

Non-destructive *in situ* Provenance Study of Mesoamerican Turquoise by XRF

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The Aztecs among others Mesoamerican cultures used significant amounts of green-blue minerals, generally designated as turquoise, in their offerings. The aim of this work is to determine the chemical composition of blue minerals present in artefacts discovered during several archaeological excavations among which the Templo Mayor in México-Tenochtitlán, Aztecs former capital. This work proposes a first evaluation of the different mineral species by performing *in situ* analyses using nondestructive X-ray fluorescence spectroscopy and comparing the obtained results to those of a mineral database. This study is based on the theory of the "cultural turquoise" established by Weigand *et al.* [1] and resumed by Kim *et al.* [2]. It suggests that most of the Mesoamerican societies, along times, conferred a symbolic value to the green blue color and employed blue and green minerals to prepare offerings. Nevertheless, one can also think that the manufacture of the objects was carried out without giving so much importance to the choice of the raw material when mixing various mineral species from "cultural turquoise". This last point is discussed in this investigation.

The second part of this work consists of the XRF analysis of geological "chemical turquoise" references of several mines from American Southwest and Mexican Northwest. The goal is to determine the validity to use XRF study of the turquoise chemical composition for provenance study and so, to apply it to archeological data in order to evaluate Mesoamerican long-distance trade.

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[1] P. C. Weigand, G. Harbottle, E. V. Sayre, *Exchange Systems in Prehistory* (1977) 15-34.

[2] J. Kim, A. W. Simon, V. Ripoche, J. W. Mayer, B. Wilkens, *Measurement Science and Technology* 14 (2003) 1579-1589.

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