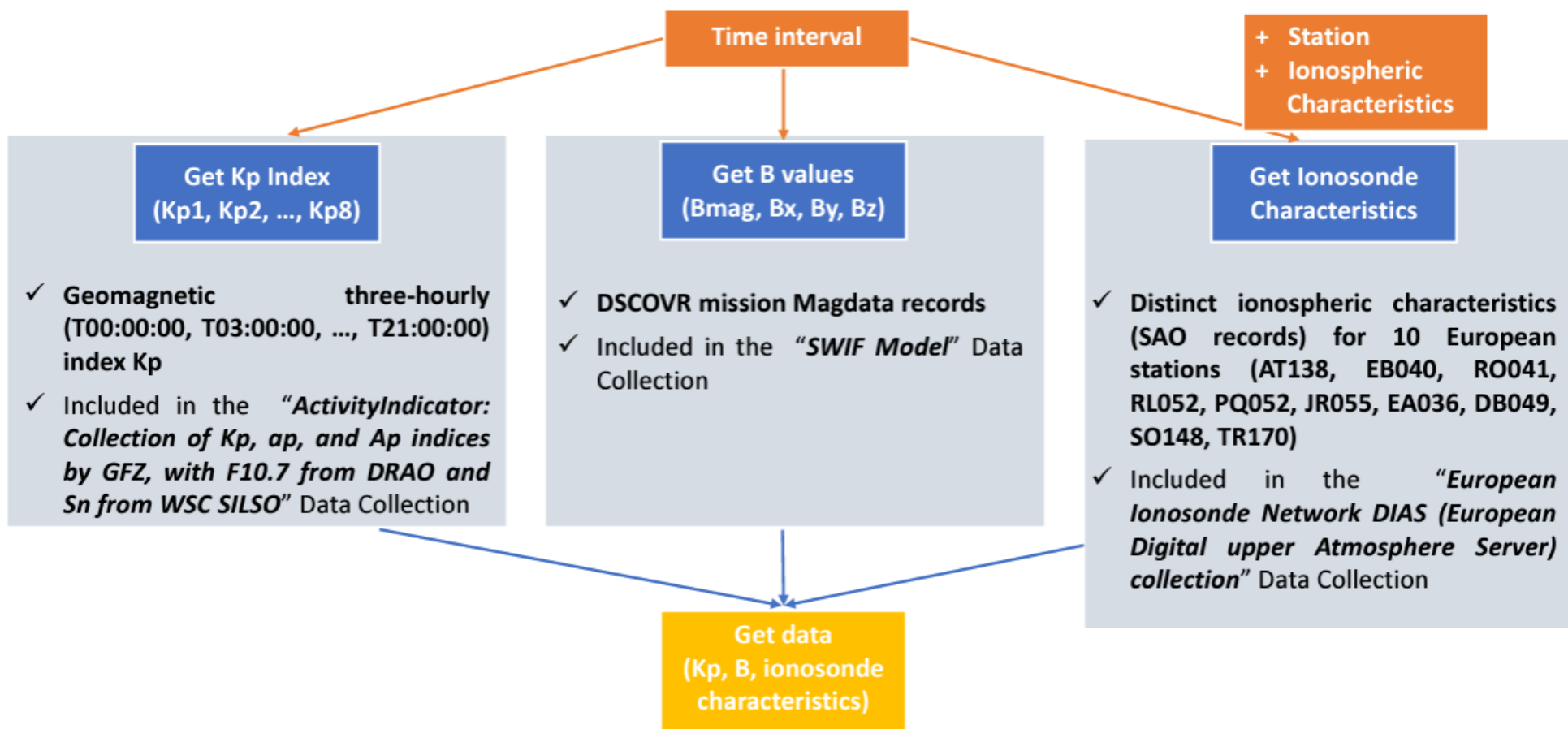




eSC Highlights – Execute Workflows

Combine multiple Data Collections into one automated execution

“Solar Wind Magnetosphere Driven Ionospheric Response (SWIMAGD-IONO)” Workflow





eSC Highlights – Execute Workflows

Combine multiple Data Collections into one automated execution

Execute workflow and visualise results

Plot Data

Plot the KP data, B data, and SAO metadata for selected parameters

Plot the KP data, B data, and SAO metadata for selected parameters

Plot the KP data, B data, and SAO metadata.

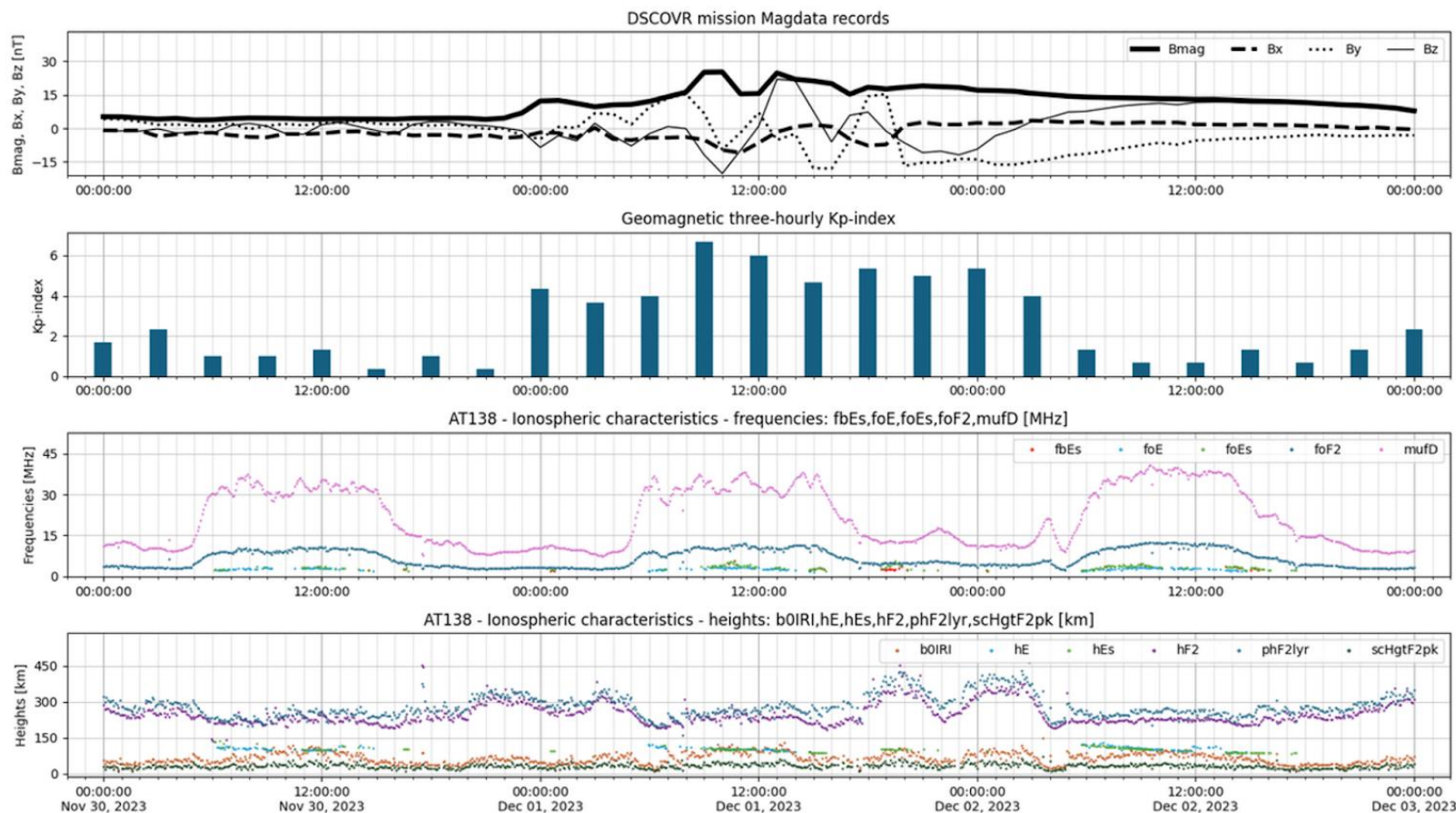
Parameters

Name	Description
date_of_interest * required	Date in the format 'YYYY-MM-DD', e.g.
string	2023-12-01
(query)	
station * required	Select a station
string	AT138
(query)	
characteristics * required	Comma-separated list of characteristics
string	b0IRI,fbEs,foE,foEs,foF2,hE,hEs,hF2,mufD
(query)	Es,foF2,hE,hEs,hF2,mufD,phF2lyr,sch

Run /plot_data/

Responses

Details





eSC Highlights – Resource management

- Registered users can create, delete or modify resources under their institution
 - A resource can be a Data Collection, a Workflow or a Catalogue
 - Registering a Data Collection requires up to 12 steps
- Resource registrations are in XML format
- Two options for managing/creating XML files
 - Edit XML files off-line and upload them
 - Use registration wizard to generate XML automatically
- User management is based on EGI CheckIn for authentication and Perun for authorisation



eSC Highlights – Resource management

Registration Wizard

Metadata Sections

Full Name and Organisation
Identifier
Description, Types, Features of Interest and Permissions
Projects, Procedure and Sub-collections
Collection Results
Data Levels
Quality Assessment
Related Parties
API (Optional)

New Data Collection

* indicates a required field

Data Collection Full Name *

Organisation Associated With the Data Collection *

Complete fields by typing in information directly

Select information from drop down box

Identifier

Local ID *

The local ID is automatically generated from the full name you give this registration. It must be unique, so if the local ID generated has already been taken a timestamp will be added to help ensure uniqueness. The local ID also cannot be changed once this form is submitted.

DataCollection_

Namespace *

This is automatically generated with the short name of the organisation associated with this registration.

Some information is generated automatically so that user does not have to worry

Metadata Version *

The version number of the object being identified.



eSC Highlights – Resource management

Registration Wizard

Metadata Sections

Full Name and Organisation
Identifier
Description, Types, Features of Interest and Permissions
Projects, Procedure and Sub-collections
Collection Results
Data Levels
Quality Assessment
Related Parties
API (Optional)

API

Optional

A link to an OpenAPI specification (written in YAML or JSON) for interacting with the Data Collection can be provided below. A user interface will be generated from this specification and will be accessible from the details page of the Data Collection.

OpenAPI Specification URL

Description



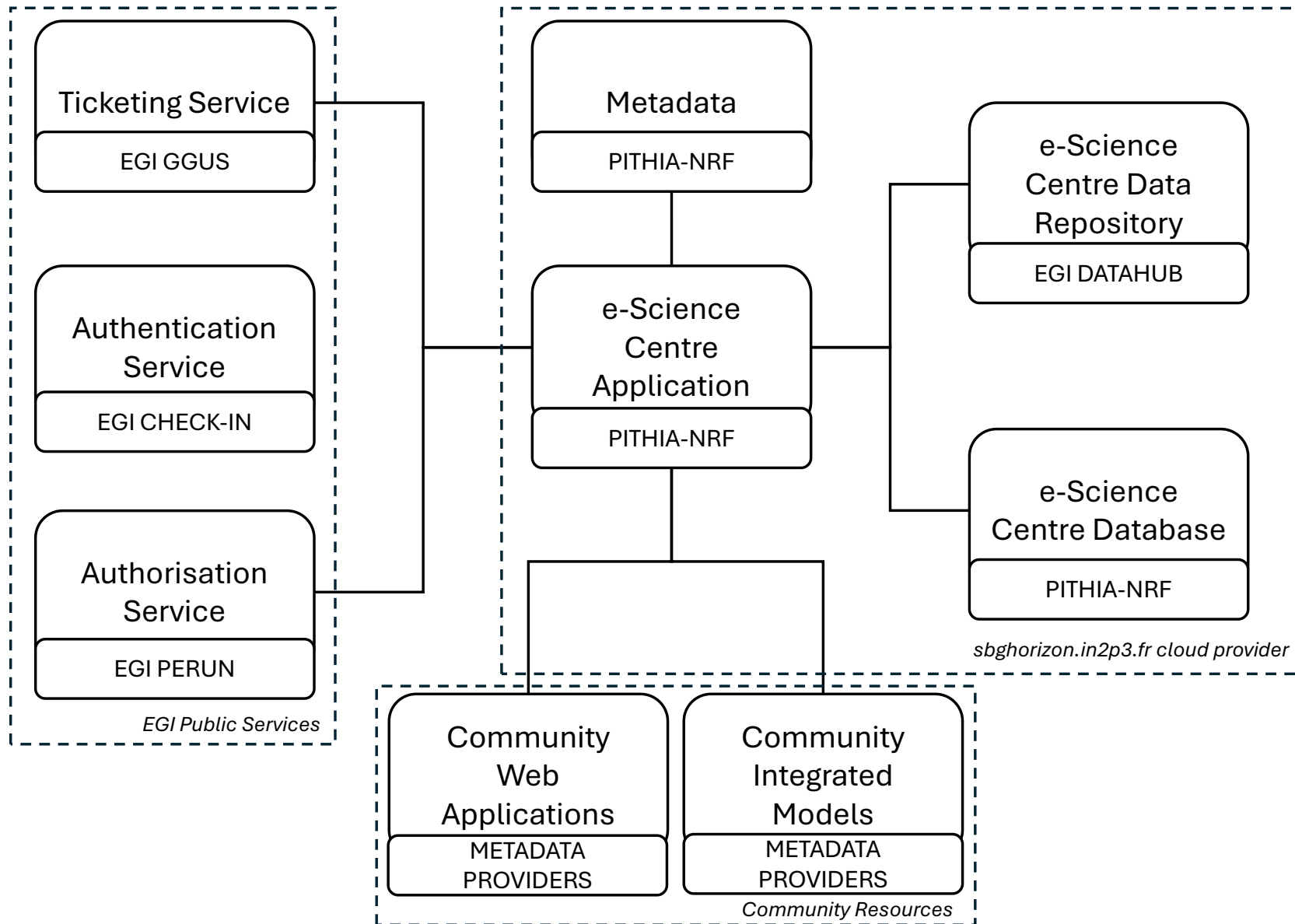
Validation usually takes up to a minute to complete on a good internet connection.

Validate and Register

Once form completed, user can validate it and generate XML automatically



eSC Deployment on cloud computing resources





Thank you for your attention!

WEB:

<https://www.pithia-nrf.eu>

<https://esc.pithia.eu/>



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