

## **CLASSIFICATION OF UNUSUAL HP METAMORPHIC ROCKS OF ARCHAEOLOGIC RELEVANCE: A PROPOSAL**

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All over the Western Europe, a great number of prehistoric stone implements – mainly axes (Fig. 1) but also chisels, pendants and bracelets – is made of high-pressure (HP) metamorphic lithotypes such as Na-pyroxenites and eclogites. These rocks, commonly referred to as “jades”, represent minor “accessory” lithologies, which occur as small primary outcrops in the Italian Western Alps or as secondary clastic deposits derived from the erosion of the formers.

Due to their overall scarcity, these lithologies have been partly neglected by the Subcommittee on the Systematics of Metamorphic Rocks (SCMR) of the International Union of Geological Sciences (IUGS) [1]. Despite this, their archaeometric relevance became very important in the last years for both geological and archaeological purposes, due to the increase of mineral chemical studies coupled with the improvement of micro-analytical techniques. The detailed archaeometric characterization of these prehistoric tools represents in fact the keystone for in-depth studies focused on ascertaining the provenance of the raw materials.

A new petrographic classification is here proposed for these lithotypes, which is consistent with previous works [2-3] and based on the criteria recommended by the SCMR. Simple diagrams are provided, which allow a classification of these rocks by quantifying the mutual amounts of their major constituents (Na-pyroxenes and garnets) while overlooking the discrimination of some hard-to-measure crystal-chemical features. The advantage of the suggested classification diagrams is to couple the compositional heterogeneity of Na-pyroxenes with the presence or absence of garnets, eventually adding further specifications (such as presence of minor and accessory minerals, grain size and microstructure) as additional information. Other unusual HP rocks, seldom represented in these archaeological implements, are also considered and aptly classified with a serious petrographic approach.

The necessary petrographic information can be inferred through a consolidated archaeometric protocol, which involves the application of gradually more sophisticated analytical methods such as macroscopic examination, density measurement, X-ray powder diffraction, optical microscopy under plane-polarized light and scanning electron microscopy with energy dispersive spectrometry [4-5]. Other techniques, such as diffuse reflectance UV-Vis-NIR spectroradiometry, vibrational spectroscopies or geothermobarometry, might also be used according to circumstances.



Fig. 1. Na-pyroxenites and eclogite Neolithic axes from the San Damiano d'Asti archaeological site, Northern Italy (from Venturino Gambari M. - Ed., "Le vie della pietra verde. L'industria litica levigata nella preistoria dell'Italia settentrionale", Catalogo della Mostra, Torino).

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