



Project of the FP7 SPACE Programme

## Problem-oriented Processing and Database Creation for Ionosphere Exploration

### 2<sup>nd</sup> International DEMETER Workshop

Paris, 10-12.10.2011

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EUROPEAN COMMISSION  
European Research Area



## General information

**Project title:** *Problem-Oriented Processing and Database Creation for Ionosphere Exploration*

**Short title:** *POPDAT*

**FP-7 Direction:** Activity 9.2 – Strengthening Space Foundations  
**Area 9.2.1:** Research to support space science  
and exploration

**Sub-area – 9.2.1.3:** Exploitation of space science and  
exploration data

**Terms of execution:** 01.06.2011 - 30.04.2013

**Requested EU contribution:** 1 374 209.00 €

## Abstract

*The Project purpose is the problem-oriented processing of data collected and stored by former ionospheric satellite missions.*

*At a first stage of the Project implementation, the different types of wave data will be selected, processed and arranged in topical catalogues: AGW, TID, and ELF-VLF plasma emissions. Then the Ionosphere Wave Service will be created including the composition of catalogues metadata to provide useful tool to access the database through a web portal.*

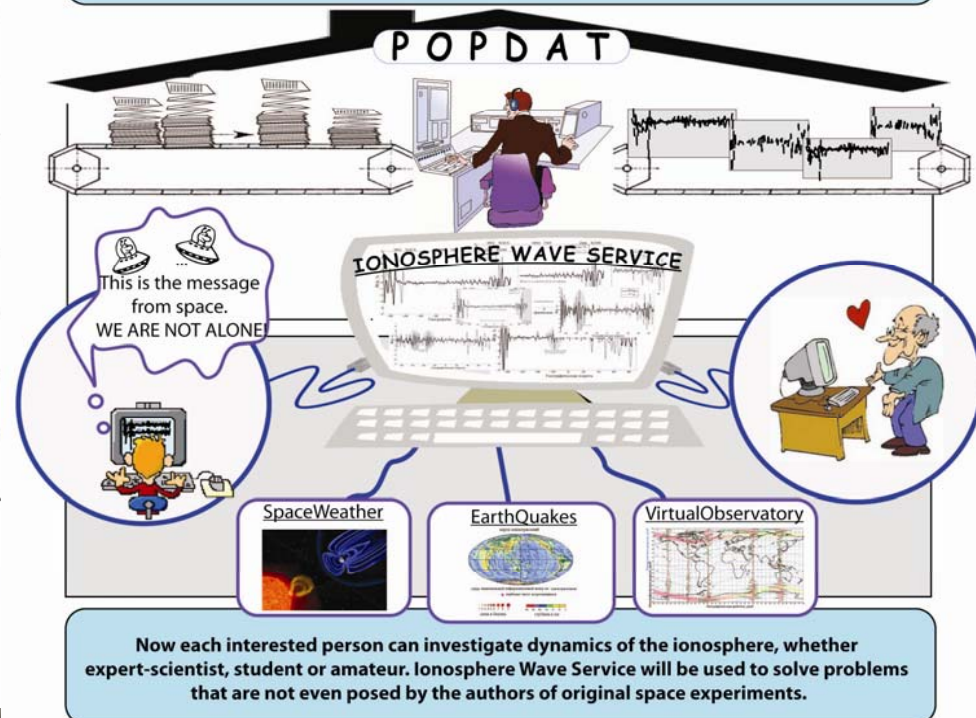
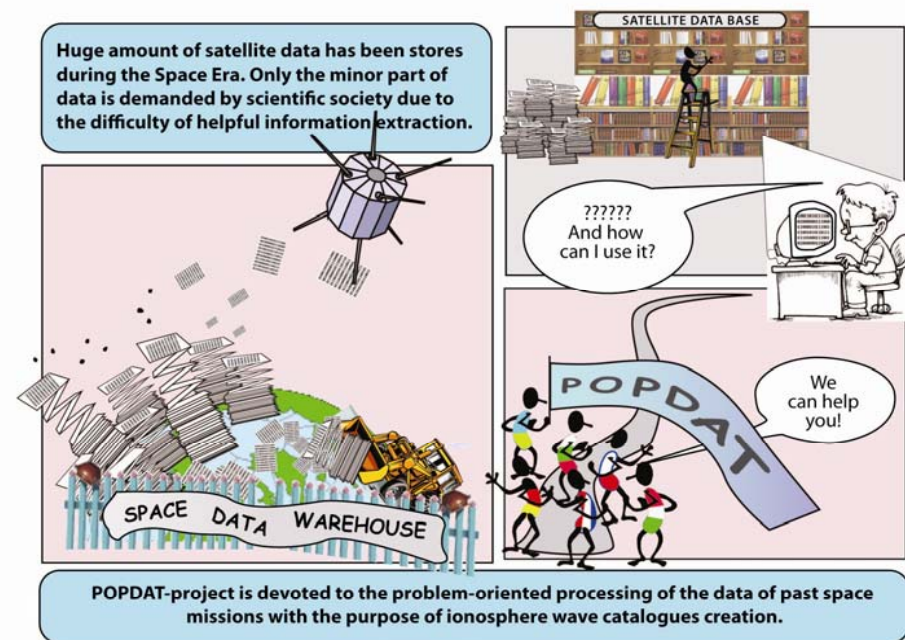
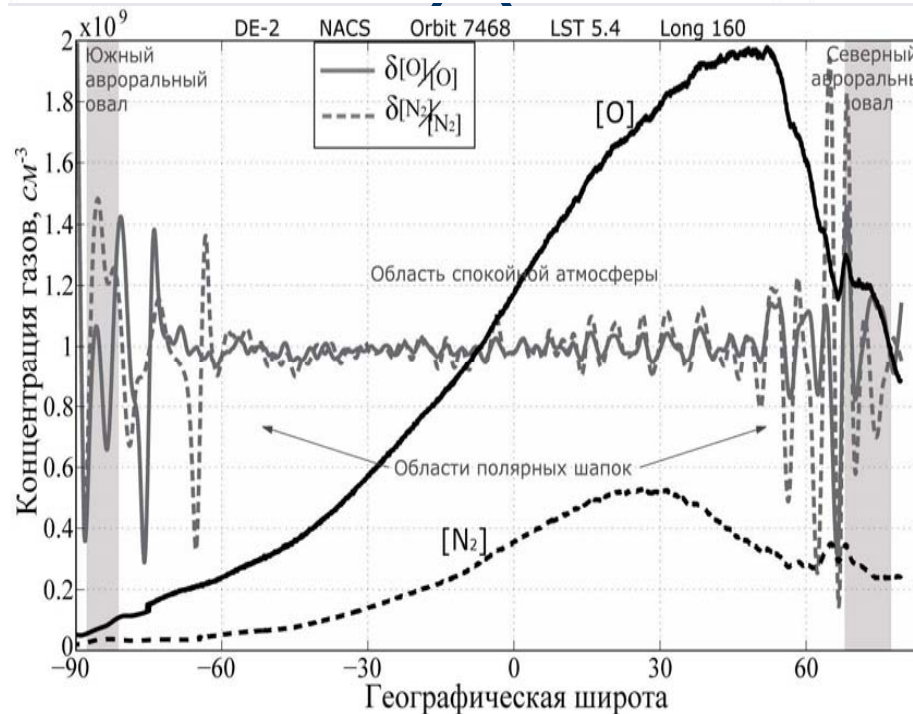
*Ionosphere Wave Service will be promoted to a great number of specialists working in the numerous theoretical and applied space oriented branches.*

## The particular goals of the POPDAT Project are:

- *Collection of datasets from different sources which concern the wave-like phenomena in ionosphere;*
- **Appropriate design of the flexible software tools for the search of wavelike behaviors detected in the satellite datasets;**
- *Creation of thematic catalogues of ionosphere perturbations;*
- **Implementation of a Ionosphere Wave Service accessible to scientific communities and public users;**
- *Liaison with ULISSE information system;*
- **Creation of Ionosphere Virtual Dynamic Observatory to assist educational activities;**
- *Dissemination and promotion of the Ionosphere Wave Service at topical conferences and in scientific and public press.*



UT (ms)	O density (1/cm <sup>3</sup> )	% err.	N2 density (1/cm <sup>3</sup> )	% err.	He density (1/cm <sup>3</sup> )	Orbit No.
33669947	1.774781E+09	2.50	0.000000E+00	0.00	6.250185E+05	8523
33670947	1.768981E+09	2.50	1.158804E+07	29.50	0.000000E+00	8523
33671947	1.770030E+09	2.50	1.172935E+07	30.50	6.064271E+05	8523
33672947	1.765016E+09	2.50	1.174215E+07	31.00	7.636427E+05	8523
33673947	1.764852E+09	2.50	1.151687E+07	29.00	9.106152E+05	8523
33674947	1.761281E+09	2.50	1.162260E+07	30.00	1.127852E+06	8523
33675947	1.758037E+09	2.50	1.159393E+07	29.50	0.000000E+00	8523
33676947	1.755284E+09	2.50	1.159316E+07	29.50	7.553691E+05	8523
33677947	1.745912E+09	2.50	1.156321E+07	29.50	6.622990E+05	8523
33678947	1.753515E+09	2.50	1.179795E+07	31.50	0.000000E+00	8523
33679947	1.749812E+09	2.50	1.151354E+07	29.00	1.115346E+06	8523
33680947	1.739588E+09	2.50	1.148820E+07	29.00	0.000000E+00	8523



# POPDAT Concept

*Problem-oriented data  
processing*

*WP1*

**POPDAT**

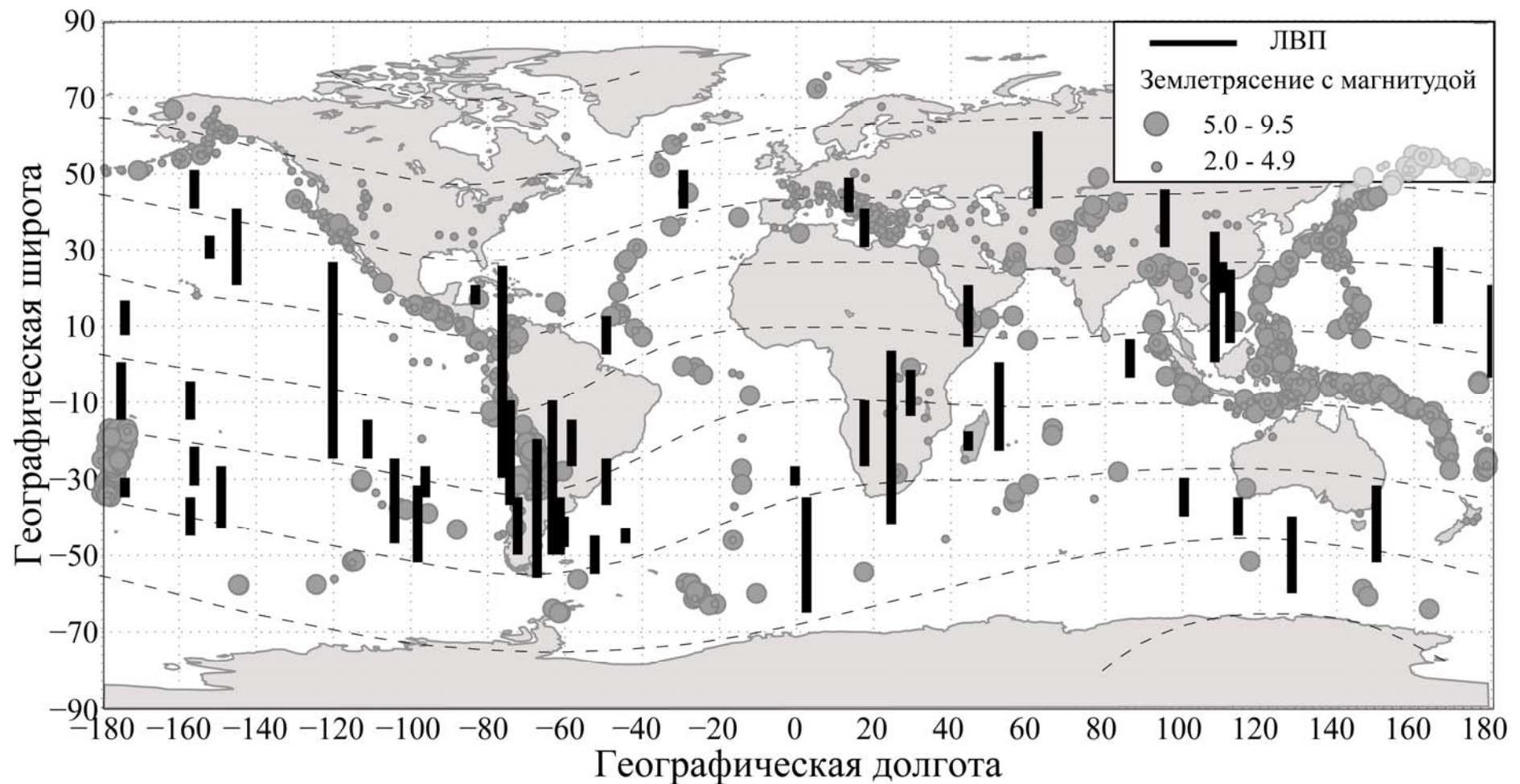
*WP2*

*WP3*

*Ionosphere  
Wave Service*

*Wave  
catalogues*

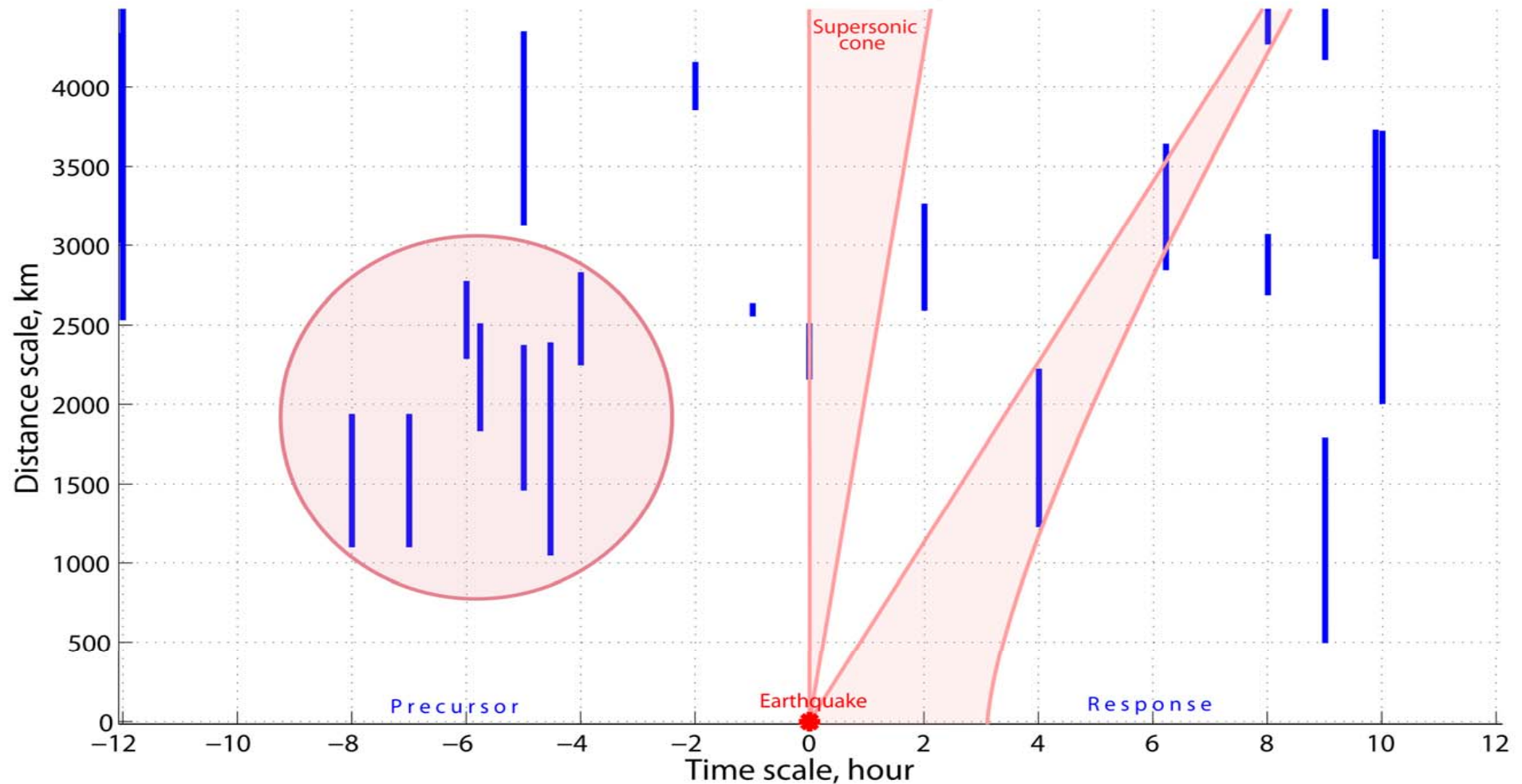
## Illustration: Global distribution of AGW flashes





# Illustration: AGWs and EQs (Superimposed epochs analysis)

For all EarthQuakes with Depth<100 & Magnitude>4.9 1982–1983



[Skorokhod & Lizunov, Geomagnetizm and Aeronomy, 2012, No 1]



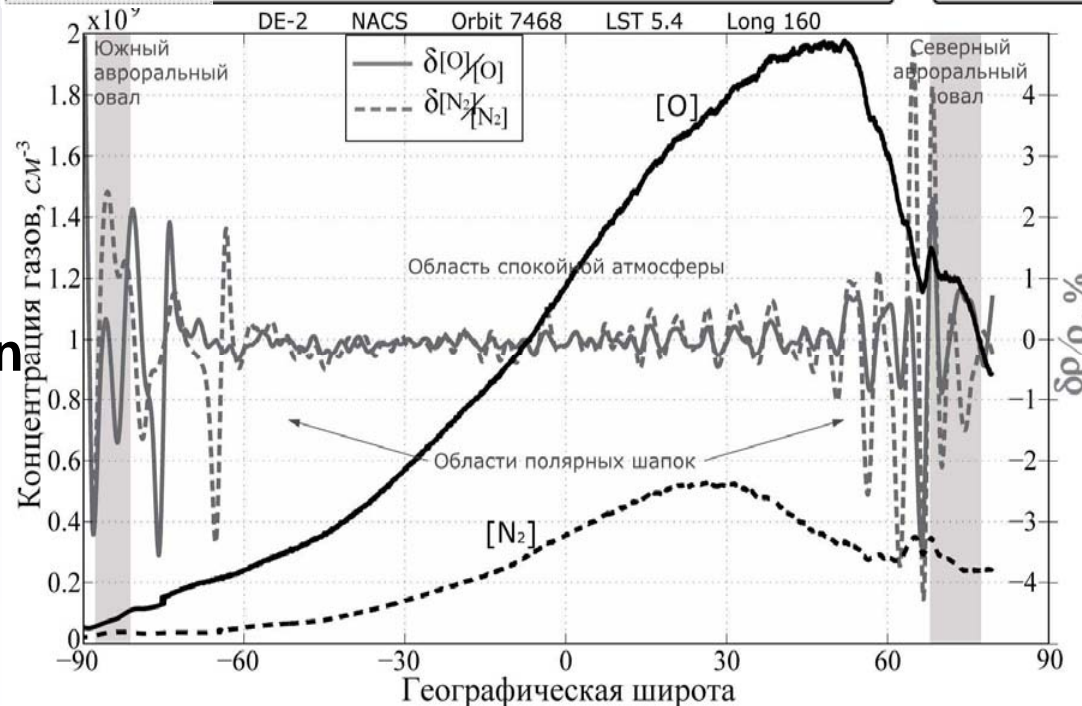
# WP1. Problem-oriented data processing of selected space experiments

**Task 1.1: Ionosphere satellite experiments review and clustering according to the observed wave processes**

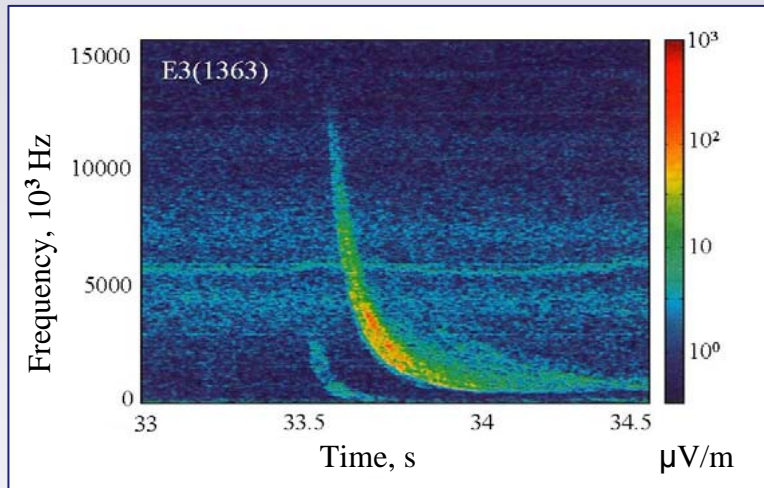
**Task 1.2: Theoretical substantiation and development of the methodology of wave disturbances selection from satellite data**

**Task 1.3: Data mining**

UT (ms)	O density (1/cm <sup>3</sup> )	% err.	N2 density (1/cm <sup>3</sup> )	% err.	He density (1/cm <sup>3</sup> )	Orbit No.	Alt. (km)	Lat. (deg)	Lo (d)
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33678947	1.753515E+09	2.50	1.179795E+07	31.50	0.000000E+00	8523	216.42	-63.06	5
33679947	1.749812E+09	2.50	1.151354E+07	29.00	1.115346E+06	8523	216.46	-63.13	5
33680947	1.739588E+09	2.50	1.148820E+07	29.00	0.000000E+00	8523	216.49	-63.20	5



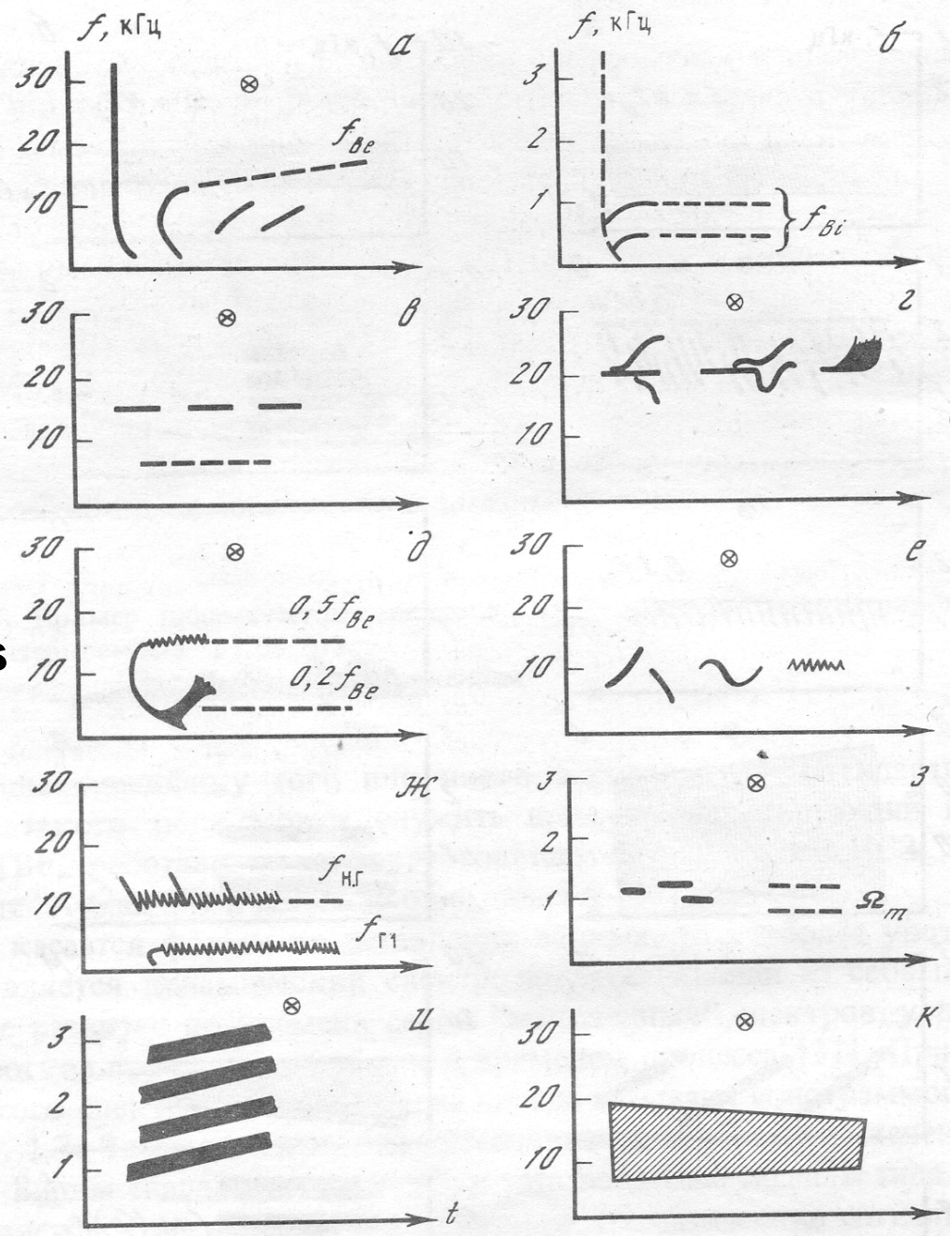
## WP2. Creation of topical catalogues



**Task 2.1:** Inventory of users needs

**Task 2.2:** Optimization of the list of physical parameters and their structuring in catalogues

**Task 2.3:** Creation of catalogues which concern the wave-like phenomena in ionosphere



## WP3. Ionosphere Waves Service creation

**Task 3.1: Service requirements**

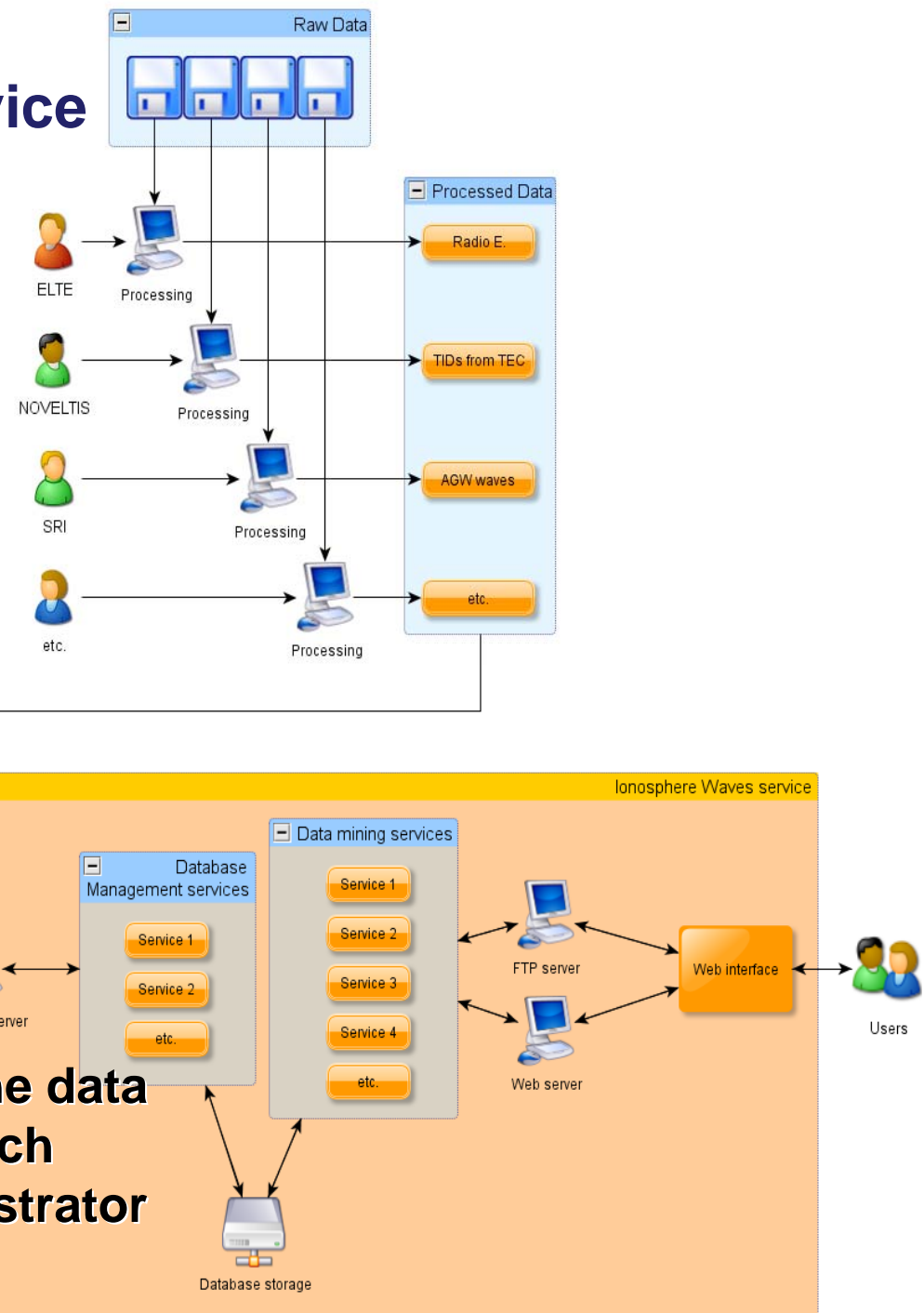
**Task 3.2: Service architecture design**

**Task 3.3: Development of the service**

**Task 3.4: Validation of the service**

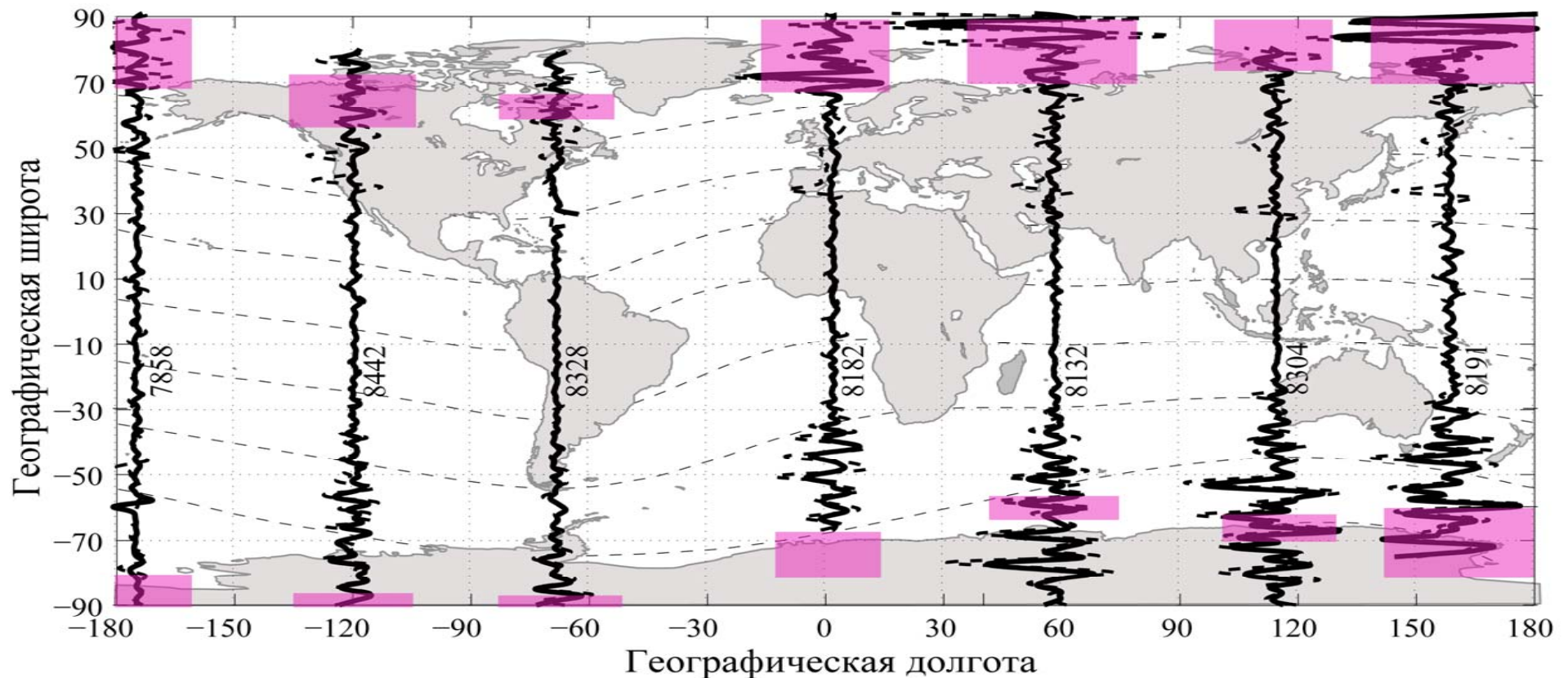
**Task 3.5: Deployment of the service**

**Task 3.6: To describe and determine data policy and data preservation for each experiment incorporated in demonstrator**





## WP4. Study results dissemination and education



**Task 4.1:** Project website creation

**Task 4.2:** Exhibition of the efficiency of Ionosphere Wave Service application in solving certain scientific problems design

**Task 4.3:** Information events

**Task 4.4:** Traditional dissemination activities



# Project Consortium



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# POPDAT Team



[www.popdat.org](http://www.popdat.org)



## Contact



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