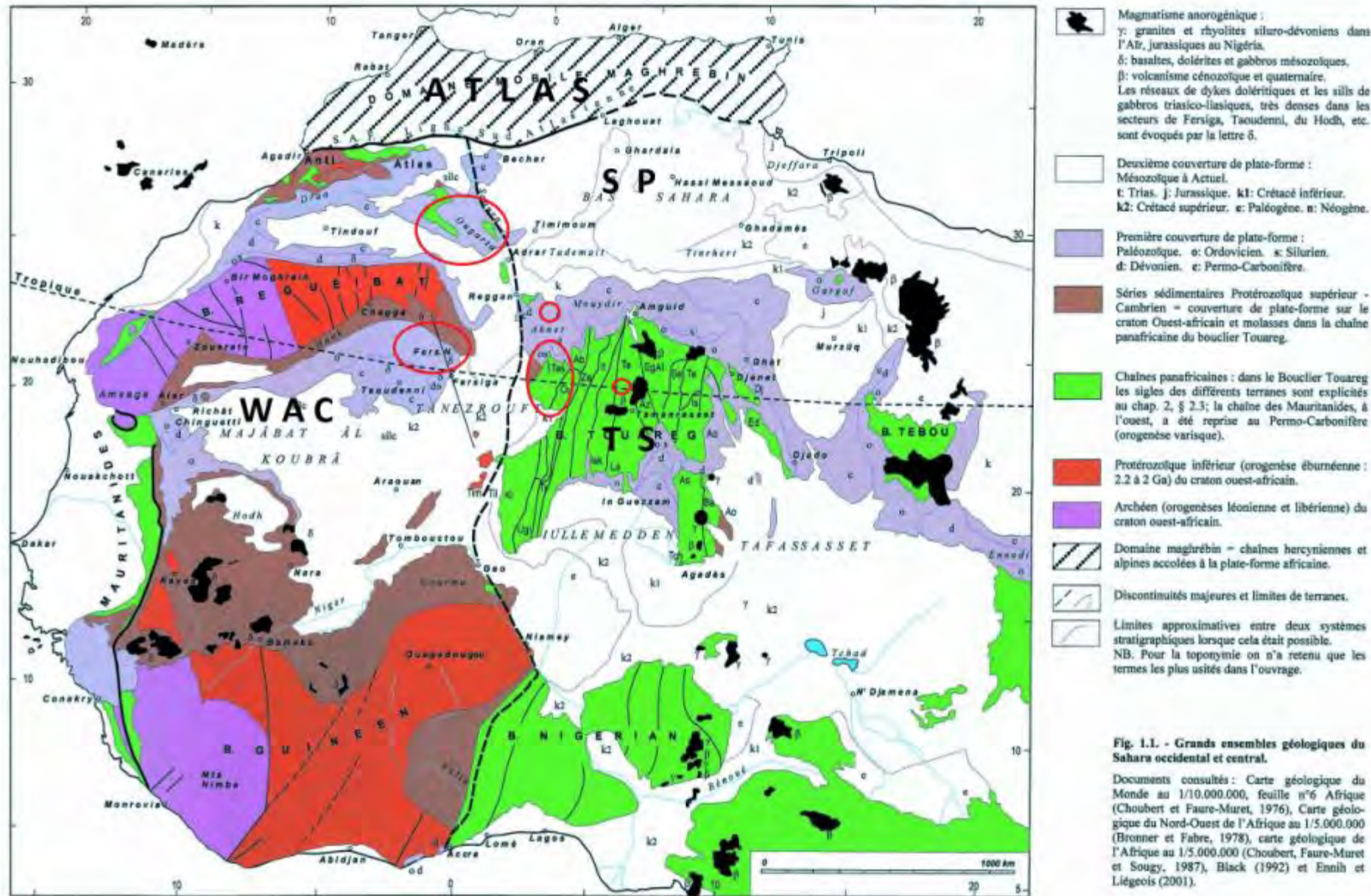


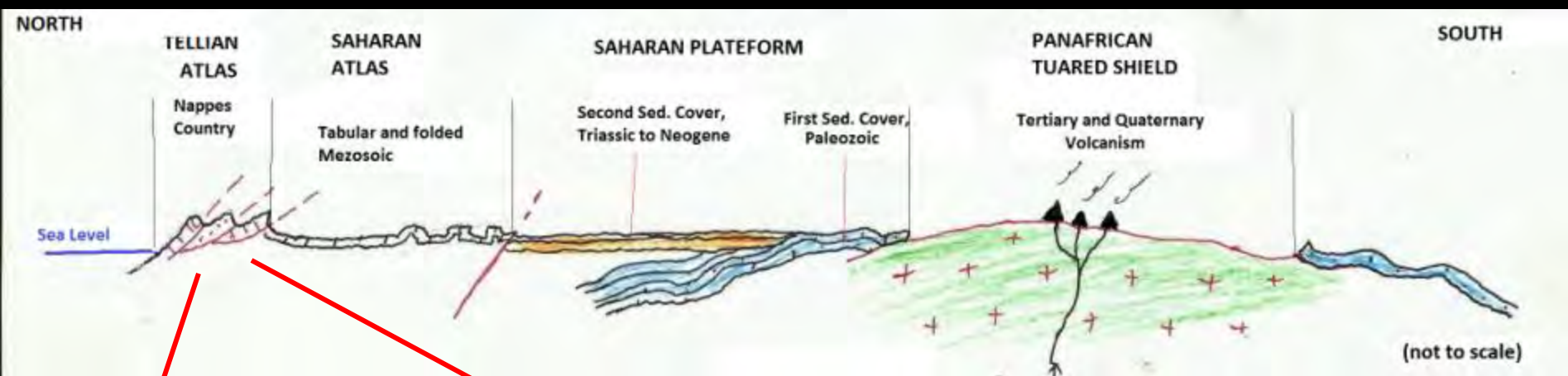
SAHARAN GEOLOGY



By Dr Ali Ait-Kaci,
AGM of the Geological Society of Zimbabwe
24th of February 2017

OUTLINE of the Geology of North Western AFRICA

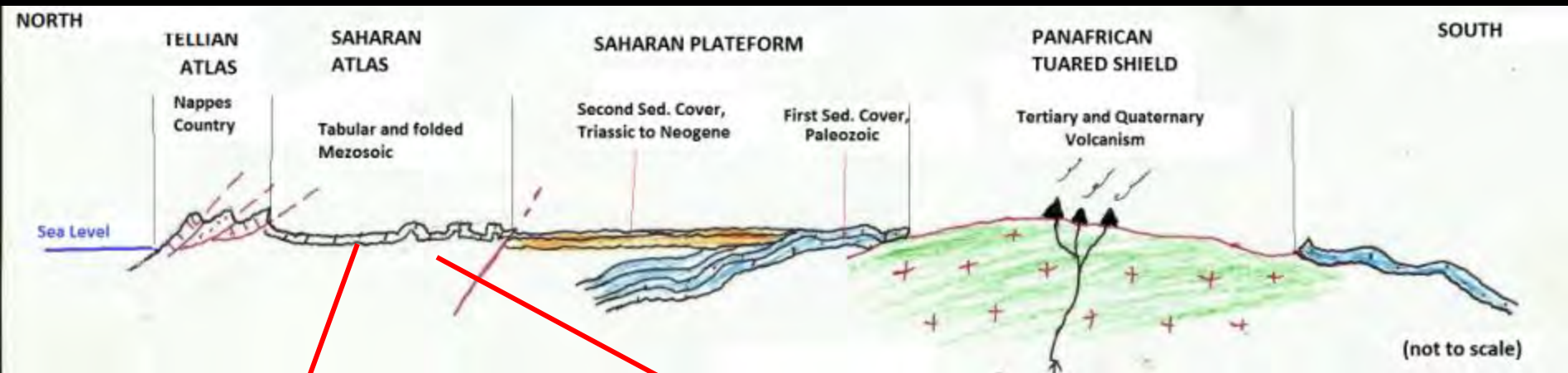




Djebel Djurdjura



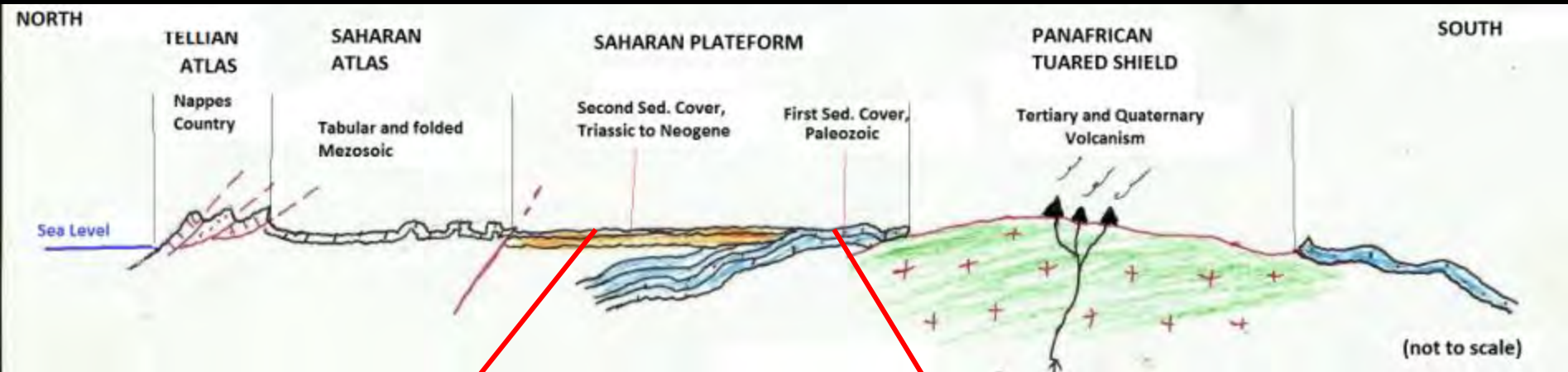
Laarba des Ouacifs



Cenomano-Turonian, Bou Saada



Active diapir, Djelfa (1984)



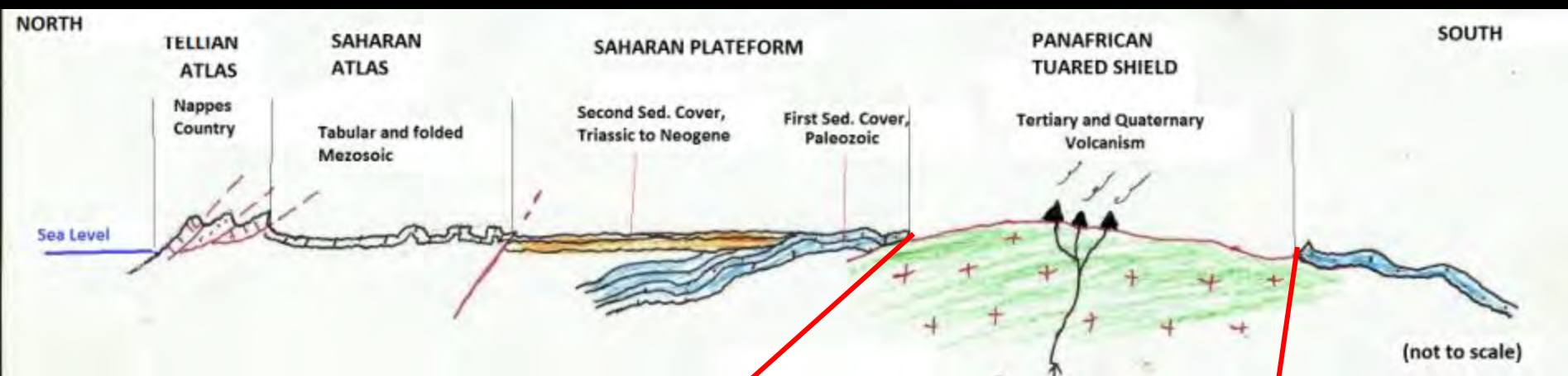
Cretaceous, Ghardaia



Ordovician, Amguid Guelta (1983)



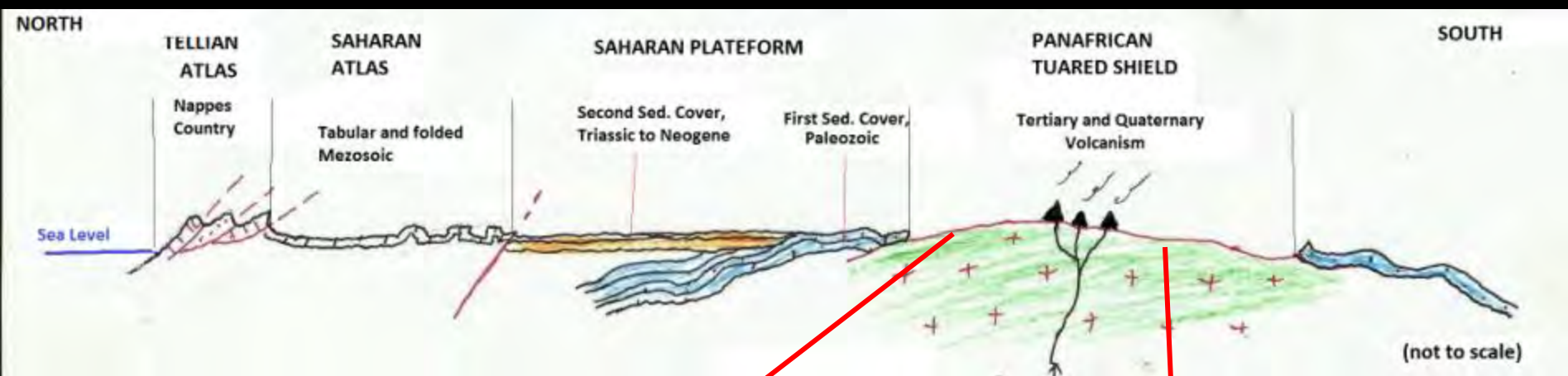
Devonian, Mouydir (1985)



Adrad Ahnet (1984)



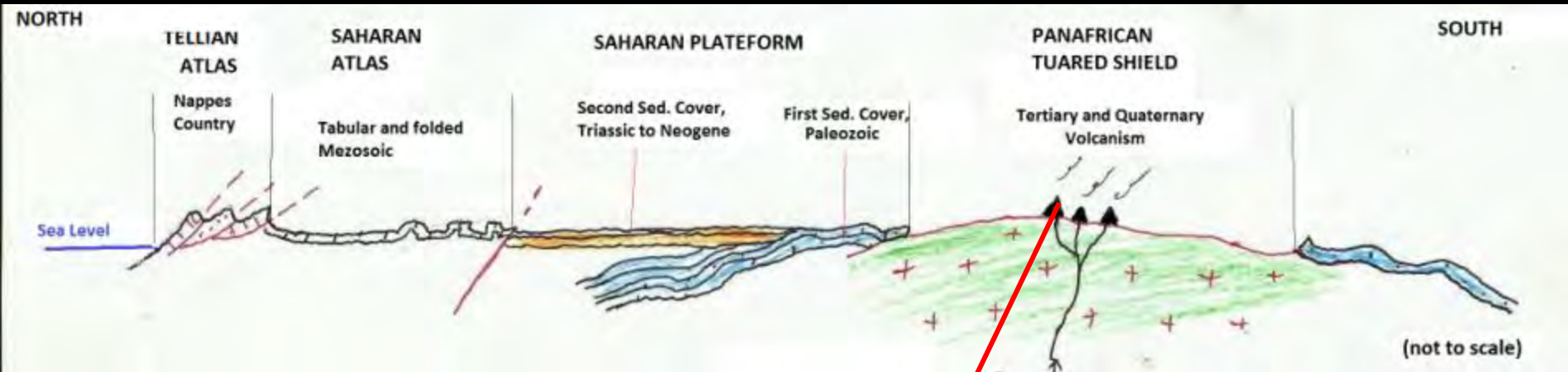
Tassili des Ajjers



Quartzites de l'Ahnet



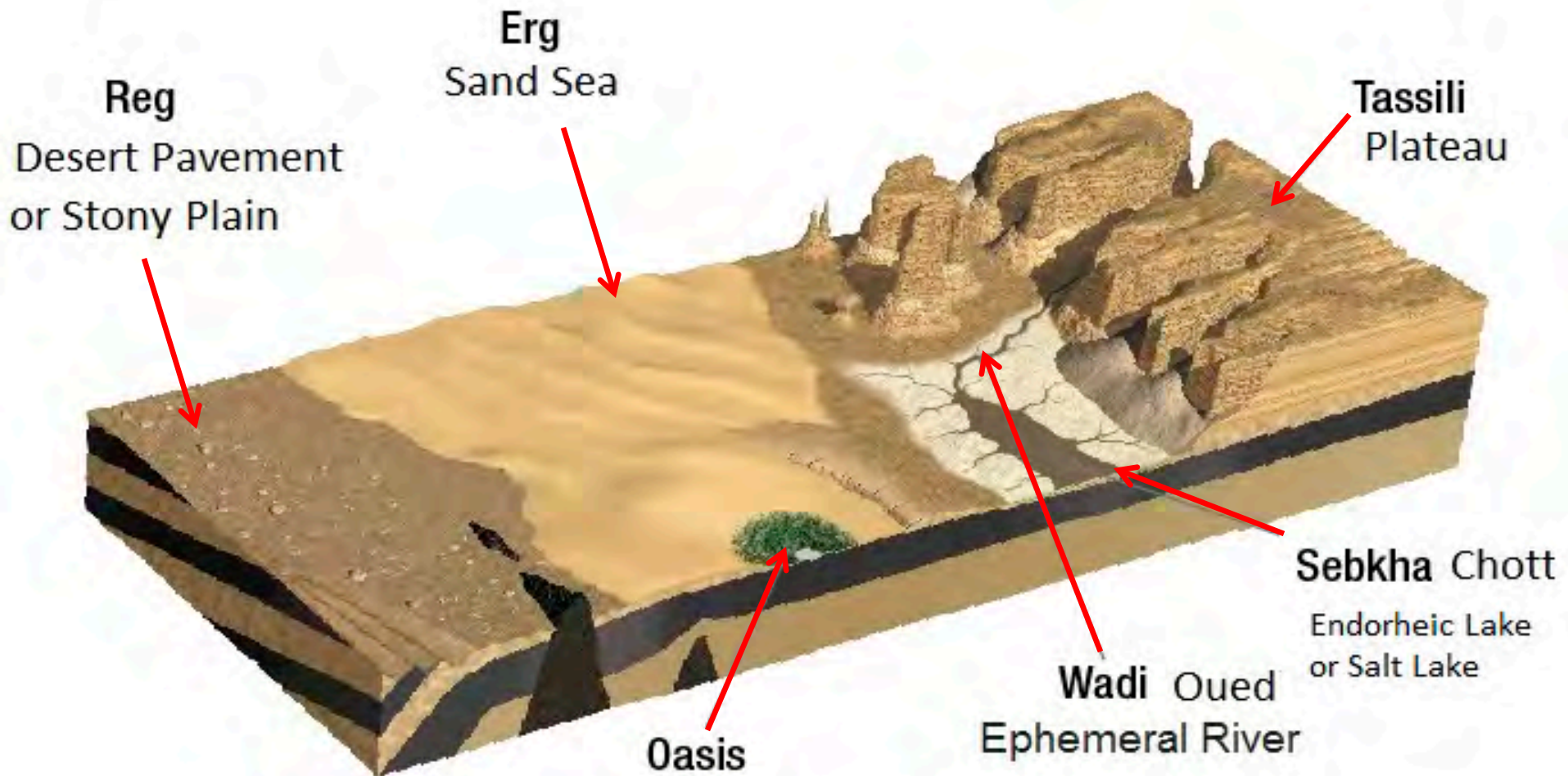
Calcaires a Conophyton



Assekrem, near Tamanrasset



Sahara Desert Landscapes



Landscapes

Ergs : Sand accumulation



Grand Erg western Desert = 570 x 320 km
Dunes up to 300 m in height



December 2016


Landscapes

Regs : Deflation Zones



Sometimes tricky.....



A satellite image showing a massive sandstorm originating from the northwestern coast of Africa. The storm is depicted as a large, billowing cloud of orange-brown dust that extends westward across the Atlantic Ocean. The landmass of Africa is visible on the right side of the frame, with the storm's source area highlighted in a lighter tan color. The ocean to the left is a deep blue, contrasting with the dusty storm. The Canary Islands are visible as a small cluster of land in the middle of the storm's path.

SANDSTORM LEAVING NORTH
AFRICA TOWARDS THE ATLANTIC –
CANARY ISLAND.

Landscapes

Oueds (wadis)

(Ephemeral Rivers)

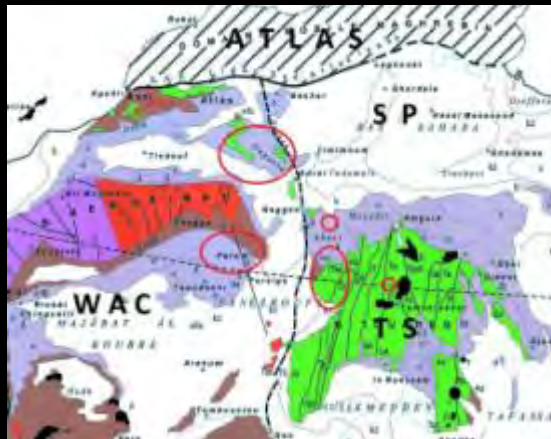
Oued Saoura near Beni Abbes

On average, it flows once every 10 years





And sometimes, very heavily !!!



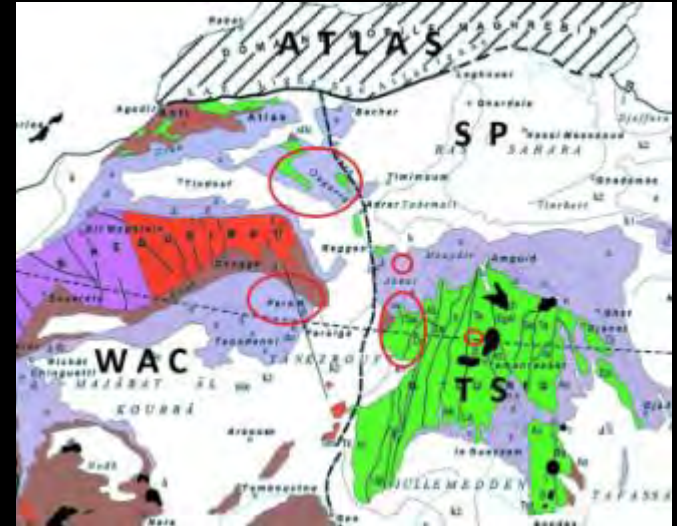
Landscapes Sebkhas (Endorheic Salt Lakes)



Sebkhet El Melah, Ougarta Mountains



Salt deposit



Teepee structures formed when crystallization pressures expand an evaporative mineral sheet until it breaks and bends. The broken apex is visible at the top of the arch formed by crystals growing with nowhere to expand but up.

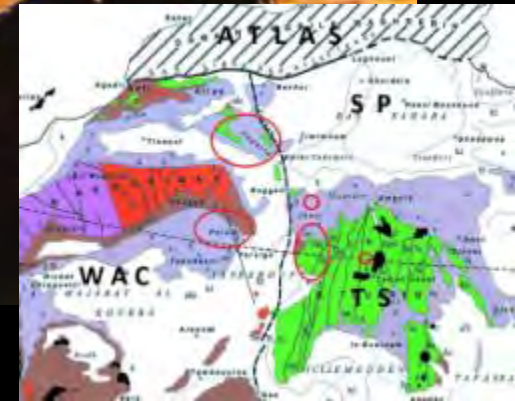


Sebkhet El Melah, Ougarta Mountains

With giant Teepee Structures....



In Ziza Guelta (Tuareg Shield)



Landscapes

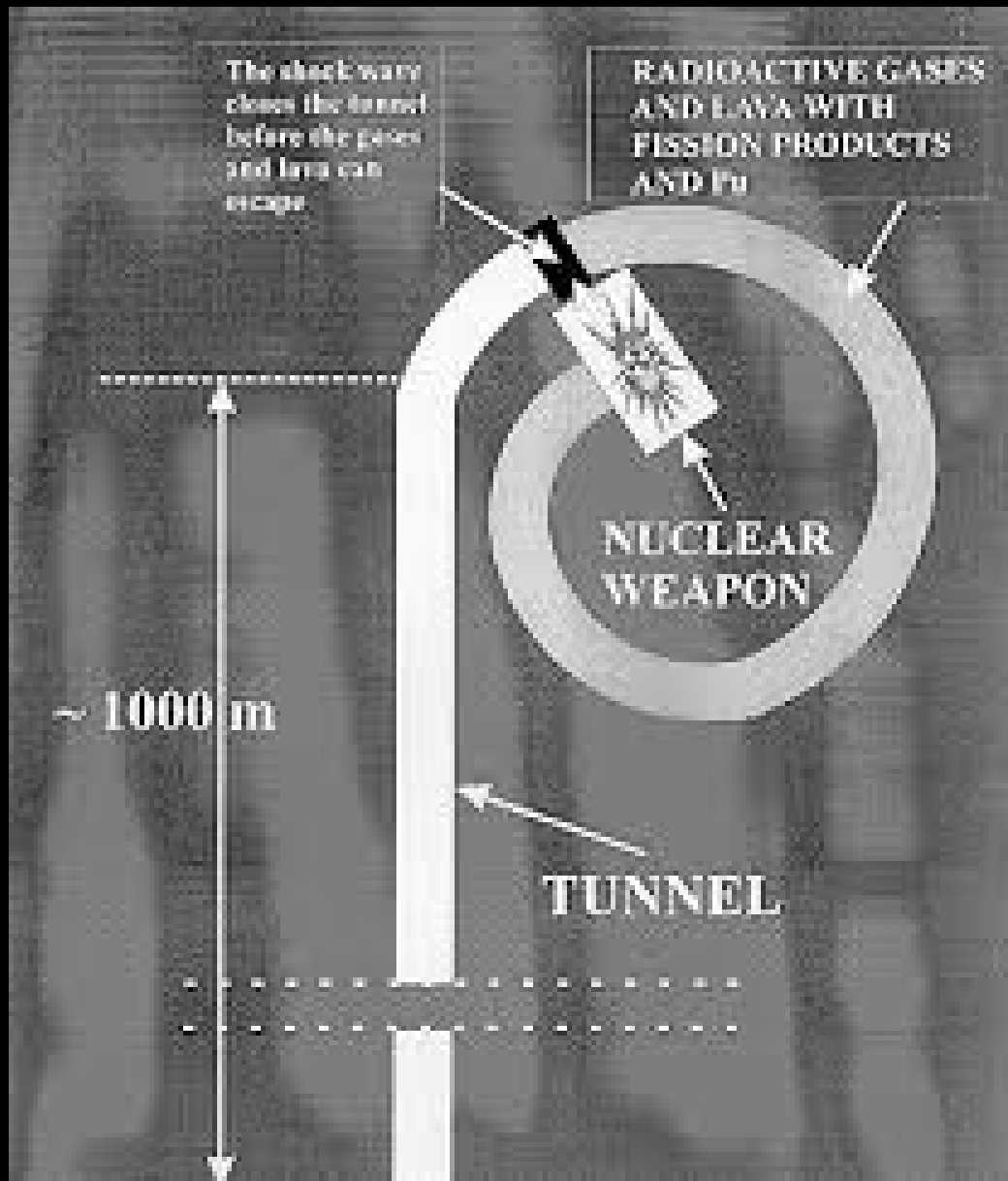


Granites



And a very special one : In Ekker





Operation "BERYL"



Subterranean French atomic bomb test.
Code name : Beryl. Four times the
Hiroshima Bomb....

- This type of “shooting gallery” was dug to end in a spiral shape. On the one hand, this shape of tunnel seriously weakened the ground at this point, and on the other hand, it dampened the expulsion of gases, of dust, and of lava produced by the vitrification of the soil. According to calculations by engineers, due to these two factors, the gallery went to the point of collapse and sealing. It was also closed by a concrete plug. Actually, four highly resistant steel doors closed the gallery at different covered levels in order to seal the shaft with polyurethane foam. These measures were used to ensure the greatest possible containment of radioactivity, which justified inviting so many “officials” to attend the test.

But.... The first of
May, 1962



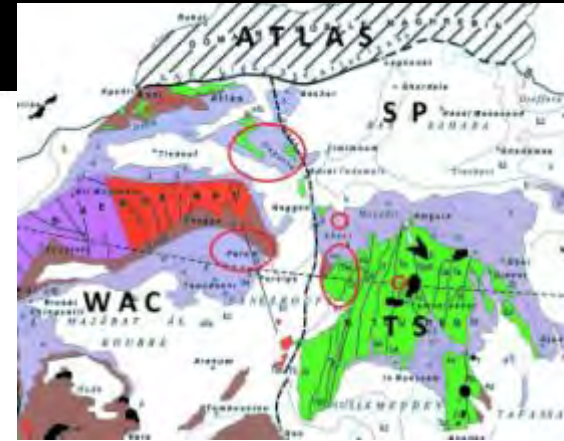
- On May 1, 1962, during the second subterranean test, the spiral did not seem to collapse early enough and the plug had been pulverized. The door closing the gallery at the end was projected several tens of meters letting out a cloud of radioactive gas and particles outside the test site. A fraction of the radioactivity was expelled with the gas, lava, and slag. The lava solidified on the floor of the gallery, but the particulates and the gaseous products formed a cloud which culminated at about 2,600 m of altitude, leading to radioactive fallout detectable for a few hundred kilometres upwind from the site.
- According to the witness Pierre Messmer (French minister of Defence at that time), some seconds after the ground trembling caused by the explosion, the spectators saw “a kind of gigantic blowtorch flame that started exactly horizontal in our direction... This gigantic flame was extinguished rather quickly and was followed by the release of a cloud which was ochre-coloured at first, but then quickly turned black.”



And today.....

Devonian Mud-Mounds (Kess-Kess) of the Mouydir area : an underwater scenery...

191 large ones, up to 40 m high, up to 200 m diameter,



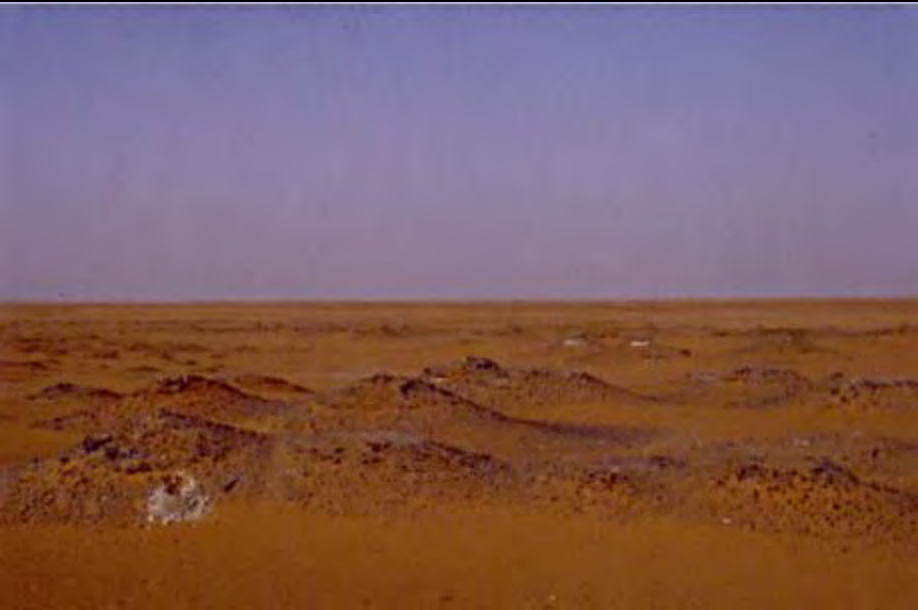
mud atoll

shallow-pelagic carbonate shelf.

All the buildups are totally exhumed, thus perfectly exhibiting their original morphologies, slope angles, elevations, and the pattern of the onlapping strata as well as their relationship to the surrounding off-buildup sequences.

Devonian Mud-Mounds

Small mud mounds 1-5 m high, 10-20 m in diameter



The lithology of the buildups is a massive boundstone with a high proportion of irregular, spar-filled cavities (stromatactis). The carbonate mud is considered to be an in situ, cyanobacterial precipitate.

Organic components of the buildups include numerous crinoid ossicles, some tabulate and solitary rugose corals, brachiopods, mollusc debris, trilobites, and very rare sponge spicules and bryozoans.

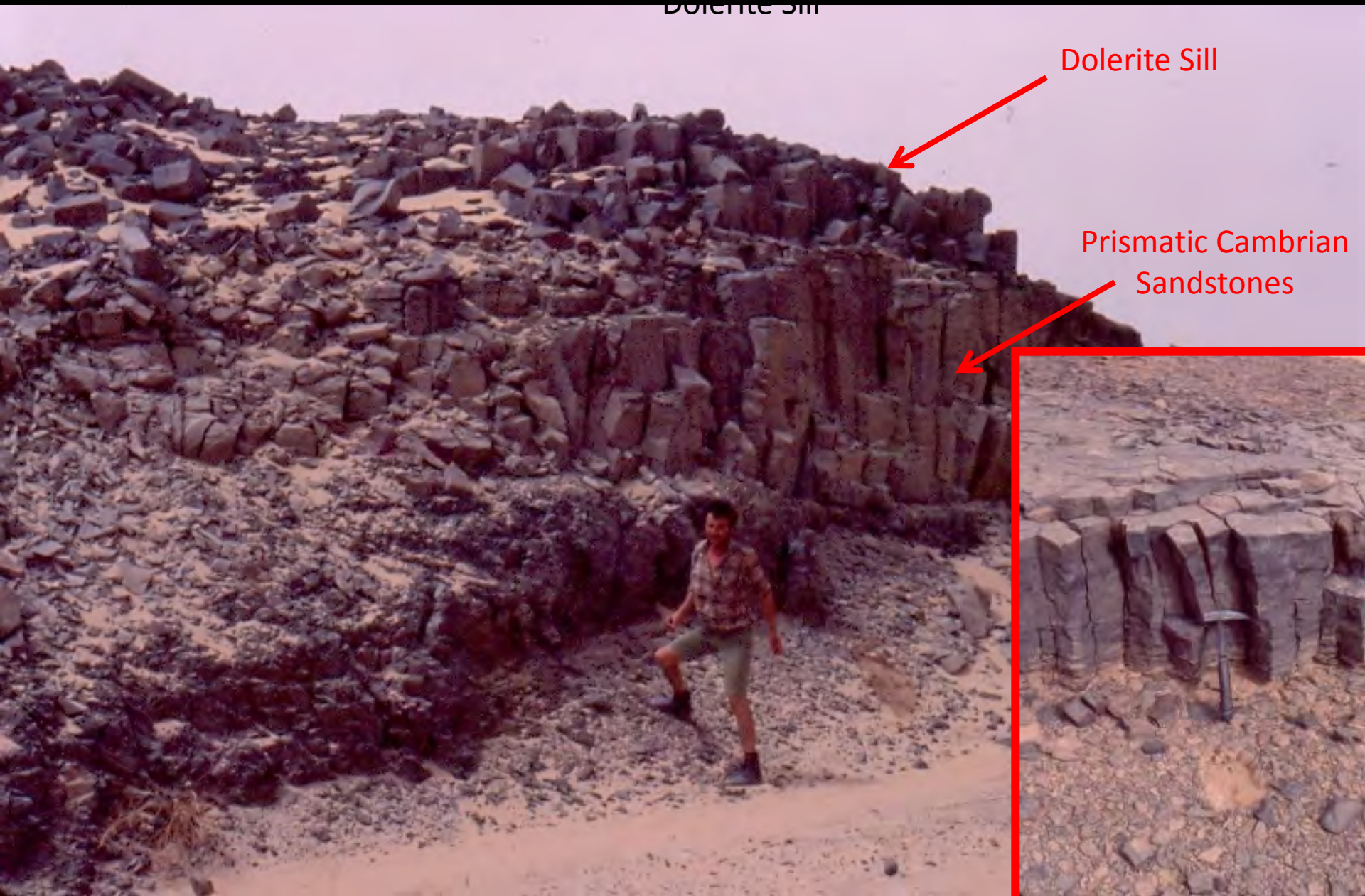
Cambrian Sandstones

Dolerite Dyke

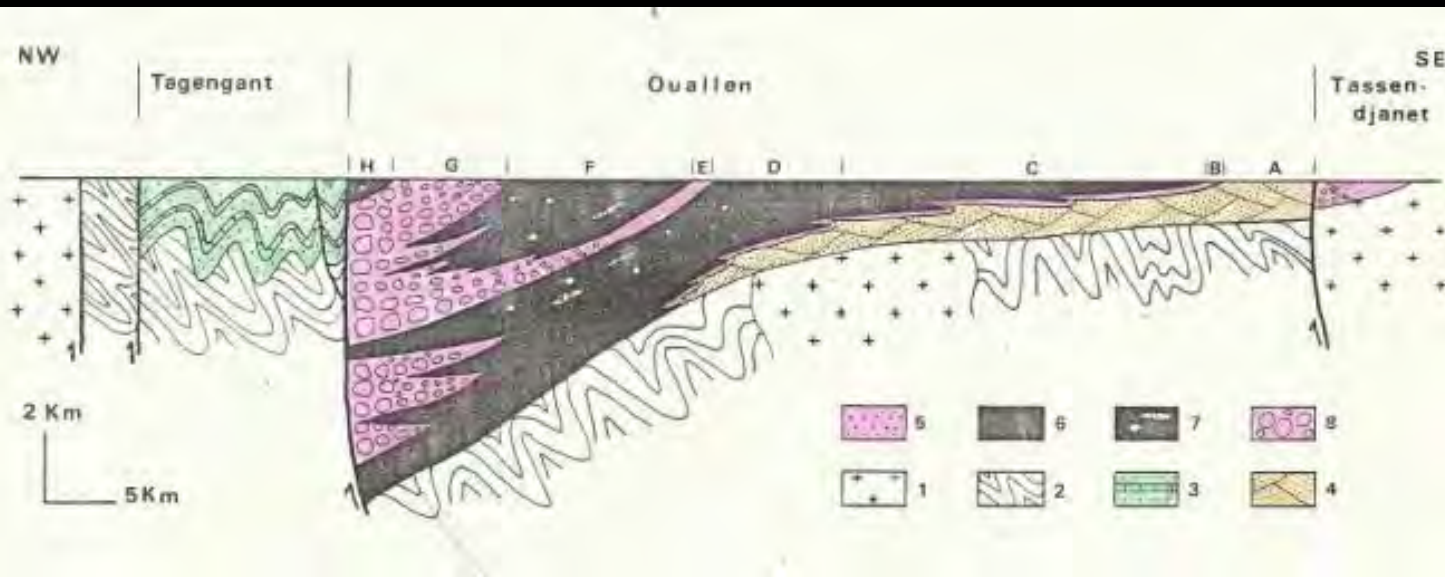
TAOUDENNI, WEST AFRICAN CRATON (1988)



TAOUDENNI, WEST AFRICAN CRATON (1988)



A very thick Aeolian Sandstone Formation : 900 m!



Serie Pourpree de l'Ahnet, Tuareg Shield



Typical Aeolian sandstones



Serie Pourpree de l'Ahnet, Tuareg Shield



Fersiga, West African Craton (1990)

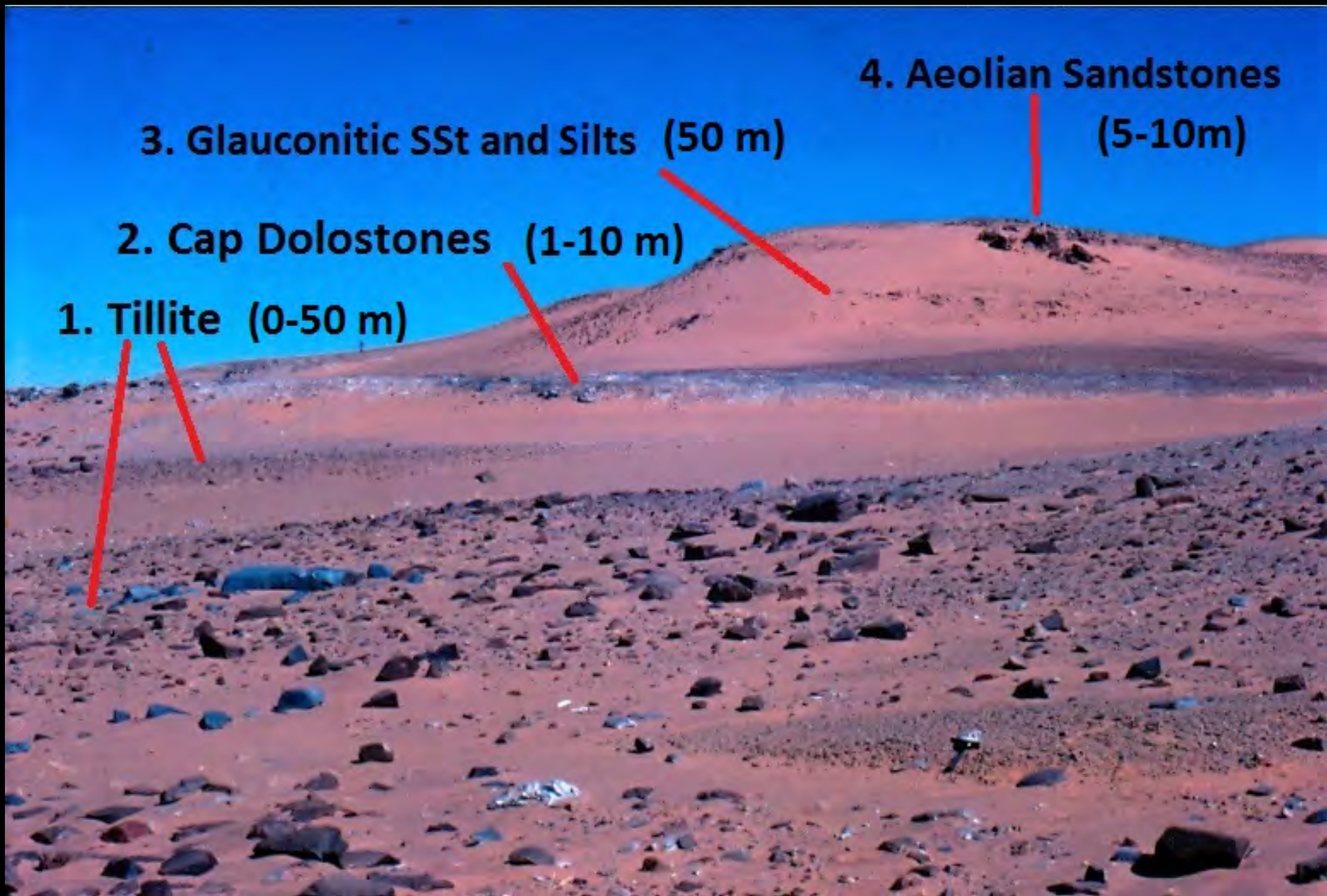


3. Glauconitic SSt and Silts (50 m)

4. Aeolian Sandstones (5-10m)

2. Cap Dolostones (1-10 m)

1. Tillite (0-50 m)



1. Continental Glacial Deposits



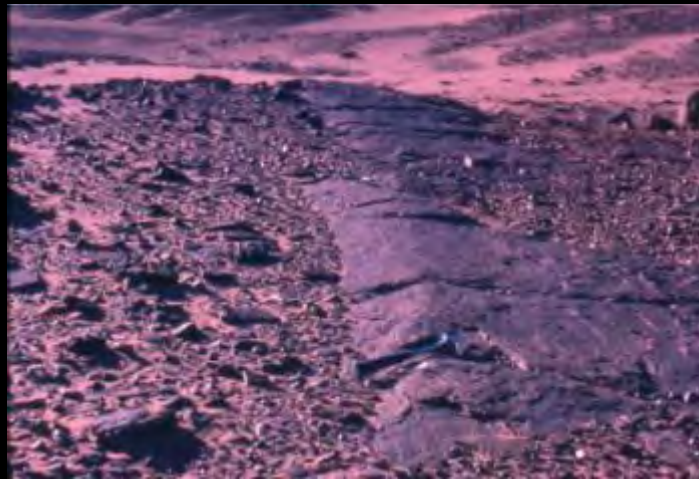
Tiliite



Glacio-lacustrine deformed varvites



Striated boulder

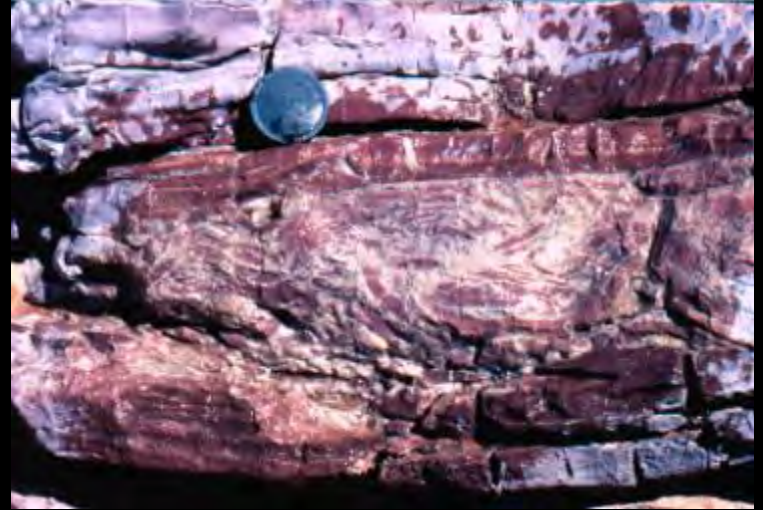
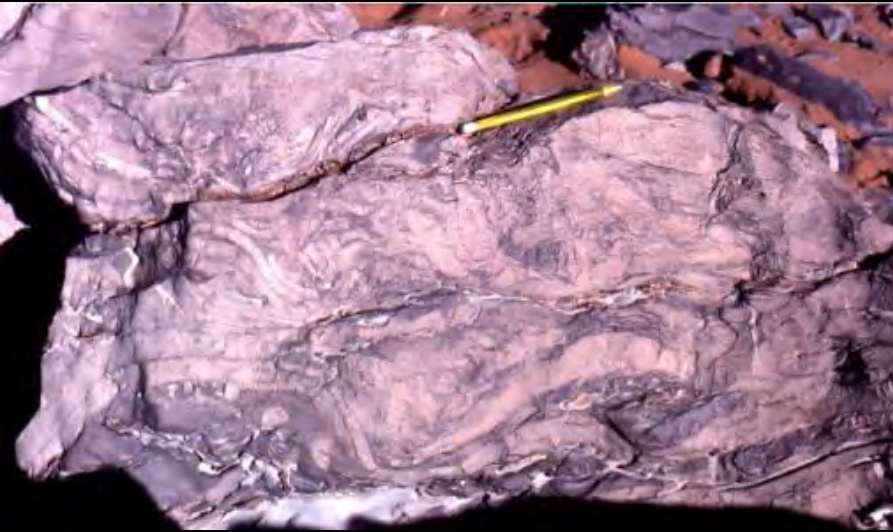


“Roches Moutonnees”
(Basement)

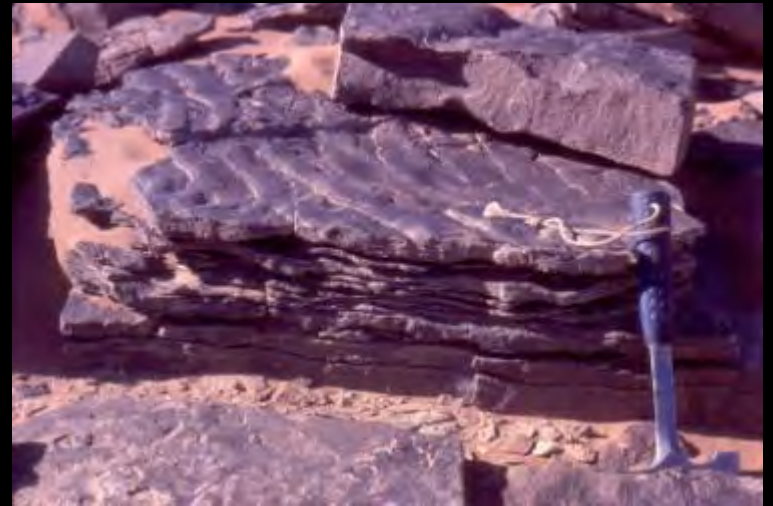
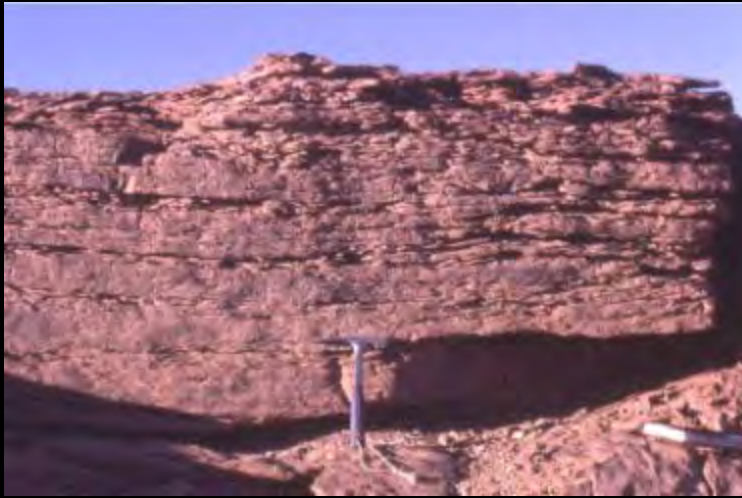


Striated Pavement with typical
glacial fractures (Basement)

2. Cap Dolostones : Contorted and brecciated dolomites with Stromatolites, Baryte and phosphatic crusts on their top



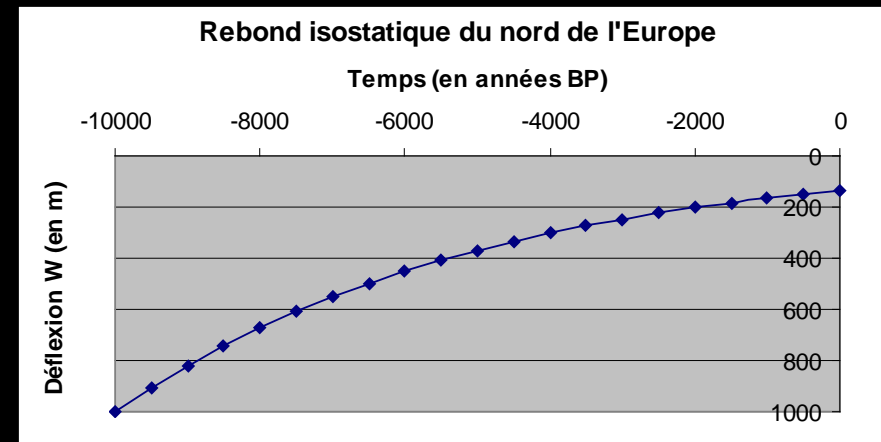
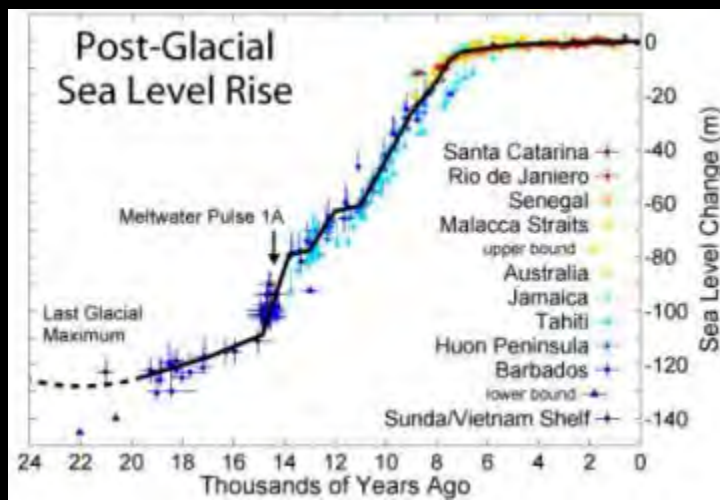
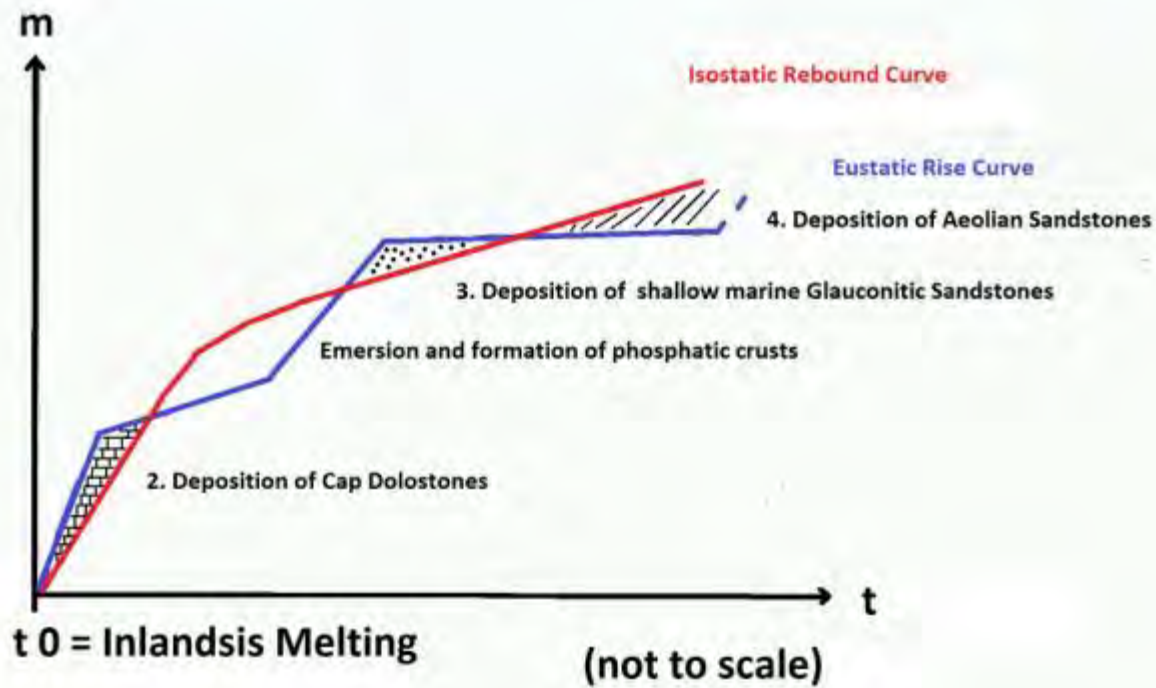
3. Glauconitic Sandstones and Silts



Hummocky Cross Stratifications

4. Aeolian Sandstones







THANK YOU....