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New clastic sedimentary sequence resting on Precambnan basement from the Air Mountains (Southern Sahara, Republic of Niger)

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Geologia. — *New clastic sedimentary sequence resting on Precambrian basement from the Air Mountains (Southern Sahara, Republic of Niger).* Nota di SILVIA METZELTIN, presentata (*) dal Socio A. DESIO.

RIASSUNTO. — È stata rinvenuta presso Tadeida, nella parte Nord del massiccio dell'Air e verso l'asse dello stesso, una successione clastica (conglomerati, arenarie) finora sconosciuta. Nonostante qualche differenza litologica (i conglomerati non sono poligenici) si ipotizza una correlazione con la *Formation mollassique du Proche Ténéré* (Cambriano?).

1. GEOLOGICAL SETTING AND PREVIOUS WORKS

The desertic Air Mountains stretch in the southern Sahara (Republic of Niger) over 60,000 km^3 at 17°/20° 30′ N Lat and 7° 30′/10° L Long, reaching an elevation of about 1900 m.

The Precambrian basement forms 3/4 of the outcrops in the area and was uplifted as a horst in a N–S direction, probably reactivating some Precambrian faults. Ring complexes like Nigeria's Younger Granites, of probable Jurassic or older age, are intruded into the basement. Tertiary through Recent alkaline vulcanism developed towards the South. The sedimentary sequence begins with a molassic formation (due to erosion and peneplanation of Precambrian chains) outcropping in the Eastern part of the Airs; Paleozoic sandstones outcrop in the West, and Cretaceous sediments ("Continental intercalaire" with world-known Dinosaurs) again in the Eastern part (Black *et al.*, 1967; Black and Girod, 1970; Furon, 1958, 1960).

The Precambrian basement of the Air Mountains, on the basis of the lithological and structural affinities with the other Saharian massifs, is correlated with the "Suggarien" of the Hoggar and of the Iforas. In this basement, several units are distinguished (Black *et al.*, 1967).

The first detrital sequence unconformably overlying the basement is the *Formation du Coin* constituted by conglomerates, sericitic arkoses, black quartzites and quartzitic-feldspathic sandstones, all of epimetamorphical origin and probably Cambrian in age. On top of this formation rests a molassic unit named the *Formation mollassique du Proche Ténéré*, constituted by polygenetic conglomerates, sericitic arkoses, of probable Cambrian age. Both formations are grouped into the Saharian "Pharusien" because of the affinities with similar formations from the Hoggar (Black *et al.*, 1967; Furon, 1958, 1960).

In the southwestern part of the Air Mountains quartziferous conglomerates and muscovitic leptynite, metamorphic and strongly folded, named

(*) Nella seduta del 16 dicembre 1978.

the *Formation du Tchililt*, are tectonically in contact with the molassic *Proche Ténéré* Formation. However, the *Tchililt* Formation is attributed to the "Suggarien" basement (Black *et al.*, 1967).

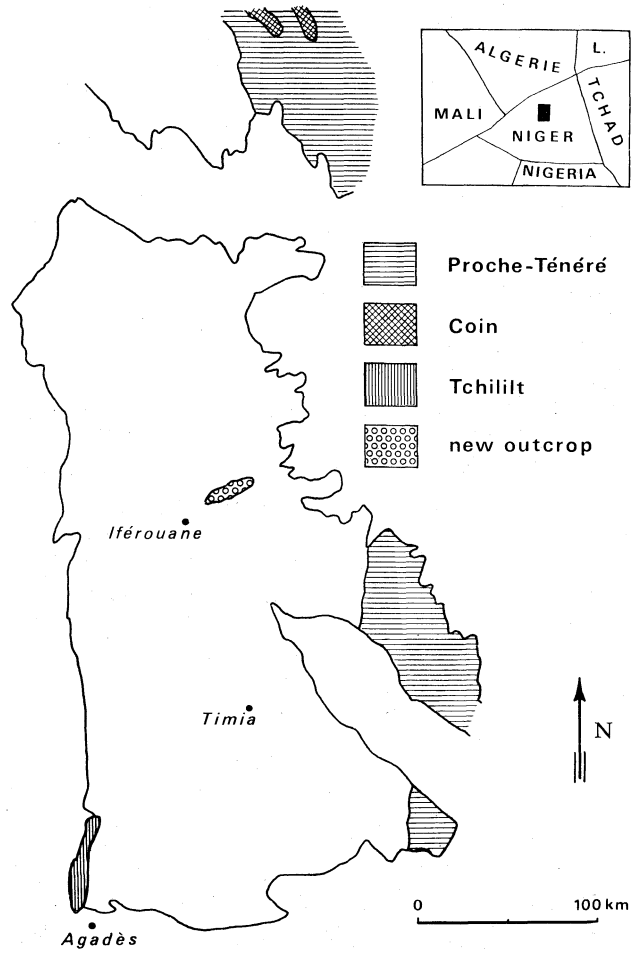

Fig. 1. – Sketch-map showing the distribution of Cambrian (?) clastic series in the Air Mountains.

In the barren sandstone sequence, about 100 m thick, of probable Cambrian–Devonian age, outcropping in the western edge of the Air Mountains, Joulia and Lapparent (1954) distinguished the following succession from top to bottom:

c) white sandstones with white feldspathic cement, conglomeratic at the bottom, with weathered lighter surface (Devonian);

b) shales and sandstones (Gotlandian?);

a) white fine siliceous sandstones, with black weathered surface, beginning with a feldspathic conglomeratic layer (Cambrian–Ordovician ?).

2. THE NEW OUTCROP

a) *Location.*

The new clastic sequence outcrops NE of the Iférouane Village, in the North–Western part of the Tamgak Mountains, at 19° 12′ Lat and 8° 36′ E Long, where it constitutes the summit of a NE–SW elongated asymmetrical elevation, indicated 1651 m on the French I.G.N. map (1972). It is possible to follow the sequence over more than 10 km on the North–Western wall. The outcrop can be reached by going up the Kori Tadek and then by walking for nearly a day from the Tadeida mosque.

b) *Lithological description* (from bottom to top; see Fig. 2).

1) *Green whitish migmatitic paragneiss* of the Precambrian basement. These rocks are attributed to the *Formation gneissique d'Azanguérène* and are considered the oldest formation of the axial zone of the Air Mountains (Black *et al.*, 1967).

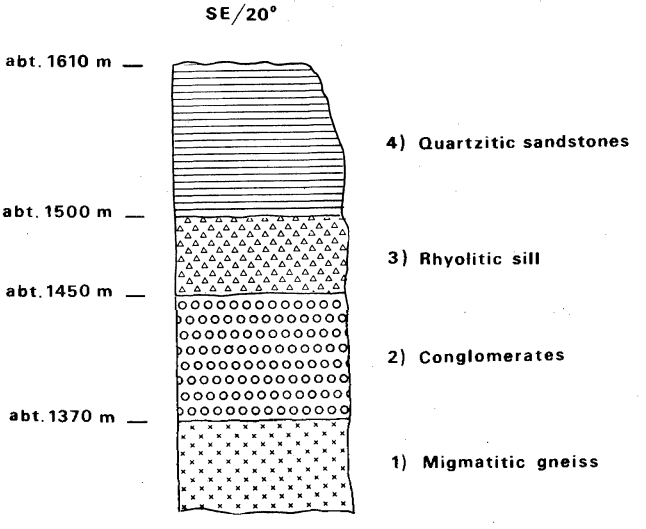

Fig. 2. – Stratigraphic scheme of the new clastic sedimentary sequence from the Air Mountains near Tadeida.

2) *Conglomerates.* The poorly stratified conglomerates are mainly monogenetic, with clasts of quartz mostly rounded, sometimes elongated and angular in shape. Clasts are generally from 2 to 4 cm in size. Levels of smaller clasts showing oblique lamination are interbedded. The whole appears massive, nearly anagenetic, light brown or yellowish coured (see Pl. I, Fig. 1).

3) *Rhyolitic sill.* This sill has a dark pink colour, is massive, not porphyritic, without cavities. In thin section it shows a mosaic structure, rich in

quartz with corrosion gulfs and abundant perthitic orthoclase. Mica is scarce. The facies recalls a sub-volcanic rock (see Pl. I, Fig. 2).

4) *Quartzitic sandstones*. Massive, homogeneous, fine-grained sandstone. The colour is white to greenish, with a brown or black weathered surface. Locally they become fissile as a quartzite. In thin section this appears as a very mature quartzitic sandstone with scarce feldspathic grains. Zircon is abundant. Micas are sericitic. The matrix is sericitic and seems slightly metamorphic.

c) *Correlations*.

Two possible correlations were examined for this outcrop: 1) with the " Pharusian " *Formation mollassique du Proche Ténéré* and 2) with the Paleozoic series—although there are important variations: the new sequence is neither polygenetic as the first formation, nor very feldspathic as the second one.

However, it is intruded by a rhyolitic sill as is often the *Formation mollassique du Proche Ténéré* (Black *et al.*, 1967). Therefore, a correlation with this " Pharusien " molassic formation is here proposed.

A possible correlation with the *Tchililt* formation must be excluded because the new succession is not strongly folded like the *Tchililt* formation but, on the contrary, gently monoclinally dipping towards the SE.

Whatever the right correlation may be the discovery of this new clastic sequence is of great importance from a paleogeographical and structural point of view.

3. References

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Fig. 1. – Quartzitic conglomerate.

Fig. 2. – Contact between the quartzitic conglomerate (at the bottom) and the rhyolitic sill (with the altimeter).