EGeo Services SAS
Geoscience consulting solution
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Geolinks SAS software

2D ray tracing for feasibility surveys

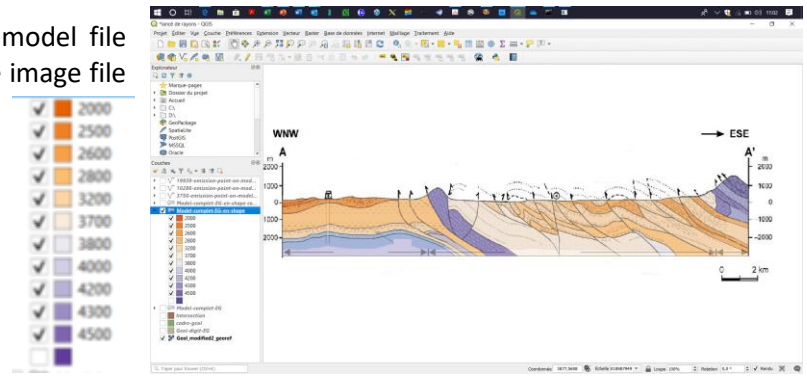
A simple way of modelling with Geolinks-raypath software

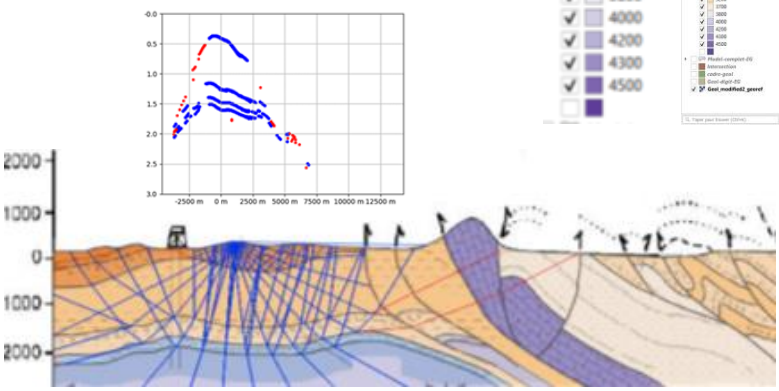
At the feasibility stage, it is very often the case that the knowledge of the geology is very limited, coming from old 2D lines interpretation, some borehole data and academic works.

In the feasibility surveys, it is sometime requested to simulate the seismic waves propagation by using ray tracing softwares using the 2D/3D models obtained from historical work on the area.

The main purpose is to confirm if the contractual spread length for the new acquisition is offering enough long offsets to capture all the rays outcoming. Another reason could be to model the impact of potential multiples at the target level. In that case the resulting reflections amplitudes have to be modelled as well and would justify the use of a wave equation modeling software as Tesseral. A third reason would be to address the effect of lateral events reflections on the seismic section. In that case the initial modem has to be 3D and will not be reliable and effective if based only on 2D seismic sections.

The input could be a standard geological model file format or it can be digitalized from a simple image file as .gif, .jpg…





Due to the limited accuracy if the initial model, there is at this stage no need for sophisticated software's modelling ahead of the basic P waves.

In the example below, the model was drawn form a seismic section and manually digitalized form a .gif file and converted into a suitable model for ray-path. A single Source point is presented here in the middle of the section allowing at this position to check the matching between theoretical spread (4000m offset) and observed first refraction arrivals (red dots). Additionally, first break and position of the GR allow some more analysis.