



Access to Observatori de l'Ebre node

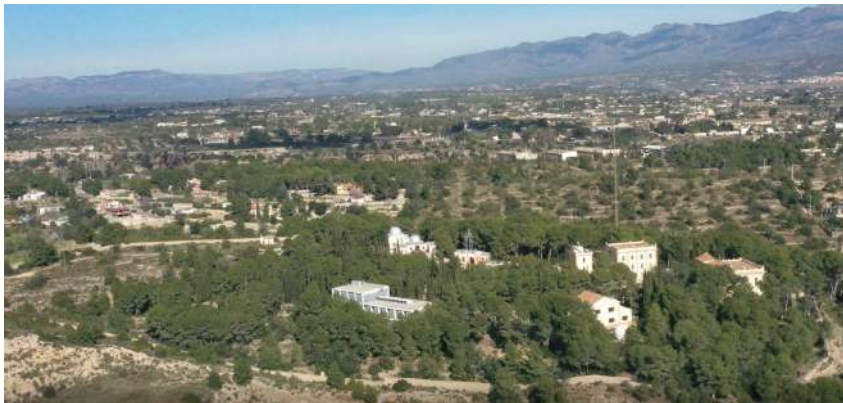
WP7: Access to PITHIA-NRF facilities



Observatori de l'Ebre (OE) is a research institute born in **1904** to study Sun-Earth relationship. We study, analyze and measure the variability of the Earth's magnetic field and ionosphere.

Located in Roquetes, Catalonia, Spain

www.obsebre.es



Description of the infrastructure:

OE team operates a DPS4D ionosonde system, providing routine vertical incidence (VI) and bi-static oblique incidence (OI) ionospheric measurements in synchronous operation with other European DPS4D systems.

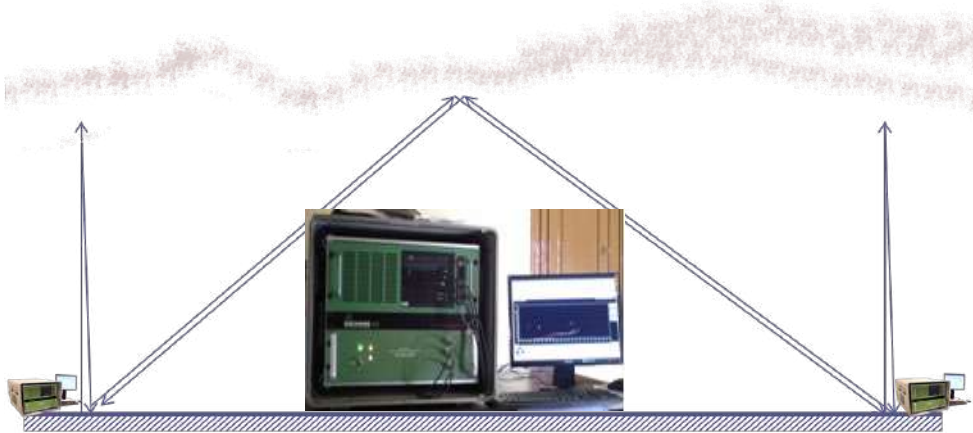


OE team operates another ionosonde (AIS) in Livingston Island (Antarctica) only during austral summer time.



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Uniqueness of the node

DPS4D developed and built by [Lowell Digisonde International](#) in collaboration with [UMass Lowell Center for Atmospheric Research](#).

The DPS4 monitors the effects of space weather on Earth's ionosphere, supporting communication & navigation satellite operations, and HF and VHF radiowave communication.

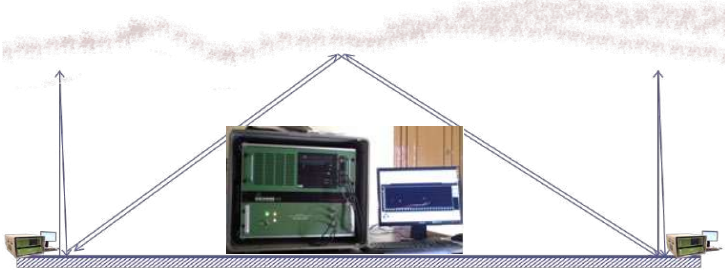
DPS4D operates with:

- Frequency Range: 0.5 - 30 MHz (all modes of operation)
- Bandwidth: 34 kHz @ 3 dB (theoretical) 42 kHz (measured)
- Output format for autoscaled ionogram and profile data with the URSI approved data exchange format SAO-XML
- Programmable selection of any number of "null" frequencies or frequency bands for which no RF power is transmitted during an ionogram scan.
- Highly flexible scheduling protocols support different research objectives requiring high data sampling cadences and complex series of measurements, as:
 - Real-time monitoring of space weather effects.
 - Travelling Ionospheric Disturbance Studies Direct TID measurements with vertical and oblique sounding.



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Uniqueness of the node

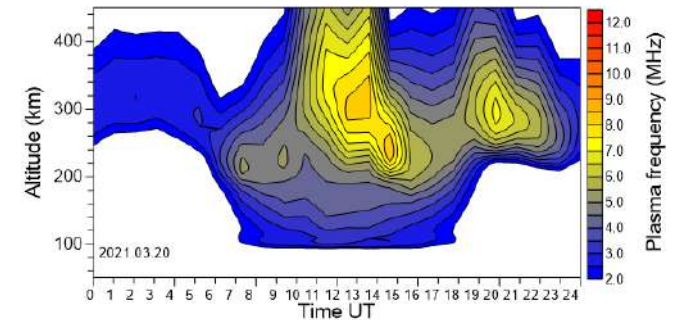
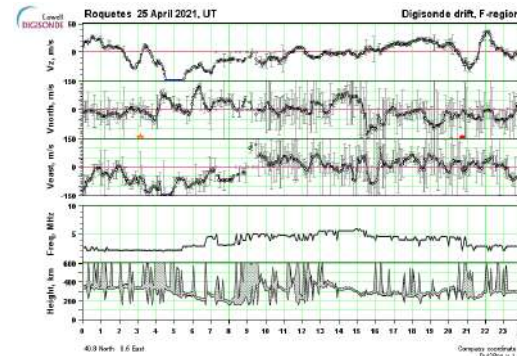
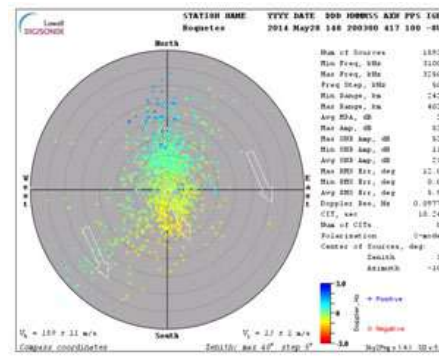
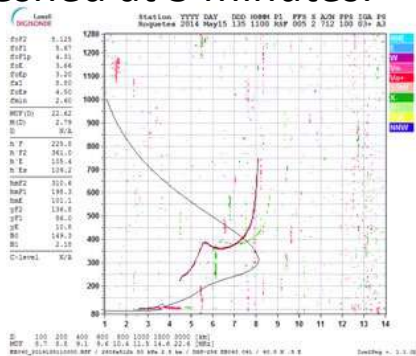
DPS4D developed and built by [Lowell Digisonde International](#) in collaboration with [UMass Lowell Center for Atmospheric Research](#).

Physical measurements:

From the ionospheric echoes: Amplitude, phase, direction of arrival, virtual height, Doppler frequency & spread, ordinary & extraordinary wave polarization identification.

Real-time ionospheric electron density profiles with density error bars for each height; vertical ionospheric total electron content (ITEC); real time classical ionospheric characteristics including foF2, foF 1, foE, foEs, MUF(3000)F2, hmF2, hmF1, hmE, and the IRI parameters B0, B1.

By- and added value products: VI and OI ionograms, skymaps, digisonde drift velocity, ionospheric tilts and directograms refreshed at 5 minutes.





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Data Catalogue:

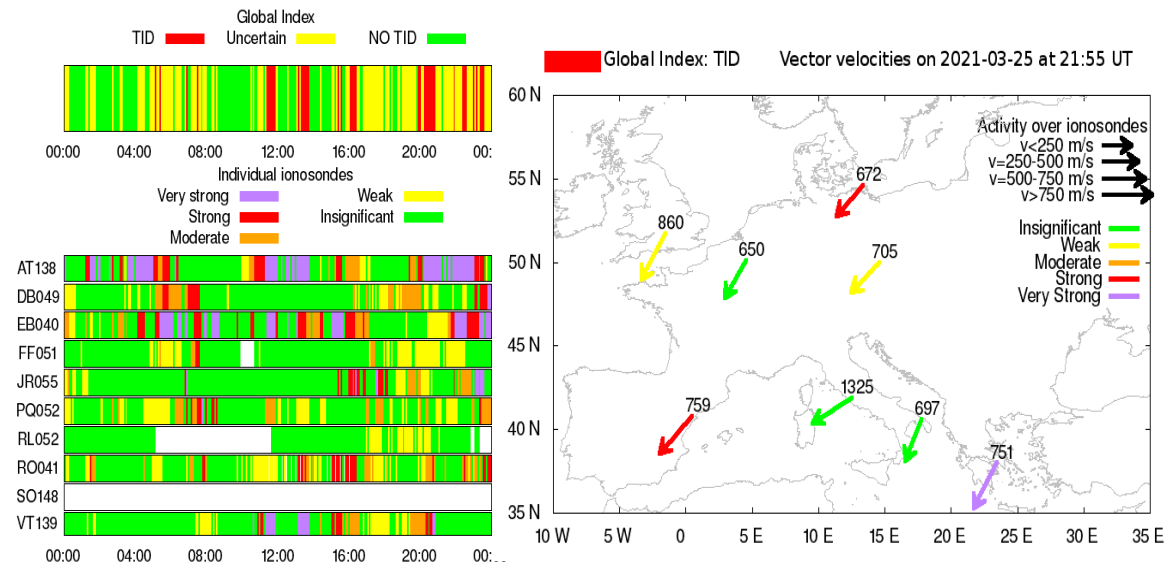
- EB040 ionograms since 1955 to present, the longest Spanish Ionospheric database.
- Livingston ionograms since 2005 to present, only for austral summer time.



Products and models:

-Identification and specification of Large Scale Traveling Ionospheric Disturbances

HF-Int Model, using MUFD data of ionosondes network over Europe, identifies periodicities, velocities and directions of LSTID
 Altadill et al. (2020) <https://doi.org/10.1051/swsc/2019042>





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Products and models:

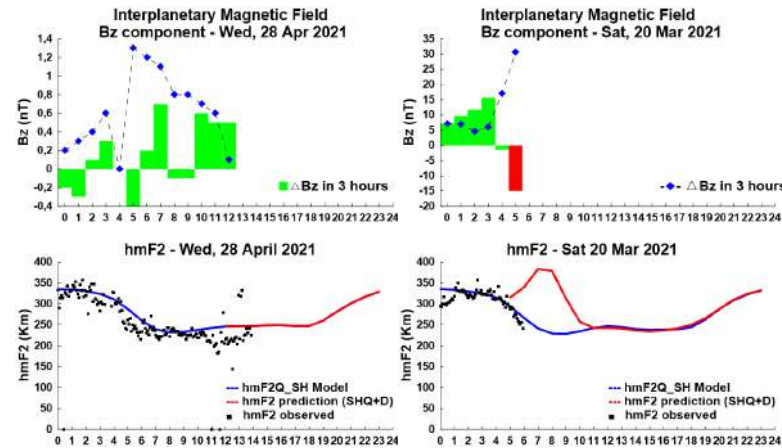
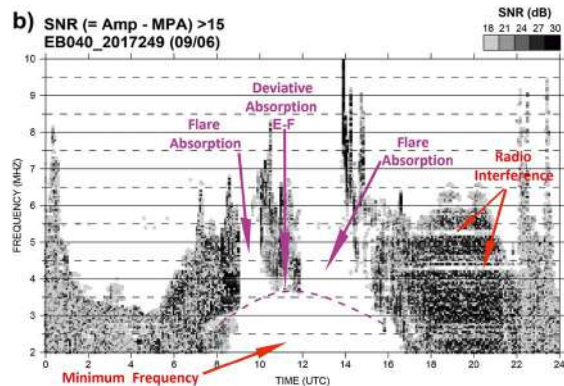
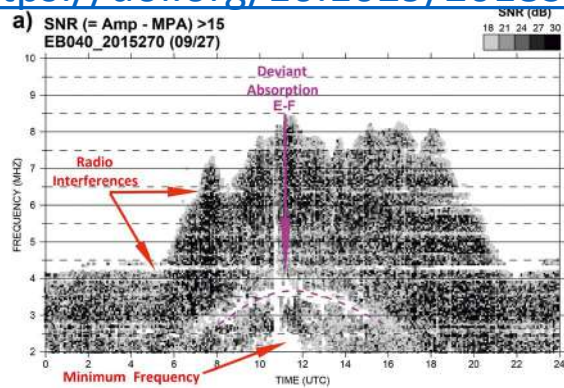
-Absorption study effects produced by Solar flare emissions Study of the absorption signal observed in the signal noise ratio (SNR) during Solar flare emissions. Curto et al. (2018)

<https://doi.org/10.1029/2018SW001927>.

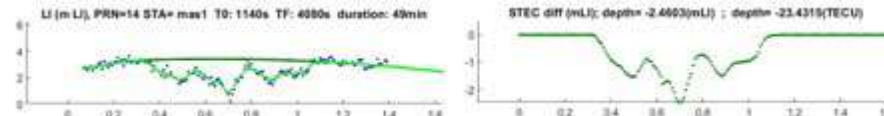
-hmF2 Model under quiet and disturbed conditions

Model of the response of the electron density peak hmF2 to geomagnetic storms in relation to local-time, season and conditions of the interplanetary magnetic field Blanch, E. and D. Altadill (2012)

<https://doi.org/10.1029/2012JA018009>



-Identification and specification of Plasma Depletions. Using GNSS receivers, estimation the horizontal drift velocity, the size of the disturbance assuming a flat wave



Blanch et al., (2018) <https://doi.org/10.1051/swsc/2018026>.



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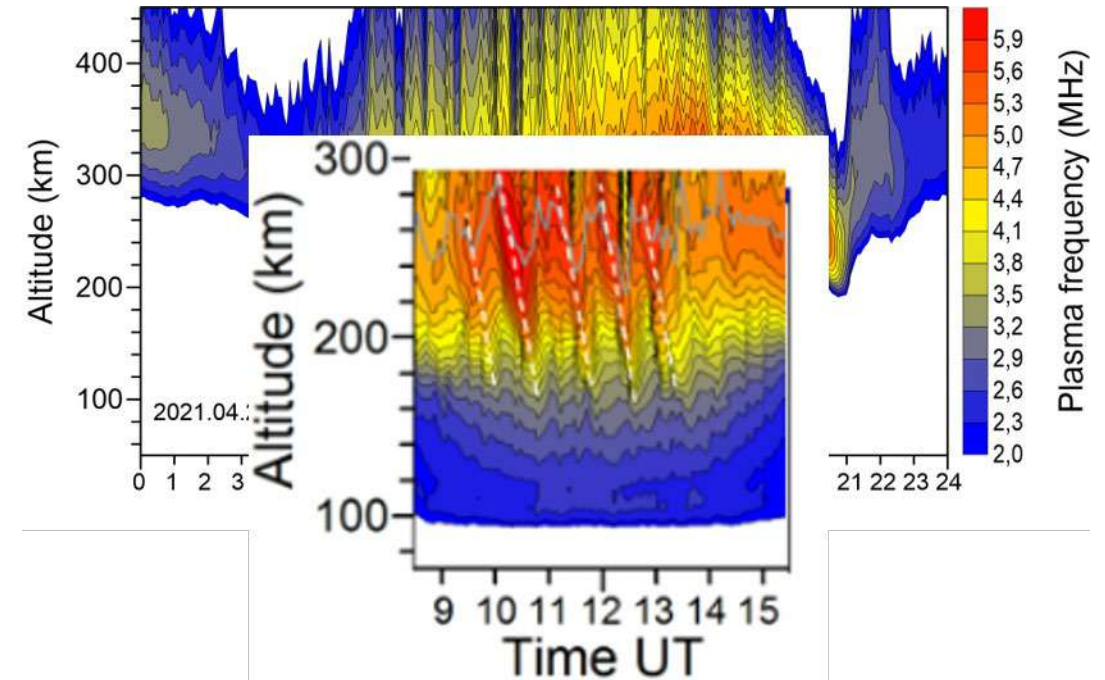


OE node is open to experiment analysis available

- Retrospective validations of the prototype warning system for monitoring and predicting ionospheric height disturbances related to severe SWe.
- Solar flare absorption effects on Ionograms.
- Characterization of LSTIDs over EU.
- Characterization of the Ionospheric tilts.
- Characterization of vertical propagation on ionospheric disturbances.
- Identification and specification of Plasma Depletions.
- Specific campaigns of DIGISODE soundings (NVIS, VIS, OIS)

Operation possibilities

- Scheduling and running specific campaigns onsite and bistatic





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If your project is selected for Access to OE node:

OE support offered:

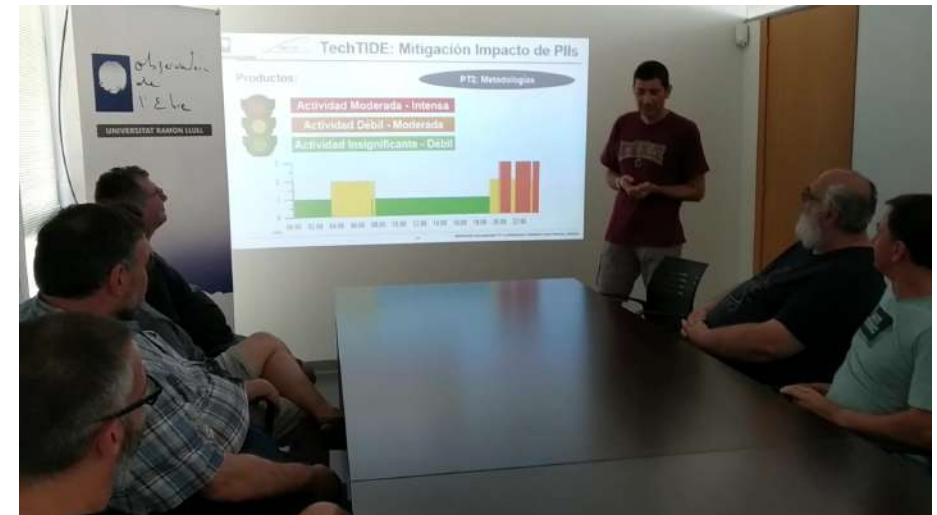
Hands-on access:

- Offering travel to the site and one week of accommodation
- Support at site for running experiments, analyzing, database searching, etc.
- Support from distance before and after the visit.
- Compile all user scientific reports and evaluations into an EU-report

Possibility for remote access:

- Data providing via ftp.
- Support for running experiments, analyzing, database searching, etc.
- Support from distance with regular videoconferences.
- Compile all user scientific reports and evaluations into an EU-report

Virtual access not currently available



TNA commitments:

- Present scientific results and findings in a report
- Write an evaluation of the Project experience.
- Specific data/products generated for the TNA might apply for one year embargo