DISPEC

Scientific exploitation of space Data for improved Ionospheric SPECification

Introduction

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Main objective of DISPEC project

The **exploitation of bottomside and topside ionospheric data**, provided by space missions – such as Swarm, DORIS, GRACE, GRACE-FO, Spire, COSMIC-2– and by ground-based GNSS receivers and ionosonde sounders, to support research activities **for improved ionospheric specification**, through the derivation of **high-level data products.**

The project outcomes have the **potential to complement the ESA Space Science Archives and the Space Weather Network**, the data collections provided by the global networks of ionosondes and GNSS ground based receivers, and to **enhance the capacity of European Research Infrastructures**.

Specific objectives

a. Improve the **capabilities for advanced processing of data** through the application of machine learning algorithms, spectral analysis, Bayesian methods, that will release higher-level data products for fast data processing and scientific analysis, including curated and clean data, spectrograms for selected bands, 4D analysis of long-term time series.

b. Develop **high-level data products** compatible to **FAIR** principles.

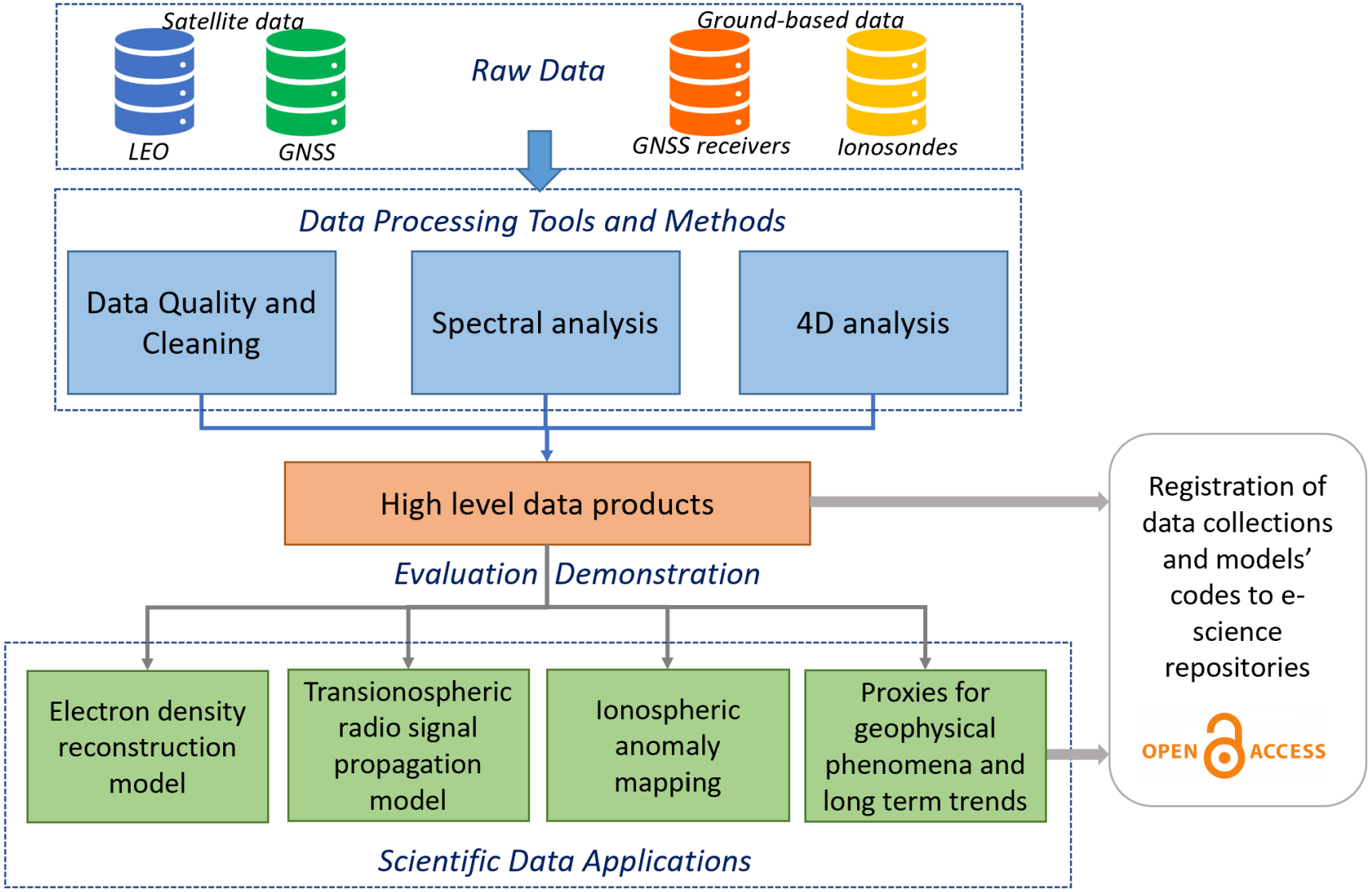
c. Evaluate the improvements that the use of the DISPEC high-level data products bring in the performance of ionospheric specification models, for electron density reconstruction, for transionospheric radio signal propagation, for ionospheric irregularities specification but also for long-term trends analysis.

d. Distribute the DISPEC foreground knowledge (data, data-products, codes, methodologies and scientific publications) following the **open science** principles

e. Develop **synergies** with ESA, global data centers, and European Research Infrastructures for the efficient exploitation of the resulted high-level data products, adopting **standardized** production methodologies.

f. Compile a **white paper** with recommendations that should help preparing future European and international missions and ground-based networks of ionosondes and GNSS receivers. The white paper will also include conclusions on the data quality impact in models' transition from Research to Operations.

General Methodology



Ambition

The principal ambition of DISPEC is:

- the derivation of high-level data products **with specified data quality flag and defined data level**, following the Research Data Alliance standards, to allow the adoption by space agencies, data-centers
- the **re-use** of DISPEC data products by the research community, given the expected improvements to the accuracy of ionospheric specification models and the support that provide for models' validation.

Timeline

DISPEC runs from January 2024 to December 2026

Milestones

December 2025: DISPEC demonstrator

December 2026 Performance evaluation of DISPEC Scientific Data Applications

November 2026: DISPEC school for PhD students and young scientists

December 2026: DISPEC white paper

Thank you for your attention!

WEB: https://dispec.eu

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