


جامعة أبو بكر بلقايد
كلية التكنولوجيا
UNIVERSITY OF TLEMCEN
Faculty of Technology



Department of
Civil Engineering

CHAPTER 5
Adaptation of Geological Techniques to Civil
Engineering Needs

Presented by
Prof. Habib TROUZINE

Tlemcen, December 2024

Chapter 5: Adaptation of geological techniques to the needs of civil engineering (3 weeks)

- 5.1 Geological mapping
- 5.2 The use of graphic constructions
- 5.3 Geological survey of discontinuity surfaces
- 5.4 Use of stereographic projection


MAPPING

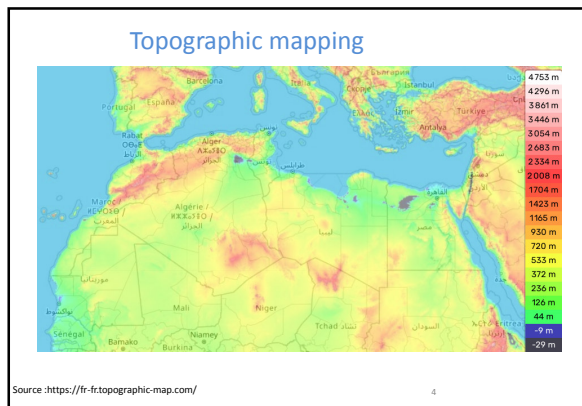
the activity or process of making a map:

the mapping of underground sites

A GPS device uses mapping software to help drivers navigate.

a polar mapping expedition

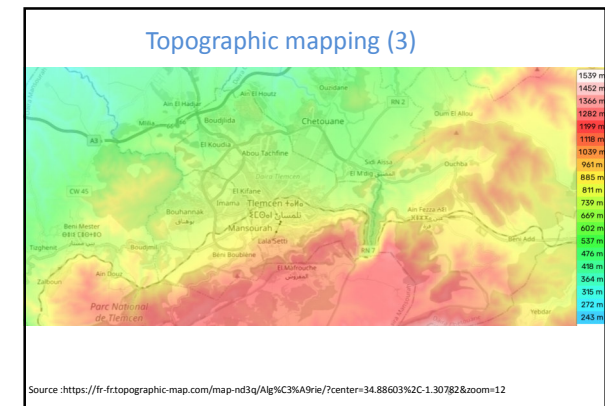
Source :  Cambridge Dictionary



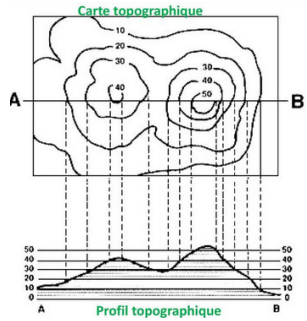
Topographic mapping (2)

A topographic map is a reduced-scale map representing the relief determined by altimetry and human developments of a geographic region in a precise and detailed manner on a horizontal plane.

Source : <https://>



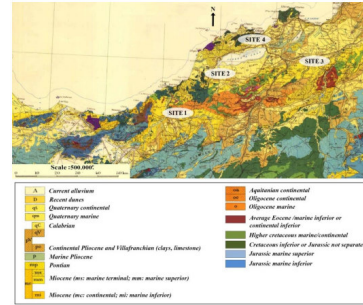
Topographic Map & Profile



The equidistance is the difference in altitude between two successive contour lines. It remains constant for the entire map.

Contour lines are used to represent relief on topographic maps.

Geological mapping (1)



Geological mapping (2)

A geological map is a topographic map on which geological information at the outcrop is superimposed.

Geologic informations are represented by a color code and specific signs.

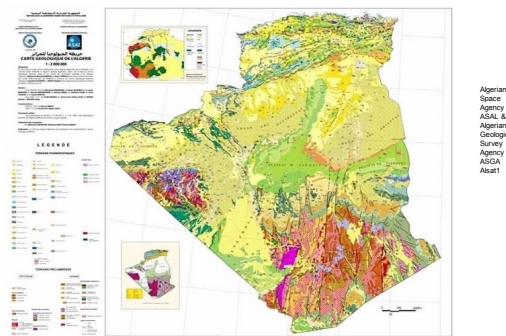
Geological mapping (3)

A geological map provides information about the **rock layers** which are found on the surface of the earth's crust.

Geological formations are evaluated according to:

- ✓ Their composition (lithology)
- ✓ their age (stratigraphy)
- ✓ their structural (tectonic) position

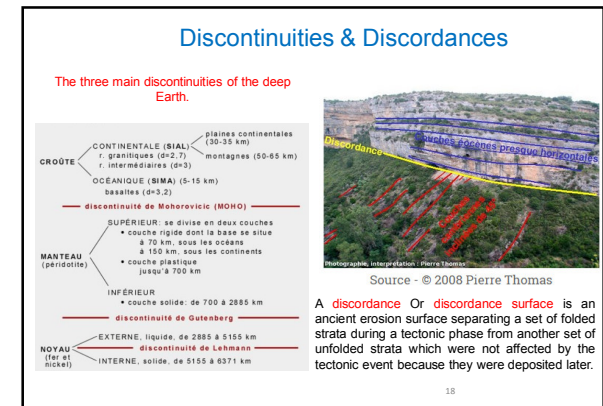
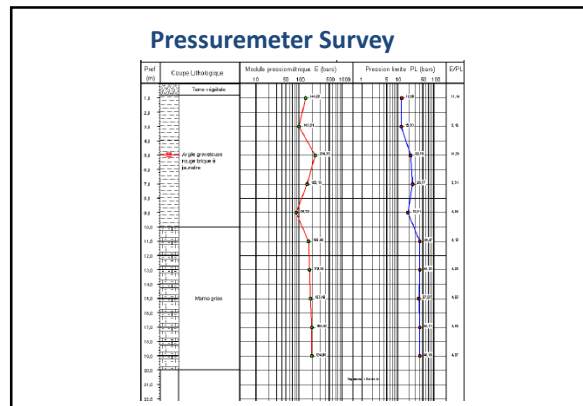
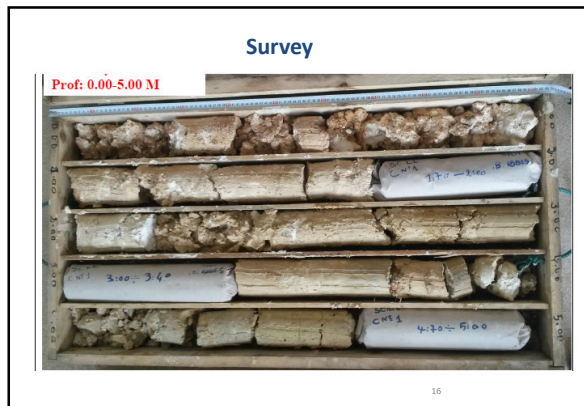
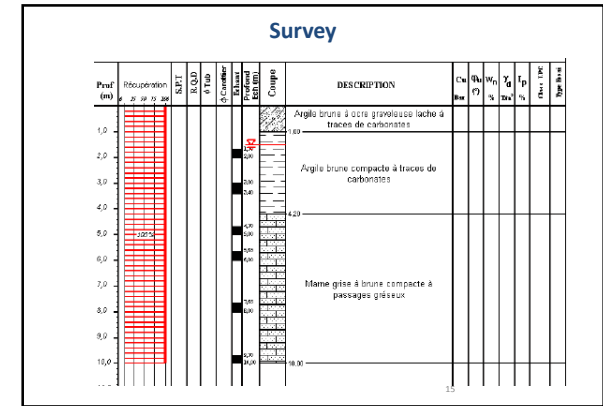
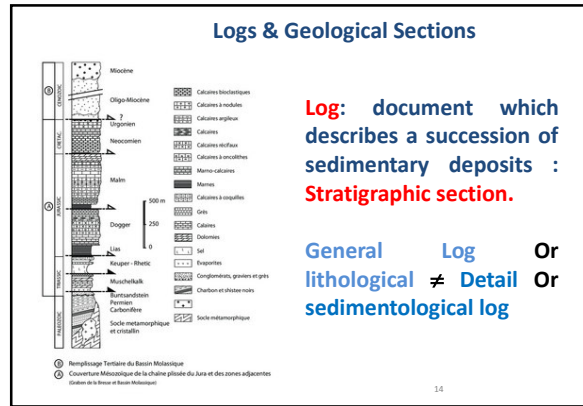
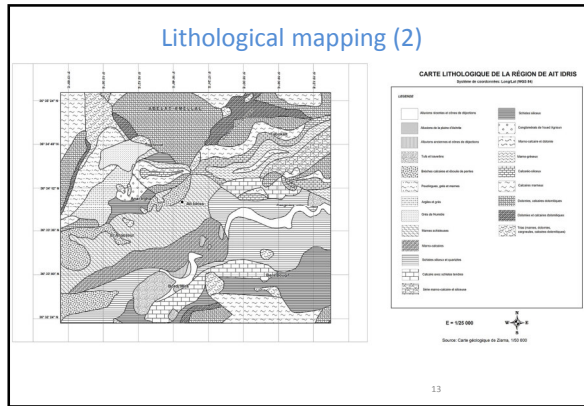
Mapgeological of Algeria to 1/2,000,000th



Lithological mapping

The lithological map is a map that represents the nature of rock formations flush of a given region, "clays, marls, limestones, clayey limestone, etc."; it is used to better understand the geodynamics of the region in question.

Shedoes not contain any color, but only conventional figures expressing the lithology.



Earthworks

Earthworks : work of moving large quantities of materials (soils, rocks, etc...).

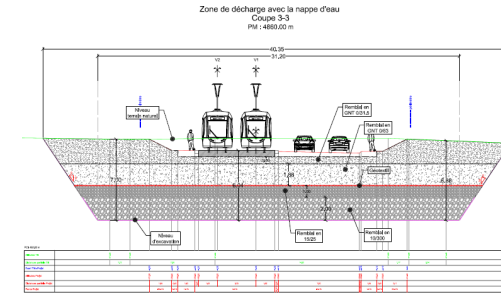
The reworking of natural land leads to a generally definitive modification of the topography and landscape, by creating earthworks either in fill or in excavation.

19

Earthworks



GENERAL GEOLOGICAL DESCRIPTION OF A LINEAR PROJECT (1) _ Case of the SBA Tram project



Source: LTPO for EGIS RAIL (2012) Geotechnical study report Project: SIDI-BEL-ABBES TRAMWAY (PLATFORM)

GENERAL GEOLOGICAL DESCRIPTION OF A LINEAR PROJECT ROUTE (2) _ Case of the SBA Tram project

The route runs through mostly flat terrain. The subsoil is composed of Quaternary to modern formations resting on alternations silicon- Miocene clastics.

It generally has a layer of asphalt (sometimes with a concrete slab) which covers heterogeneous embankments of variable thickness. Under the embankments (including the thicknesses of the layers constituting the body of the roadway), the ground consists of deposits channeled of alluvial origin, formed of conglomerate (mature or immature), sands, sandy clays and clays.

These Quaternary formations overlie a thick Miocene folded alternation composed of massive red sandstones and greenish marls.

Source: LTPO for EGIS RAIL (2012) Geotechnical study report Project: SIDI-BEL-ABBES TRAMWAY (PLATFORM)

22

GENERAL GEOLOGICAL DESCRIPTION OF A LINEAR PROJECT (3) _ Case of the SBA Tram project

The core drillings, from SC.1 to SC.5, showed that the route intersects a layer of asphalt which tops embankments (from 0 to 3 m thick including the road body) and alluvial formations formed of clays and sandy clays with layered pebbles.channeled. These latter increase in thickness at the level of the SC.1 survey.

Source: LTPO for EGIS RAIL (2012) Geotechnical study report Project: SIDI-BEL-ABBES TRAMWAY (PLATFORM)

Geological report: Case of the detailed preliminary design of the crest dam of Tabia(1)

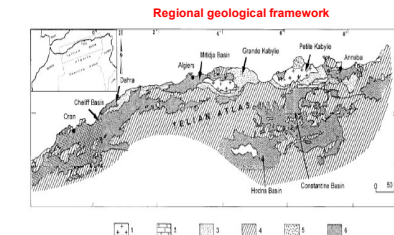


Figure 3.1: carte géologique de l'Atlas tellien (d'après M. Meghraoui)
Paléocène (2) Jurassique (3) Flyschs crétaéo-Oligocène (4) Jurassique et Crétaéo Tellien (5) Volcanisme néogène (6) Bassins néogènes et quaternaires

Source: STUCKY – ENHYD (2006) Geological and geotechnical study of the APD of the dam of Tabia

Stereographic projection

Plans, Modeling, Simulation, Meshing

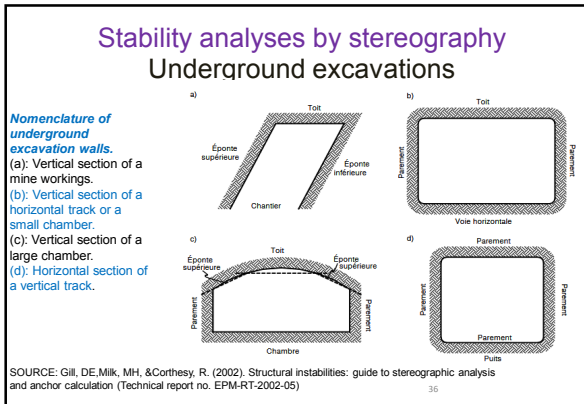
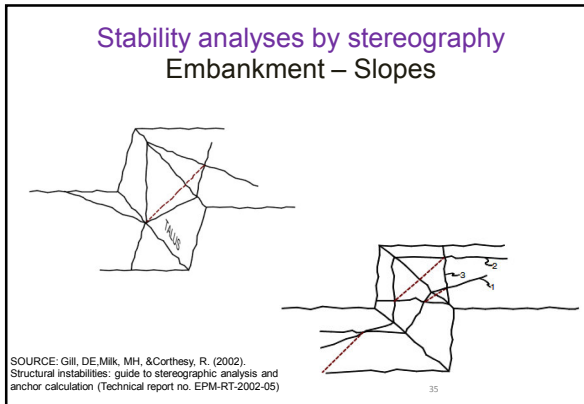
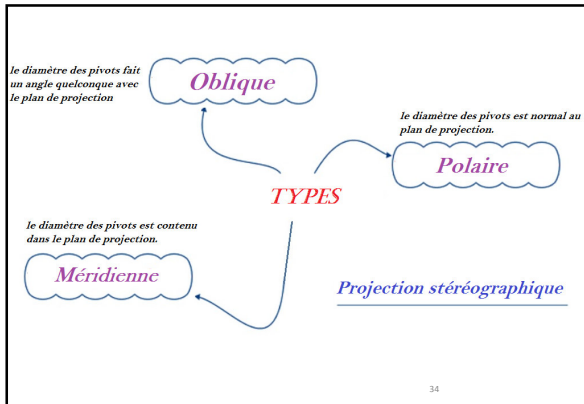
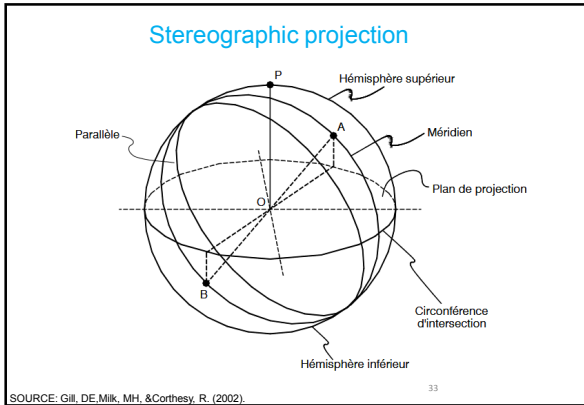
31

Stereographic projection

STEREOGRAPHY, is the art of drawing the shape or figure of solids on a plane.

PROJECTION, representation of any surface element on another surface.

32



MERCI
pour votre attention
Avez-vous
des questions ?

End of program (5 chapters), Dec 2024
Prof. Habib TROUZINE (h_trouzine@yahoo.fr)