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MINERALIZATION IN WESTERN MEDITERRANEAN OPHIOLITES

MINERALIZZAZIONI NELLE OFIOLITI DEL MEDITERRANEO OCCIDENTALE

Abstract — In the Western Mediterranean area, Tethyan ophiolites occur in the Alps, Apennines and northern Corsica. Various types of ophiolite related mineralization, both ores and non-metallic raw materials, formed during the evolution of the ophiolite complexes. The mineralization is different in the major geologic divisions which include, in a generalized column of unmetamorphosed ophiolites, mantle ultramafics followed upward by gabbros, basalts and sediments. In metamorphosed ophiolites, extensively occurring in the Alps, either similar geologic divisions are recognized, or original volcano-sedimentary sequences originated in a non-oceanic environment are represented.

Key words: Mineral deposits, Ophiolites, Western Mediterranean.

Riassunto breve — *Nel Mediterraneo occidentale ofioliti affiorano nelle Alpi, negli Appennini ed in Corsica. Nel corso della evoluzione dei complessi ofiolitici si sono formati numerosi giacimenti di minerali metallici e non metallici. Le mineralizzazioni sono differenti nei principali complessi geologici che, nella successione generale delle ofioliti non metamorfiche, comprendono dal basso in alto: ultramafiti del mantello, gabbri, basalti e sedimenti di copertura. Nelle ofioliti metamorfiche, diffuse nelle Alpi, si riconoscono gli stessi complessi ed anche successioni vulcanoclastiche di ambiente non oceanico.*

Parole chiave: *Giacimenti minerari, Ofioliti, Mediterraneo occidentale.*

Introduction

In the Western Mediterranean, Tethyan ophiolites of Jurassic-Early Cretaceous age are present in the Alps, Apennines and Corsica (fig. 1). Different mineralization, including ores and non-metallic mineral deposits, occur in the various members of the ophiolitic suite. Metallic mineral deposits are mainly represented by strata-bound Fe and Fe-Ni deposits in ultramafics, by stratiform copper deposits in basic,

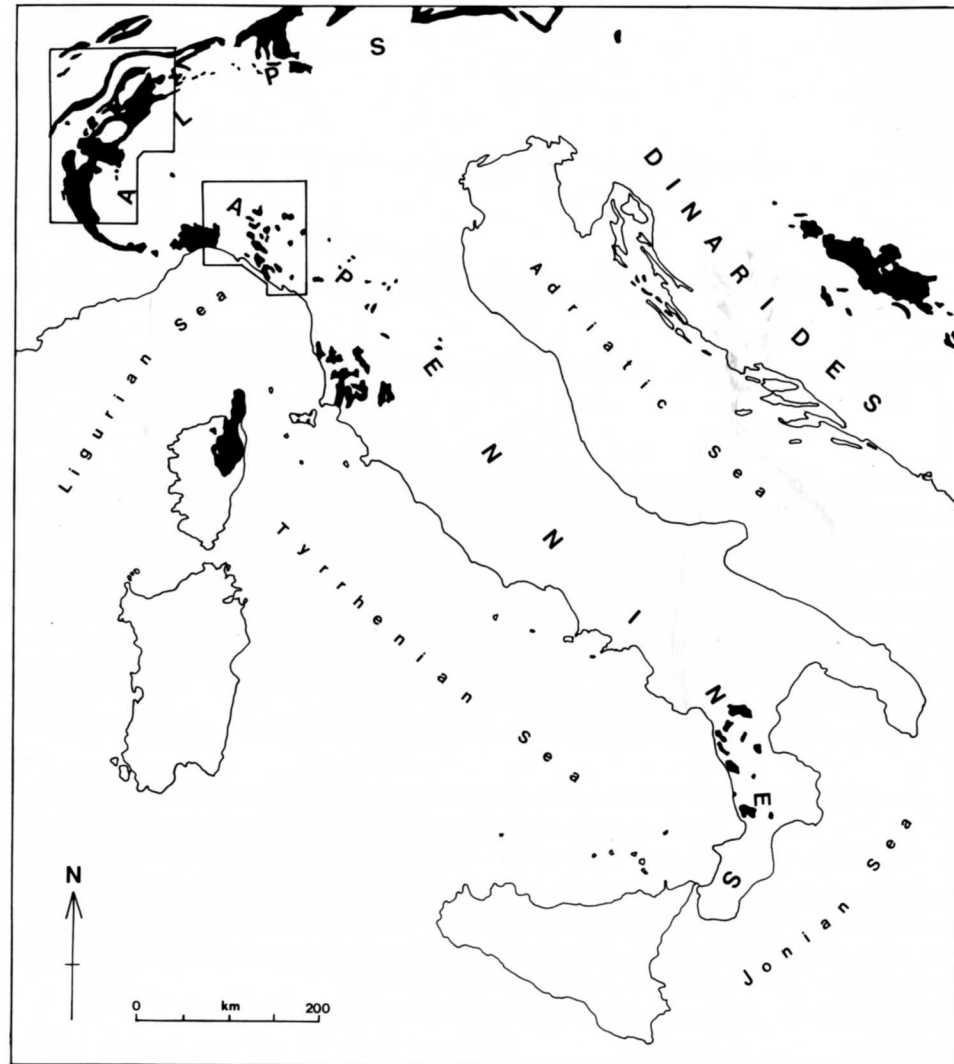


Fig. 1 - Distribution of Tethyan ophiolites (black areas) in the Western Mediterranean realm. The areas represented in figs. 6 and 7 are indicated.

- *Distribuzione delle ofioliti (aree nere) nel Mediterraneo occidentale. Sono indicate le aree rappresentate nelle figg. 6 e 7.*

mostly extrusive, ophiolites, and by some Fe-Mn deposits in the sediments on top of the basalts (MASTRANGELO et al., 1976; GLOM, 1977; FERRARIO & GARUTI, 1980; CASTELLO, 1981). Economic deposits of non-metallic raw materials, mainly chrysotile

asbestos, included in ultramafics are also to mention (NATALE, 1972; MASTRANGELO et al., 1976). The ophiolite related mineralization shows many similarities with that occurring in other Tethyan ophiolites, particularly of the Eastern Mediterranean (Yugoslavia, Albania, Greece, Turkey) with respect to parageneses and stratigraphic relations. It differs, however, in the negligible importance of chromite deposits, which, on the contrary, are conspicuous in the East Mediterranean area. Furthermore, in metamorphosed ophiolites from original volcano-sedimentary sequences, Fe-Cu-Zn deposits containing in addition Pb and Mo minerals and graphite are represented (BRIGO et al., 1976).

In the present paper, mineral deposits occurring in the different stratigraphic units of the Western Mediterranean ophiolite suite are briefly described in terms of their chemistry and relation with the host rock. Implications with the identification of the original tectonic setting of the ophiolites are discussed.

Geological framework

The Western Mediterranean ophiolites display strongly different features, both in structure and metamorphic history. They include in fact relatively coherent to highly disrupted ophiolites, which either underwent a complex polyphase Alpine metamorphism (Cretaceous to Paleogene in age), or were feebly affected by it. Two main domains are recognized: an Apenninic and an Alpine domain. The first one includes ophiolites either unaffected, or showing very low-grade Alpine metamorphism in print. They are well represented in the Ligurian and Tuscan-Emilian Apennines by relatively coherent (Internal Ligurids) to highly disrupted (External Ligurids) allocthonous complexes (SESTINI, 1970; ABBATE et al., 1980). The Apenninic domain includes also a part of the ophiolites occurring in the Southern Apennines (Calabria and Lucania: LANZAFAME et al., 1979) and Northern Corsica (GLOM, 1977).

In the Alpine domain, which extends mainly in Western and Central Alps and includes also some of the Corsican and Calabrian ophiolites, the inprint of the Alpine metamorphism, dominated by the eo-Alpine (Cretaceous) phase under high-temperature and low-pressure conditions is shown (DAL PIAZ, 1974).

The stratigraphy of the ophiolite complexes shows many similarities in both domains, and is similar to that of the present-day oceanic lithosphere, although not easily identifiable as such. The tectonic setting, in fact, is still debated, although a

