

Fig. 1. Situation géographique et géologique de l'aire étudiée.

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Magmatismes tertiaire et subrécent entre Taleghan et Alamout, Elbourz Central (Iran)

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Avec 52 figures dans le texte et 12 planches hors-texte

Summary

The area dealt with in this study covers a surface of about 750 km² in the Central Elbourz Mountains, 80 km West of Tehran. It contains almost exclusively Tertiary series. The main emphasis of this thesis is the petrographic analysis of Eo-Oligocene volcanic and subvolcanic rocks as well as the Subrecent discovered during the mapping work.

The Karadj Formation (Eo-Oligocene) begins in the southern part of the area with the transgressive Middle Tuff Member lying directly over a sharp relief of the Cretaceous Tale-Kuh Formation. In the North there is no outcrop of the older Formations. The volcanic series of pyroclastics and effusives may be correlated with the Middle and Upper Tuff Members, of the typical Karadj Formation, with ages of Middle to Upper Eocene and probably Lower Oligocene. Their deposition begins generally with tuffs and ends with flows. The lack of fossils and the thrust tectonics make the correlation within the Eo-Oligocene very difficult.

During the deposition of the tuffs in the South there was already an important effusive activity in the central zone, while in the North a shaly facies with tuffs and gypsum was dominant. After the first orogenic phase which slightly folded the basement during the Oligocene, the erosional products of the flows (locally the tuffs) accumulated in the synclinal areas. Within these generally closed basin deposits (Red Formation) gypsum is frequently found. At that time the big valleys of Taleghan and Alamout were already outlined; coarse conglomerates and silty marls, all red in colour, alternate horizontally as well as vertically. In the Mio-Pliocene an orogenic paroxysm affected all the existing series, reactivating the old folding and causing the observed thrusts. The uplift of the chain and its morphogenesis are of Plio-Pleistocene age during which the substratum was in an extension state and was accompanied by a previously unsuspected igneous activity.

The Tertiary volcanic series studied are characterized by rather strong folding and thrusting over Miocene synclines. The vergence, as would be expected in the Central Elbourz, is southwards oriented.

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It is possible to distinguish two important igneous phases in that area:

1. The Eo-Oligocene phase attributed to subsequent volcanism.
2. The less voluminous but important Subrecent phase, attributed to final volcanism.

The Eo-Oligocene igneous activity comprises on one hand the flows and on the other the dykes, sills and lacoliths.

The flows can be divided into three types:

1. Basanites of variable colours with analcite, pyroxene and olivine.
2. Trachyandesites with labradorite, pyroxene and olivine.
3. Iddingsite basalts with bytownite and andesine which lie at the top of the series.

Contrary to expectations, the andesites are very rare. Chemically, the three types are very similar to one another; their normative composition varies between monzodiorites for saturated types and theralites-essexites for unsaturated types. The typical mineralogical composition is: analcite (for basanites), labradorite, augite and olivine. Their association corresponds to a type of pacific (calcalkalic) province (al > alk) with secondary tendency to an atlantic (alkalic) province type.

The dykes, sills and lacoliths are composed of trachybasalts, trachyandesites, basanites, monzonites, monzogabbros and glassy andesites. Typical minerals are labradorite, pyroxene (commonly augite, rarely hyperstene) and olivine. They represent a pacific type of differentiation with secondary mediterranean (kali) tendency with high k-value.

The igneous activity of the Miocene (or younger) is represented by a sill of olivine-titaniferous augite-microgabbro.

The Subrecent igneous activity comprises, on one hand, one or several flows of hornblende-trachyandesites which remain as „Klippen“ and, on the other, an important number of dykes which intruded into the vicinity of the Kandevar Thrust Fault. These are: vogesites, micromonzonites, microkentallenites, latites, monzodiorites, glassy trachytes, rhyodacites, and rhyolites. Typical minerals are andesine, hornblende and biotite. Pyroxene is less common as in the Tertiary series and olivine is practically unknown. Their association represents a weak to medium atlantic type with secondary pacific and mediterranean tendencies, very similar to the association of the Damavand. The two sub-provinces are coupled to form the Damavand-province „sensu lato“. The nearest comparable example of doubtless final volcanism is the Mt Dore (Auvergne, France).

In conclusion:

1. The final, subrecent, volcanism of the Elburz Range is more fully developed than previously thought.
2. This volcanism is closely related to one from the orogenic "forelands", such as Mt Dore. This point of view corresponds well with that of STÖCKLIN (1959), who sees the Elburz as a system of border chains of the Central Iranian Orogeny.

In a broad sense, the Tertiary and Subrecent volcanisms, with their mixed character, differ considerably from that expected in a part of the Alpine-Himalayan chain. Significantly, the Elburz, apart from the metamorphic complex of the Alam-Kuh culmination, does not show a eugeosynclinal character, but rather a miogeosynclinal or even a platform one.

One problem now without a definite solution is the age of intrusion of the Alam-Kuh and Akapol batholiths. The close similarity, if not identity, of some of their dykes (glassy rhyolites and trachytes) with others of Subrecent age in the Taleghan area suggests, indeed, a similar age for these intrusions.

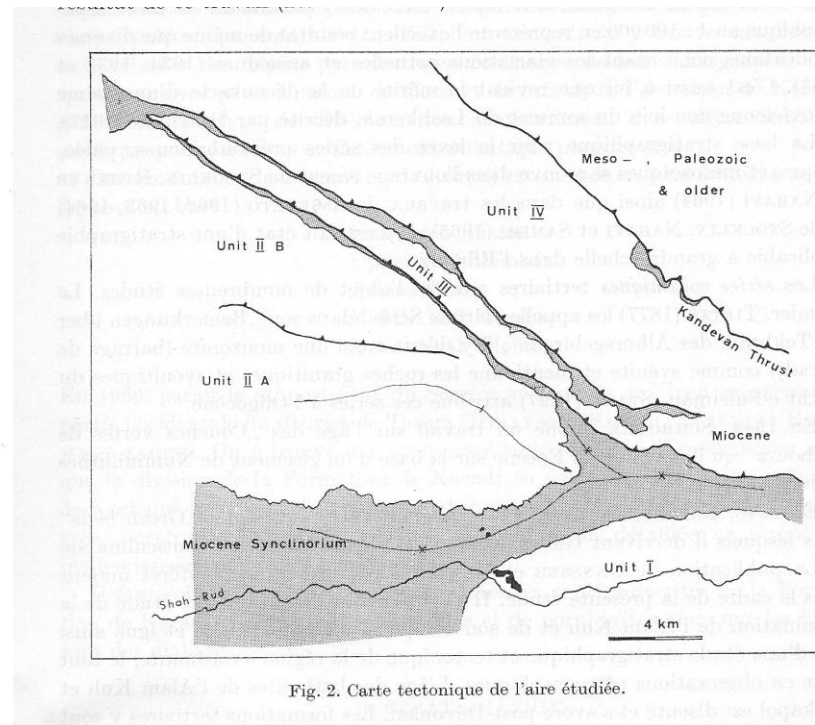


Fig. 2. Carte tectonique de l'aire étudiée.