

Morphometrics and compositional classes. The study of anthropomorphic sculptures from Teotihuacan (México)

J. BUXEDA i GARRIGÓS¹ and A. VILLALONGA GORDALIZA²

¹Cultura Material i Arqueometria UB (ARQ|UB, GRACPE), Dept. de Prehistòria, Història Antiga i Arqueologia –
Universitat de Barcelona, Catalonia, Spain, jbuxeda@ub.edu

²Departament d'Art – Universitat Autònoma de Barcelona, Catalonia, Spain

Morphometry is defined as the measurement of the external and perceptible characteristics, i.e., in a first approximation, of the shape or morphology of an object. It includes information related to the object's appearance as well as to its physical and diachronic constitution (Verrecchia, 2003).

Morphometric studies attempt to describe this form or shape through mathematical relationships that allow numerical data, and this can be achieved in different ways. In general, two main types of analysis can be performed whether they are or they are not based on the study of the contour.

In several instances, the actual contour is not supposed to be really informative. Instead, elementary Euclidean geometrical measurements or the definition of significant points (landmarks or semi-landmarks), referenced in coordinates systems, are used.

A final important point is that morphometric analysis must be invariant to translation, rotation, reflexion and scale, something that has created some difficulties not fully overcome. In the present work, we attempt to show that morphometrics is related to compositional analysis. Using a collection of anthropomorphic sculptures from prehispanic Teotihuacan (México), we will explore the non-contour methods in 2D analysis. Our analysis will be based in the EDM (Euclidean Distance Matrix Analysis) (Lele, 1993), that will be connected to compositional analysis. EDM ensures the translation, rotation and reflexion invariance, while compositional analysis is, by definition, an analysis of shape and, therefore, it is invariant to scale.

References

- Lele, S. (1993). Euclidean distance matrix analysis (EDMA) of landmarks data: estimation of mean form and mean form difference. *Mathematical Geology* 25, 573-602.
- Verrecchia, E.P. (2003). Foreword: Image Analysis and Morphometry of Geological Objects. *Mathematical Geology* 35, 759-762.