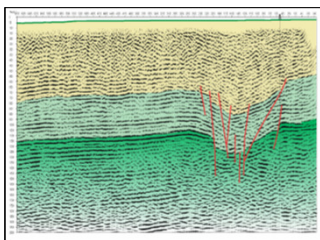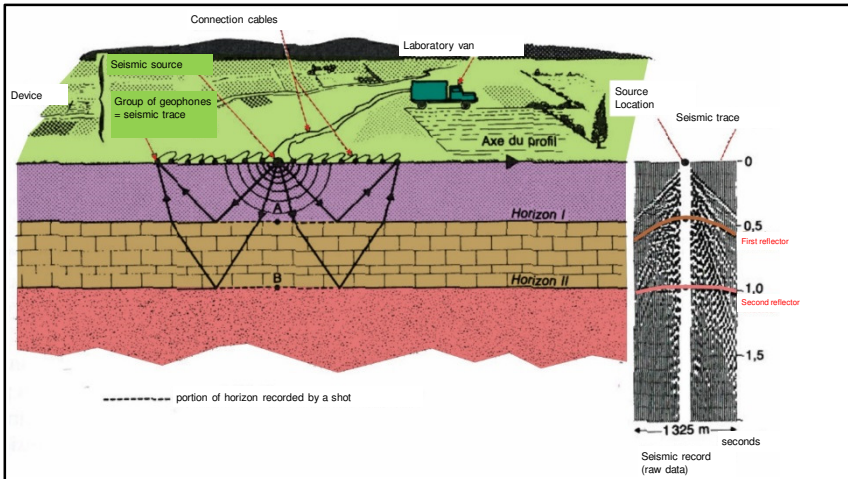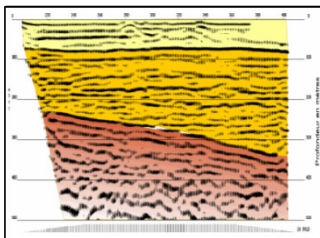# HIGH RESOLUTION SEISMIC REFLECTION

AGAP sheet 92.1 SIS 11 et SIS 12

1

2

3

The method of seismic reflection allows the structure of the subsurface to be determined by analysing the "reflectors" vertically from the point of origin of the waves.

Applications
- Geology
- Deposits, quarries
- Hydrology

A shock is created (dropped weight, explosion, vibrating truck), which generates a seismic wave that is reflected by the surfaces of discontinuity (geological boundaries or heterogeneous areas within a rock). Seismometer sensors - geophones on land, hydrophones in aquatic environments - are placed at the surface near the point of emission to detect the waves that rise to the surface. After each measurement, the shock point and sensors are moved. The data collected is the return times of the waves ("double time") that depend on the speed of these waves traversing different rocks.

The treatment comprises:
- Data pre-processing (geometric setting, qualitative analysis, filter, gain)
- Sorting the data into a common depth point (CDP) and establishing a velocity model
- Applying NMO geometric corrections (Normal Move-Out)
- Horizontal summing (Stack)
- Post-stack processing (filter, gain, deconvolution, migration, residual static)
- Time - Depth Conversion

The results obtained after treatment are presented in the form of a 2D section 'distance / double time' converted into a section 'distance / depth' with a velocity model and / or with a calibration (geological section).

Legend
1. Sketch of the principle and seismic laboratory in operation
2. Seismic profile with a treatment by migration
3. Distance/depth section

Key figures
- Depth of investigation from 0 to 1000m, depending on the geology of the site, the length of the measuring device and the seismic source

SDG Equipment
- Seismographs (Geometrics / Seismic Source)
- 96 geophones
- Multiconnector cables with receivers spaced 1 to 10m

- Seismic source: mass, dropped weight (PEG40), explosives