



Space weather activities in Tunisia

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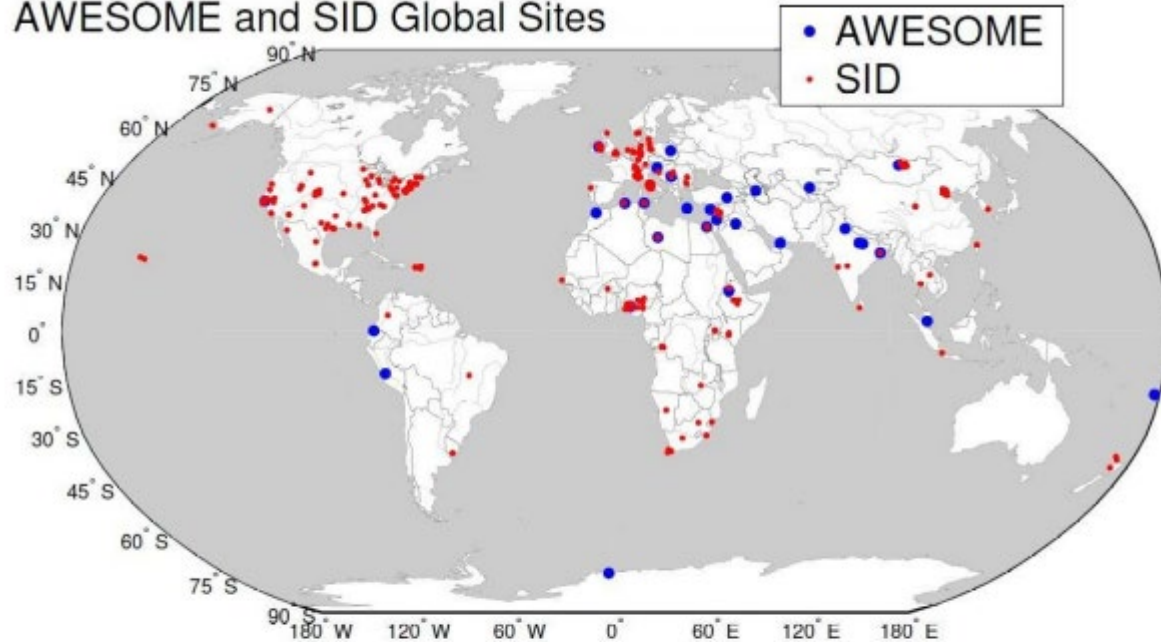
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I. ELF/VLF/LF receiving stations (3Hz-50 kHz)

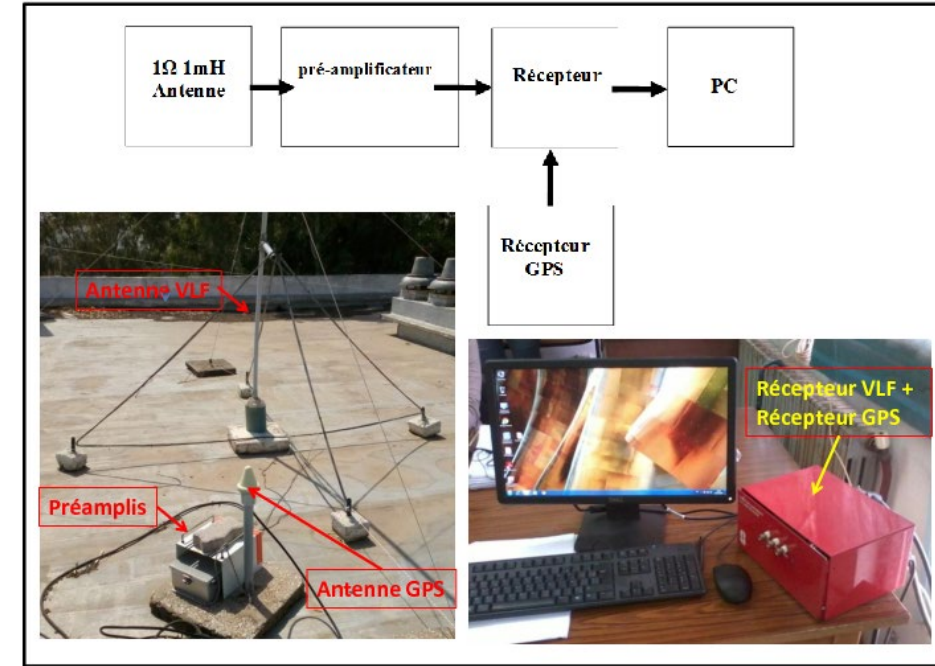
AWESOME and SID Global Sites



Georgia Institute of Technology

University of Colorado Denver

Stanford University



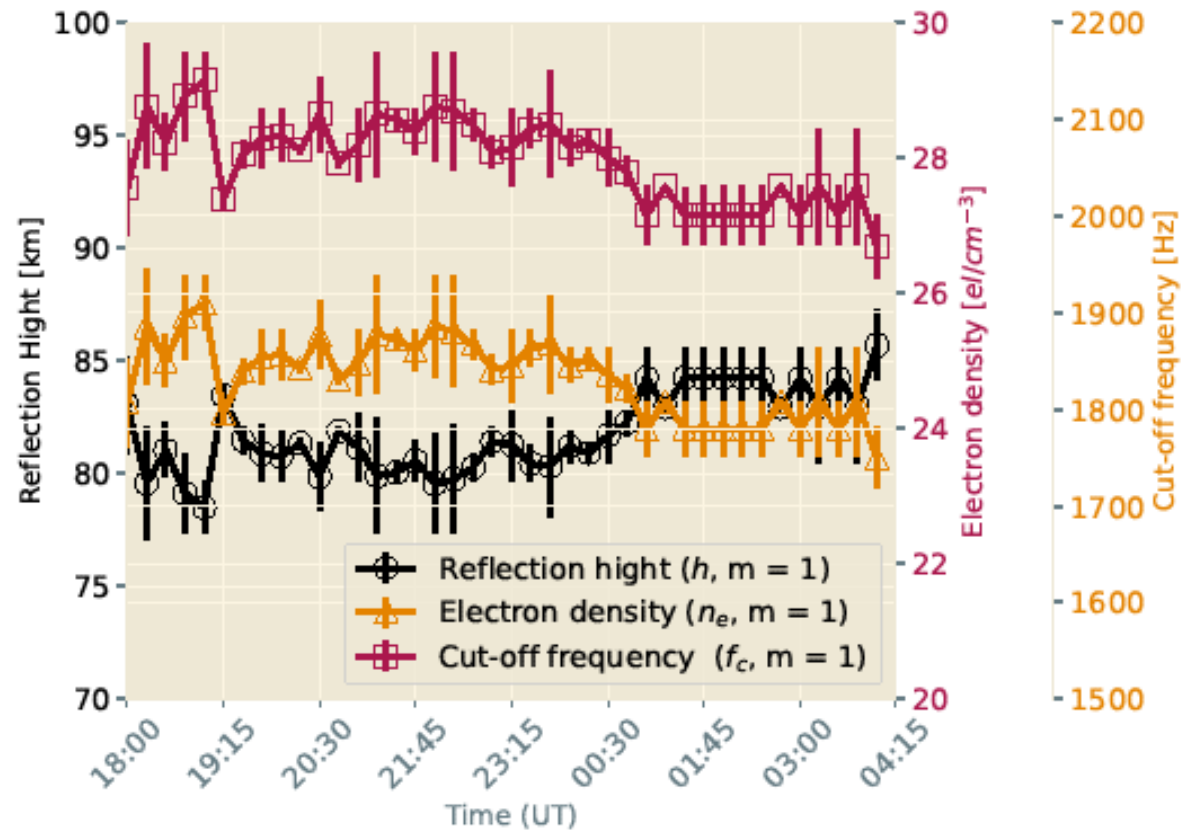
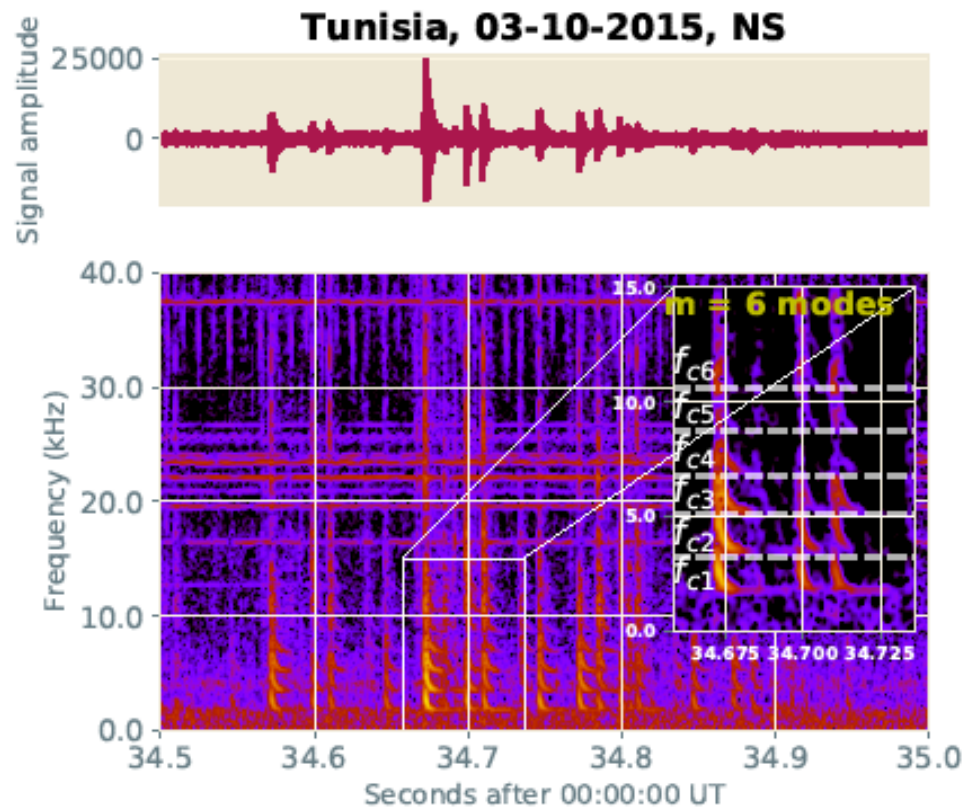
AWESOME (Atmospheric Weather Electromagnetic System for Observation Modeling and Education)

Acknowledgment :

Dr. Morris Cohen

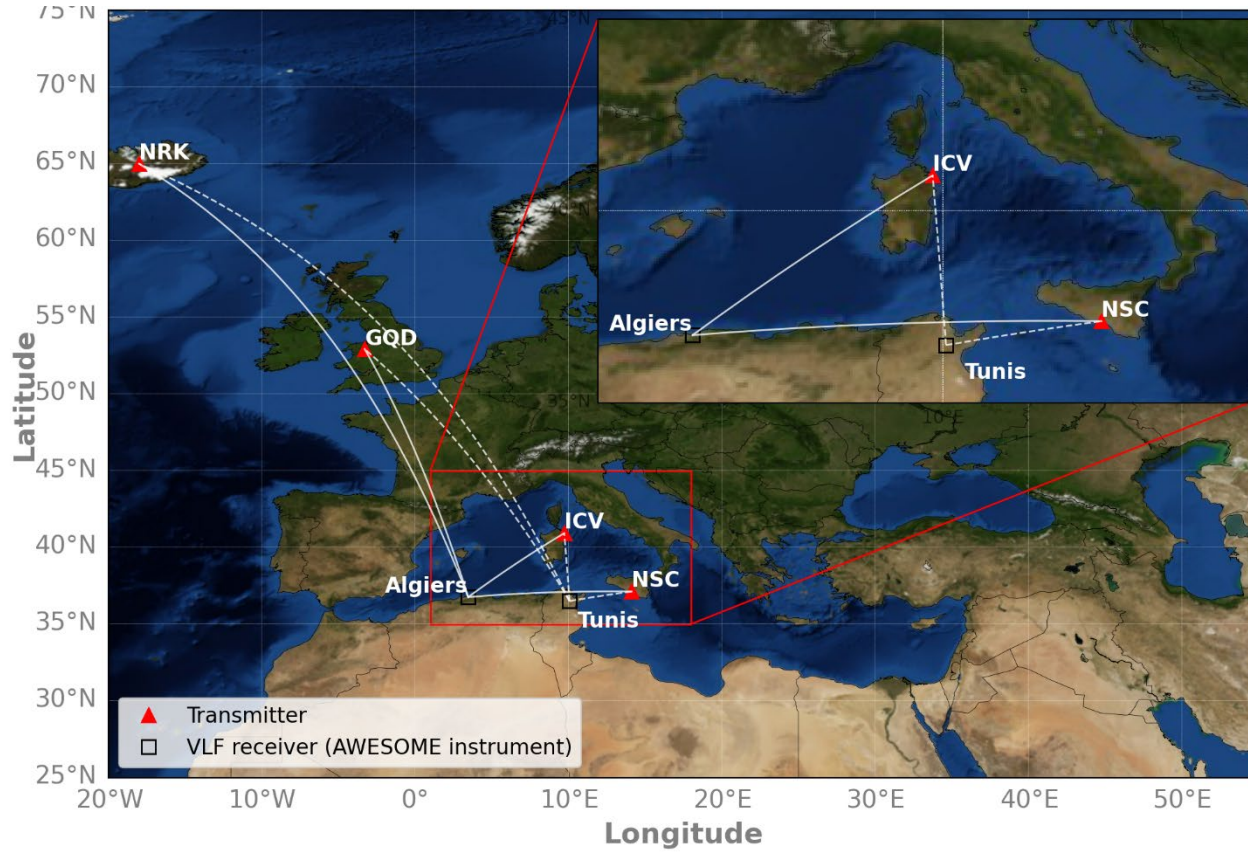
Georgia Institute of Technology

II. Observations

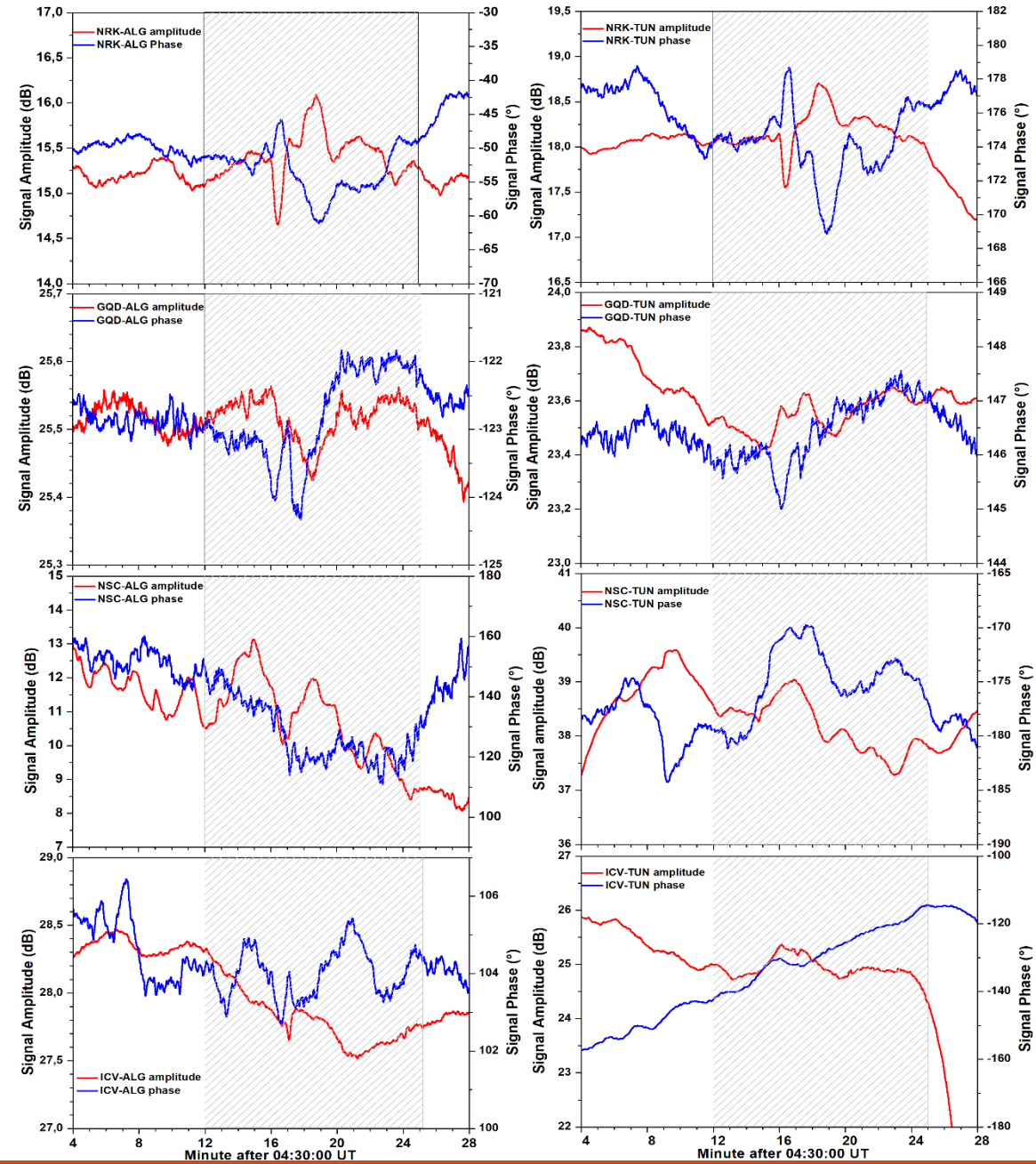


Ammar, A., & Ghalila, H. (2020). *Estimation of nighttime ionospheric D-region parameters using tweek atmospherics observed for the first time in the North African region*. *Advances in Space Research*, 66(11), 2528-2536.

II. Observations

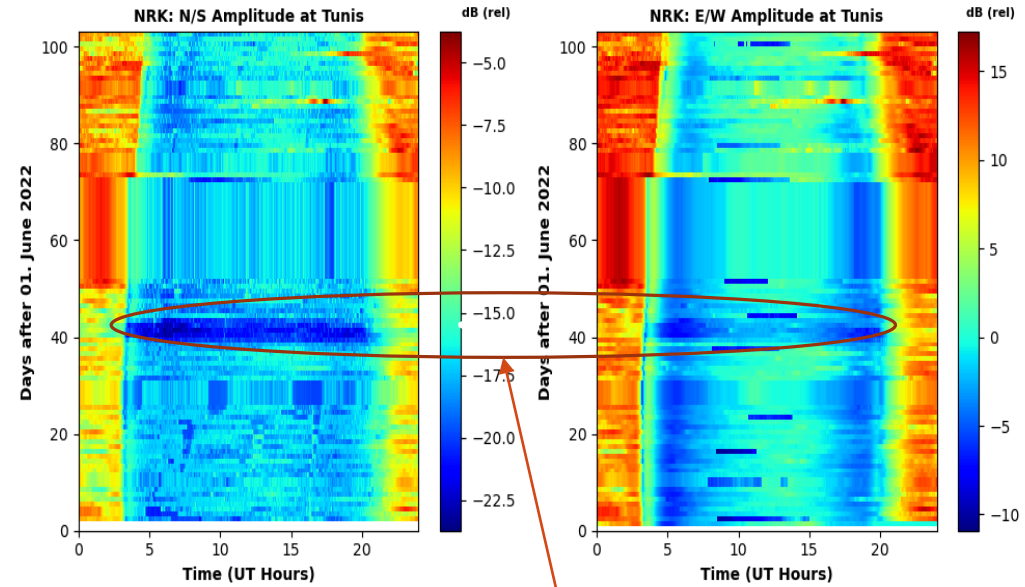
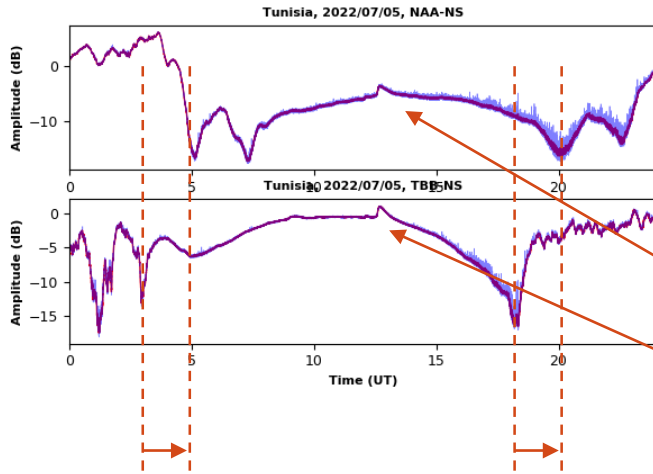


NaitAmor, S., Ikhlef, R., Ammar, A., & Ghalila, H. (2023). **Evidence of CME-Magnetospheric Shock Disturbance of the D-Region Observed in the VLF Signal.** *Journal of Geophysical Research: Space Physics*, 128(8), e2023JA031330.

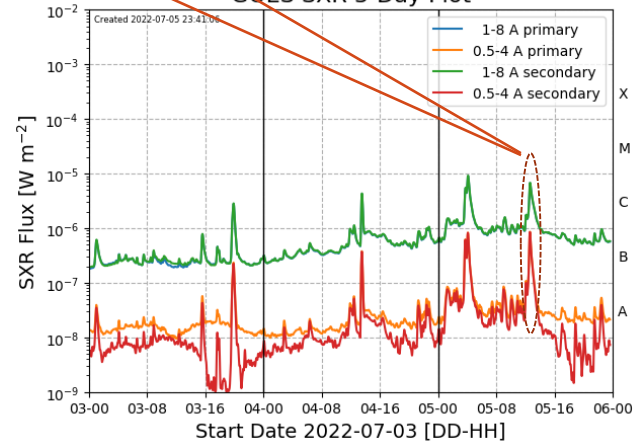


II. Observations

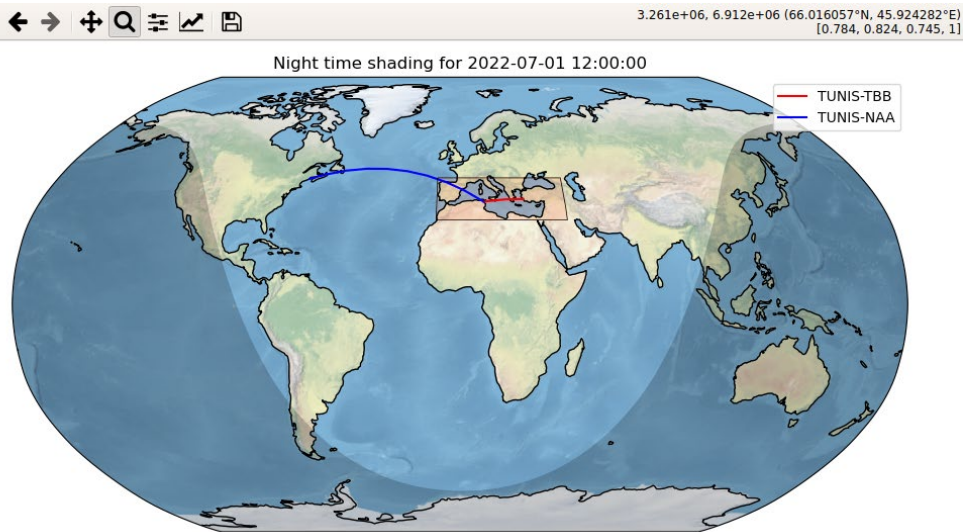
Effect of the solar flare on the terrestrial ionosphere



GOES SXR 3-Day Plot



Plot of Kp, Dst indices from 2022-07-01 to 2022-07-14



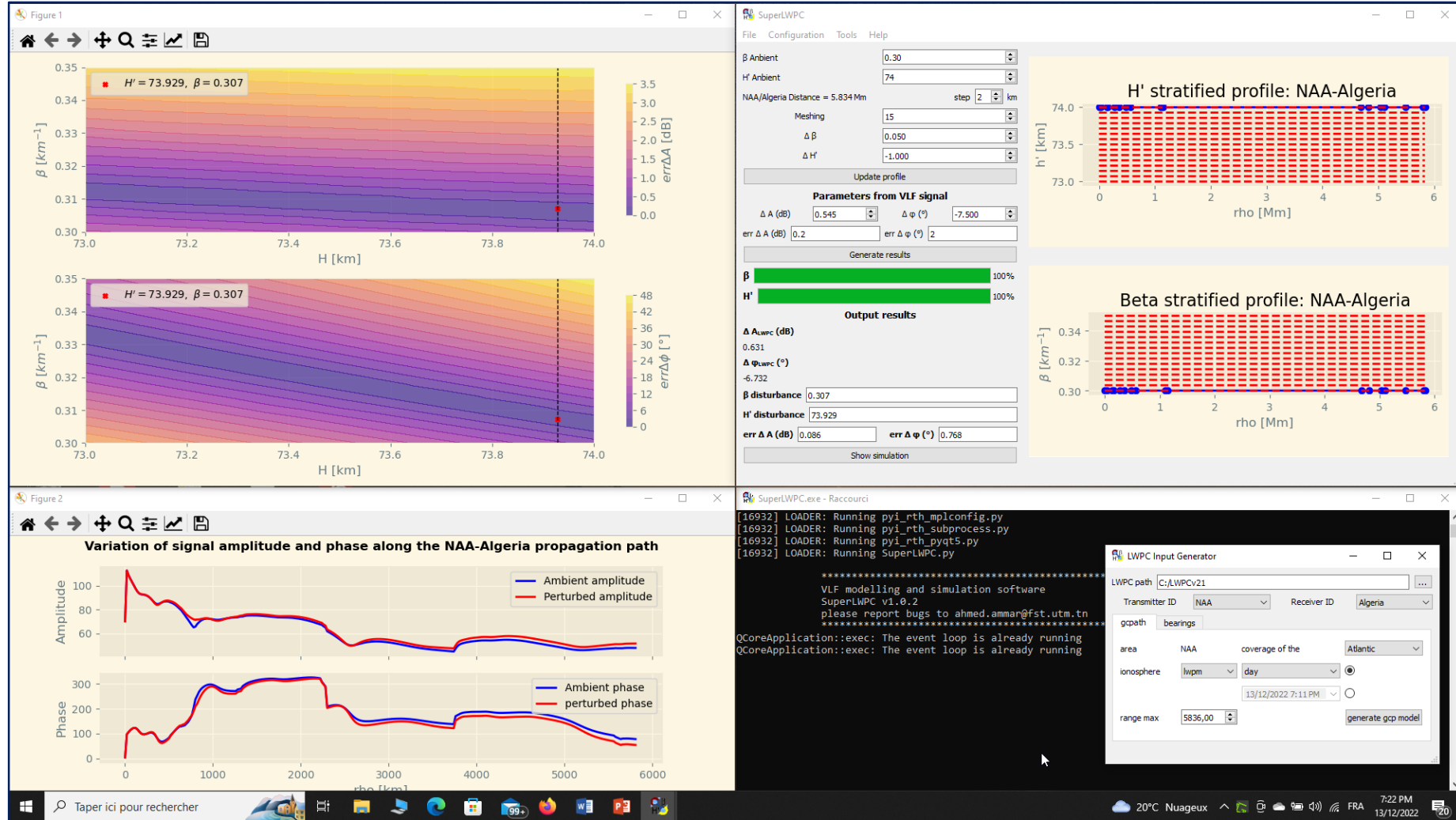
III. Modelling and Simulations (SuperLWPC)



Open Source software : [SuperLWPC](https://github.com/lwpc-gui/SuperLWPC) <https://github.com/lwpc-gui/SuperLWPC>

Numerical simulations are carried out to gain a quantitative understanding of the variations observed in the D region, and the results are discussed in the light of current knowledge of the effect of solar flares on this terrestrial ionospheric layer.

The determination of the coefficients H' and β is done **interactively** during which we seek **to minimize the deviation** between the measured ELF/VLF/LF signal perturbations and the **introduced model**.



III. Modelling and Simulations (SuperLWPC)



Open Source software : [SuperLWPC](https://github.com/lwpc-gui/SuperLWPC) <https://github.com/lwpc-gui/SuperLWPC>

The screenshot shows the Zenodo website interface. At the top, there is a search bar with "superlwpc" entered. Below the search bar, there are filters for "All versions", "Access Right" (Open (1)), "File Type" (Zip (1)), and "Type" (Software (1)). The main content area displays a search result for "SuperLWPC" with a version of "December 19, 2022 (1.0.3)". The authors listed are Ammar, Ahmed; and Ghalila, Hassen;. A description follows: "The LWPCv21 code is a set of programs that can be used according to the user's needs. The determination of the coefficients H' and β is done interactively during which we seek to minimize the deviation between the measured ELF/VLF/LF signal perturbations and the introduced model. This proce". It also notes the upload date as December 26, 2022. At the bottom, there are navigation links for About, Blog, Help, Developers, and Contribute, along with logos for CERN, OpenAIRE, and the European Union.

The screenshot shows the GitHub repository page for "lwpc-gui / SuperLWPC". The repository is public and has 0 forks and 0 stars. The main content area shows a file tree with the following files and their commit dates: assets (update release 1.0.2, 2 months ago), config (update release 1.0.2, 2 months ago), gui (update release 1.0.2, 2 months ago), lwpcv21_linux (update release 1.0.2, 2 months ago), lwpcv21_win (update release 1.0.2, 2 months ago), .gitignore (Initial commit, 2 months ago), CITATION.cff (Update CITATION.cff, 2 months ago), Data_Loader.py (first release, 2 months ago), LICENSE (Initial commit, 2 months ago), and README.md (Update README.md, 2 months ago). On the right side, there is an "About" section with a description: "Graphical user interface of the LWPC code for investigating ionospheric D-region parameters." and a list of tags: gui, pyqt5, ionosphere, space-physics, vif, lwpc. There are also links for Readme, MIT license, Cite this repository, 0 stars, 1 watching, and 0 forks. At the bottom, there is a "Releases" section with a link to the latest release, v1.0.3.

THANK YOU!