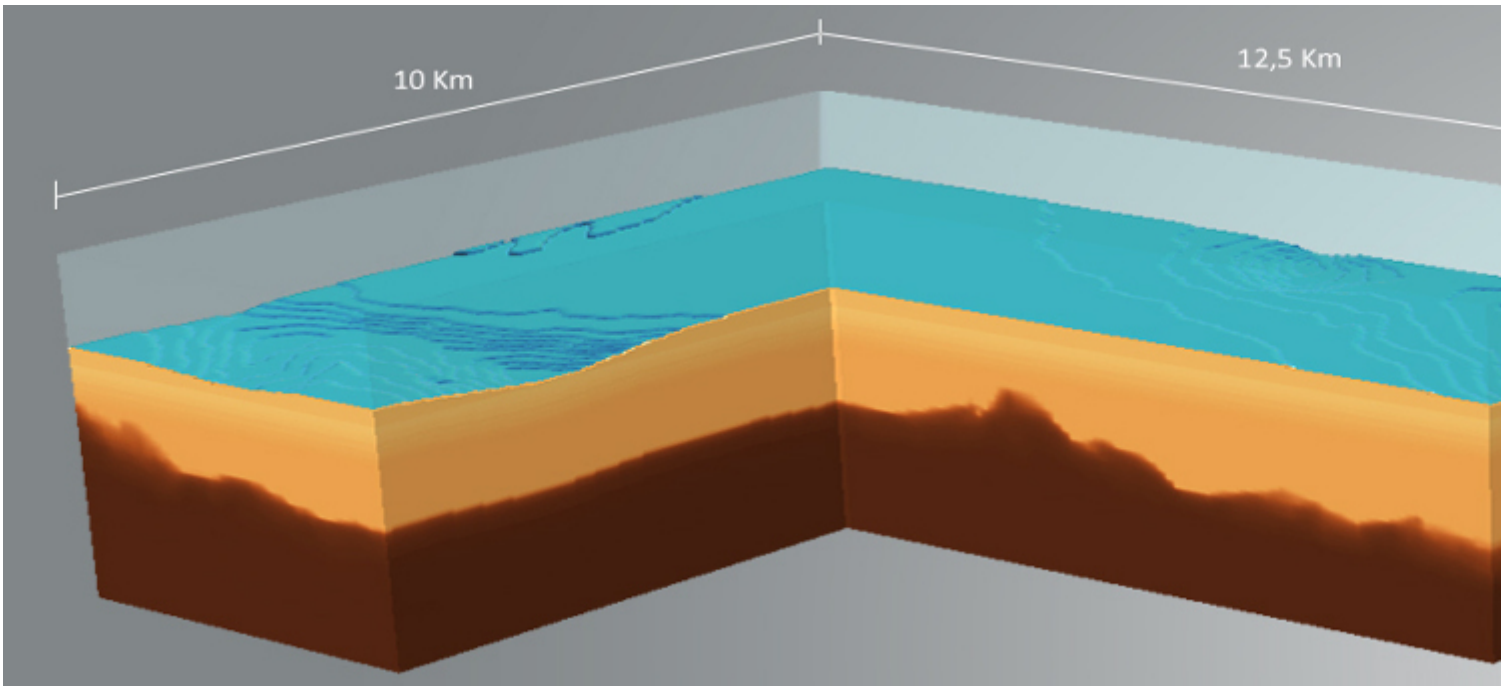
# Electromagnetic Modeling and Inversion




Electromagnetic methods are able to detect the presence of fluids at great depths under the Earth surface. This is a great complement to more traditional seismic methods, that are sensitive to the structure of the underground, providing a better understanding of the Earth internals.

## Summary

Geophysical exploration methods aim to determine various physical properties both in the shallow and deep interior of the Earth. Electromagnetic tools are applied in different areas of geophysics such as hydrocarbon and mineral exploration, geothermal reservoir monitoring, CO2 storage imaging among others. These techniques utilize low-frequency electromagnetic energy to map variations in the subsurface electrical conductivity and characterize the geological structure at depths ranging from a few meters to tens of kilometers. The modeling and inversion of the three-dimensional data requires large computational resources making the use of high performance computing absolutely necessary.

## Objectives

- Development and support of the parallel finite-difference code for 3D electromagnetic modeling and inversion
- Integration of the transverse anisotropic modeling kernel into inversion framework

- Development of a general anisotropic kernel for forward modeling
- Applications of the code to various types of real data
- Integration of the electromagnetic modeling and inversion tools with the seismic framework

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