



ID de Contribution: 23

Type: **Oral presentation**

Towards a better understanding of the D-layer of the ionosphere

jeudi 29 février 2024 10:15 (15 minutes)

The D-layer is the lowest layer of the Earth's ionosphere, situated between 60 and 90 km. It is also the least known, as it is both too high for balloons and too low for satellites. However, it is a highly variable layer, which is perturbed by a variety of external sources: the Sun, electron precipitations from the radiation belts, gamma rays from supernovae, lightning strokes... In the context of space weather, monitoring this layer is crucial, as it is responsible for the major part of HF absorption, which is a frequency band used by civil aviation.

The most powerful way to study the D-layer is by the means of waves in the range 15 –45 kHz (covering part of the VLF range, thereafter denoted VLF waves). They are man-made waves propagating in the Earth-ionosphere waveguide, propagating over long distances (thousands of kilometers). Thus, they can ensure a continuous survey of the D-layer of the ionosphere, especially over remote places such as oceans.

Any change in the D-layer electron density is a change of the Earth-ionosphere waveguide boundary. Therefore, the D-layer perturbations affect the propagation of the VLF waves. This occurs in particular for strong increases in the X-ray flux emitted by the Sun called solar flares, and which impact the entire dayside of the Earth.

In this talk, we will present the modelling of the propagation of the VLF waves from different transmitters to the receiver using a recent propagation code named Longwave Mode Propagator (LMP, (Gasdia & Marshall, 2021)). The result of this modelling will be compared to measurements in amplitude and phase from a VLF receiver situated in Nançay, in order to characterize the perturbations of the D-layer during solar flares.

Astrophysics Field

Not in the above

Day constraints

I can't be there on Wednesday, any other day is fine.

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Classification de Session: Session 5