[DeepLIM: Deep Learning for Inversion Models](#)

Description

The DeepLIM study has two technical goals:

- understanding, developing and exploiting the use of Generative Artificial Intelligence to improve and augment datasets acquired via observation campaigns, or generated by computationally intensive models.
- improving the state of the art models that are in use to perform Inversion Modelling with the use of Deep Learning algorithms.

These technologies are explored with the idea of improving the state of the art approach in Inversion Modelling, and in Data Acquisition campaigns. In particular, two major benefits are expected from the proposed activity:

- Improvement of data acquisition campaign for simulation and algorithm development
- Cost reduction due to the lower amount of real data required for inversion models training.

The study focuses on two use cases:

- Thermal-Infrared Remote Sensing, where inversion models are used to estimate ground-based information from satellite measurements of the top and bottom of the atmosphere. In this Use Case, Deep Learning is explored to extend and improve the dataset available, and to substitute non-Deep Learning models to perform inversion.
- Vertical Total Electron Component maps, where the augmentation of the dataset with Deep Learning is explored.

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