

Artefact Analysis

Code: 100717
ECTS Credits: 6

Degree	Type	Year	Semester
2500241 Archaeology	OB	3	2

Contact

Name: Xavier Clop Garcia
Email: xavier.clop@uab.cat

Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

Rafael Mora Torcal
Roberto Risch

Prerequisites

Have made previously the subject of Introduction to the Archaeology.

Objectives and Contextualisation

The subject has like aim the introduction to the basic knowledges of the methodology and the technicians of the study of laboratory in Prehistoric Archaeology. It will enter to the students in the Archaeometry of the materials lithics, pottery, metallic, incising particularly in like posing and develop the study of the raw materials, the technical of production and the forms of consumption. The contents of this subject are oriented to give to the students the necessary basic instruments for can work the archaeological materials with category of historical documents.

Competences

- Carrying out and managing archaeology fieldwork: excavation and survey.
- Managing the main methods, techniques and analytic tools in archaeology.
- Respecting the diversity and plurality of ideas, people and situations.
- Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethic relevant issues.
- Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
- Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.

Learning Outcomes

1. Applying both knowledge and analytical skills to the resolution of problems related to their area of study.
2. Applying proper techniques and analytical tools in case studies.
3. Autonomously searching, selecting and processing information both from structured sources (databases, bibliographies, specialized magazines) and from across the network.
4. Combining technical resources from similar disciplines.
5. Interpreting the archaeological fieldwork results by placing them into their historical context.
6. Mastering specific techniques and instrumental resources of archaeological laboratory analysis.
7. Organizing their own time and work resources: designing plans with priorities of objectives, calendars and action commitments.
8. Recognising and implementing the following teamwork skills: commitment to teamwork, habit of cooperation, ability to participate in the problem solving processes.
9. Transmitting the results of archaeological research and clearly communicating conclusions in oral and written form to both specialised and non-specialised audiences.
10. Using computing tools, both basics (word processor or databases, for example) and specialised software needed in the professional practice of archaeology.
11. Using the specific interpretational and technical vocabulary of the discipline.

Content

PART A.- GEOARCHEOLOGY AND ARCHEOMETALLURGY (Roberto Risch)

1.- SOME NOTIONS OF GEOLOGY

1.1.- The structure of the Earth

1.2.- The formation of rocks and deposits

1.3.- Identification of mineral and rocks

2.- STUDY OF MACROLITHIC ARTIFACTS

2.1.- Methods of study

2.2. Identification of the macrolithic artifacts

2.3. Exploitation of the raw material in primary outcrops

2.4. Morfo-technical and functional analysis of the macrolithic artifacts

2.5.- Socio-economic implications

3.- THE METALLURGY AND THE STUDY OF THE METALS

3.1.- The processes of the metal production (copper, bronze, silver and gold)

3.2.- Archaeometrical analyses of the origin of the metals

3.3.- Metallurgy and social Organization

PART 2.- THE STUDY OF KNAPPABLE LITHIC ARTEFACTS (Rafael Mora)

1.- Introduction: What information can we get through the study of lithic artefacts?

2.- Technology (Origins, technological perspective, "chaîne opératoire")

3.- Technical Modes (Mode 1, Mode 2, Mode 3, Mode 4)

4.- Refittings and retouched artefacts

PART 3.- STUDY OF POTTERY (Xavier Clop)

- 1.- The diversity of the social materiality. Artifacts, products and Archaeometry
- 2.- The pottery as a product
- 3.- Selection and treatment of the raw material
- 4.- Modelling
- 5.- Treatment of the surfaces and decoration
- 6.- Dried and firing
- 7.- Function and social uses
- 8.- Shapes and typologies

Methodology

Directed activities

The course centres in learning of the study of different type of archaeological materials from sessions theoretic-practical developed to the Laboratory.

1.-Activities to the Laboratory. They will realize sessions theoretic-practical where will combine the explanation of theoretical concepts, systems of study and analysis, variables of study, etc. With the realization the practical activities that allow to put in practical and evaluate the capacity of obtaining significant data of the concepts purchased. The activities of practical will consist in explanation and discussion of cases of study, analysis of archaeological materials, etc.

2. Autonomous activity. From the theoretical sessions of introduction and the dossiers of the course, the students will work with the extension and the assimilation of the basic concepts involved in the study of the archaeological materials. His application during the practical will facilitate the acquisition of the own capacities required for the development of the study of the different types of archaeological materials treaties.

Concrete formative activities

- 1.- Laboratory exercise (microscopy): macro and microscopic identification of minerals and rocks

Additional documentation: Virtual Campus - Rafael Sánchez López et al., Cómo hacer más fácil la identificación de minerales y rocas

- 2.- Laboratory exercise (microscopy): macro and microscopic identification of metallic minerals

Additional Documentation: virtual Campus

- 3.- Laboratory exercise (microscopy): Analysis of trace of production in lithic artifacts

Additional Documentation: virtual Campus

- 4.- Laboratory exercise: exhibition and discussion of cases of study

Additional Documentation: virtual Campus

- 5.-Laboratory exercise (microscopy): Identification of minerals, rocks and added temper in pottery

Additional Documentation: virtual Campus

- 6.- Laboratory practice: Technological analysis and examination of lithic artefacts

Additional Documentation: virtual Campus

7.- Laboratory practical: description and macroscopic analysis of prehistoric pottery

Additional Documentation: virtual Campus

8.- Laboratory practical: drawing of pottery

Additional Documentation: virtual Campus

9.- Laboratory practical: identification of pottery modeling techniques

Additional Documentation: virtual Campus

10.- Laboratory practical: identification of hand-made pottery surface treatments

Additional Documentation: virtual Campus

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Practices	35	1.4	2, 1, 4, 6, 11
Theoretical classes	20	0.8	2, 6, 5, 11
Type: Supervised			
Comment and discussion practical dossier (individual or in group)	20	0.8	3, 7, 9
Tutorial	9	0.36	2, 9
Type: Autonomous			
Practices preparation	30	1.2	7, 8, 10
Reading and documentation	30	1.2	2, 3, 10

Assessment

The competences will be evaluated by means of: works and evaluation of the practical activities.

The system of evaluation organizes of the following way: thematic Block A: 40%; thematic Block B: 20% of the note; thematic Block C: 40% of the note.

In each one of the thematic modules will be evaluate of the following way:

Assistance and participation in the classes theoretic-practical (10% global weight).

Module of delivery of the dossiers of practical (30% global weight).

Work of course or final exam (Theoretical and practical contents) (60% global weight).

The final note will be the half of the note weighted on 100 obtained in the different blocks.

To surpass the course is necessary to obtain a score of 5 in a scale of 10.

At the time of completion/delivery of each assessment activity, the teacher will inform (Moodle, SIA) of the procedure and date of revision of the grades.

It will consider non-evaluable the student that do not submit the practical and/or the corresponding works of 2 thematic blocks.

Reevaluation: The students that have not attained a note of 5 in any of the thematic blocks, will be able to present to the test of reevaluation of that or of those thematic blocks that they have suspended. The test of reevaluation will consist in a test written.

In the event of a student committing any irregularity that may lead to a significant variation in the grade awarded to an assessment activity, the student will be given a zero for this activity, regardless of any disciplinary process that may take place. In the event of several irregularities in assessment activities of the same subject, the student will be given a zero as the final grade for this subject.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Assistance and participation in the theoretical-practices classes	10%	3	0.12	2, 5, 9, 11, 10
Practices dossier	30%	3	0.12	2, 1, 3, 4, 6, 7, 8, 9, 11
Work of course	60%	0	0	2, 1, 3, 5, 11

Bibliography

Documentation and didactic material in general: Virtual Campus and to <http://seneca.uab.es/prehistoria/prehistoria> ACTIVE

PART A. GEOARCHEOLOGY AND ARCHEOMETALLURGY

1. Notions of geology.

Bauer, J. (1981). Guía básica de los minerales. Omega, Barcelona.

Bayly, B. Introducción a la petrología. (1982). Ed. Paraninfo, 2ª ed. Madrid.

Coque, R. Geomorfología. Ed. Alianza Universidad. 1984.

Klein, C. (1982). Manual de Mineralogía de Dana. Reverté, Barcelona.

Maresch, W., Medenbach, O., Trochim, H.D. (1990): Rocas. 287 páginas, Blume (editorial).

Melendez, B., Fuster, J. (2003): Geología. -911 páginas; 9º edición; Thomson Editores, Madrid, España.

Pozo Rodríguez, M. et al. "Geología Práctica. Introducción al reconocimiento de materiales y análisis de mapas". (2004). Ed. Pearson Educación. Madrid.

Rogers, J. W.; Adams, A. S. (1969). Fundamentos de la geología. 446 páginas, Ediciones Omega (Barcelona).

Simons Robinson, E. (1990). Geología Física Básica. 699 páginas, Editorial Limusa (México).

Strahler, A. (1992). Geología Física. -629 páginas; Omega Ediciones, Barcelona.

Tarbutck Edward J , Lutgens Frederick K "Ciencias de la Tierra. Una introducción a la Geología Física". (2005). Ed. Pearson-Prentice Hall, 8ª ed. Madrid.

Watt, A. (1986): Diccionario Ilustrado de la Geología Everest. 208 páginas; Editorial Everest, Madrid.

2. Study of macrolytic materials.

2.1. General works

AA.VV. (1996), La vie della pietra verde-L'industria litica levigata nella preistoria dell'Italia settentrionale. Omega, Turín.

ADAMS, J.L. (1999), "Refocusing the role of food-grinding tools as correlates for subsistence strategies in the U.S. Southwest", *American Antiquity*, 64(3), pp. 475-498.

ADAMS, J. L. (2002), Ground stone analysis, A technological approach, University of Utah Press.

ADAMS, J., DELGADO, S., DUBREUIL, L., HAMON, C., PLISSON, H. y RISCH, R. (2009), "Functional analysis of macro-lithic artefacts: a focus on working surfaces", en Farina Sternke, Lotte Eigeland y Laurent-Jacques Costa (eds), *Non-Flint Raw Material Use in Prehistory: Old prejudices and new directions*. BAR International Series 1939, Oxford, pp. 43-66.

BEAUNE, S.A. de (2000), Pour une Archéologie du geste, CNRS Editions, Paris.

BRADLEY, R. y EDMONDS, M. (1993), Interpreting the axe trade: production and exchange in Neolithic Britain, Cambridge University Press, Cambridge.

CASTRO, P., CHAPMAN, R., GILI, S., LULL, V., MICÓ, R., RIHUETE, C., RISCH, R. y SANAHUJA, M.E. (1999), Proyecto Gatas 2. La dinámica arqueoecológica de la ocupación prehistórica, Junta de Andalucía, Consejería de Cultura, Sevilla.

DELGADO RAACK, S. y RISCH, R. (2009), "Towards a systematic analysis of grain processing technologies". In Araujo, M. de & Clemente, N. (eds), *Recent Functional Studies on Non-flint Stone Tools: Methodological Improvements and Archaeological inferences*, Lisboa (<http://www.workshop-traceologia-lisboa2008.com/>)

HAYDEN, B. (ed.) (1987), Lithic studies among the contemporary Highland Maya, The University of Arizona Press, Tucson.

RISCH, R. (1998), "Análisis paleoeconómico y medios de producción líticos: el caso de Fuente Alamo", en Delibes, G. (ed.), *Minerales y metales en la prehistoria reciente. Algunos testimonios de su explotación y laboreo en la península ibérica*, Universidad de Valladolid, Valladolid: 105-154.

RISCH, R. (2002), Recursos naturales, medios de producción y explotación social. Un análisis económico de la industria lítica de Fuente Alamo (Almería), 2250-1400 ANE, P. von Zabern, Mainz.

RISCH, R. (2008) "Grain processing technologies and economic organisation: a case study from the south-east of the Iberian Peninsula during the Copper Age", *The Arkeotek Journal*, vol.2, n°2 (www.thearkeotekjournal.org).

RISCH, R. (2011) "Social and economic organisation of stone axe production and distribution in the western Mediterranean", en V. Davis y M. Edmonds (eds), *Stone Axe Studies III*, Oxbow Books, Oxford, pp. 99-118.

RISCH, R., BOIVIN, N., PETRAGLIA, GÓMEZ-GRAS, D., KORISSETAR, R. y FULLER, D. (2011) "The prehistoric axe factory at Sanganakallu-Kugal (Bellary District), southern India", en V. Davis y M. Edmonds (eds), *Stone Axe Studies III*, Oxbow Books, Oxford, pp. 189-202.

PETREQUIN, P. y JEUNESSE, C. (1995), La hache de pierre. Carrières vosgiennes et échanges de lames polies pendant le Néolithique (5400-2100 a.J.C.), Editions Errance, París.

PETREQUIN, P. y PETREQUIN, A.-M. (1993), *Ecologie d'un outil: la hache de pierre en Irian Jaya (Indonésie)*. CNRS, Monographie du CRA 12, París.

SEMENOV, S.A. (1981), Tecnología prehistórica. Estudio de las herramientas y objetos antiguos a través de las huellas de uso, Akal, Madrid.

ZIMMERMANN, A. (1988), "Steine", en U. Boelcke et al., Der bandkeramische Siedlungsplatz Langweiler 8, Gemeinde Aldenhoven, Kr. Düren, Rhein. Ausgrab. 28, Bonn.

2.2. Characterization studies:

BARRERA MORATE, J.L., MARTINEZ NAVARRETE, M.I., SAN NICOLAS DEL TORO, M. y VICENT GARCIA, J.M. (1987), "El instrumental lítico pulimentado calcolítico de la comarca noroeste de Murcia: algunas implicaciones socio-económicas del estudio estadístico de su petrología y morfología", Trabajos de Prehistoria, 44: 87-146.

COONEY, G. y MAUDAL, S. (1995), "Getting to the core of the problem: petrological results from the Irish Stone Axe project", Antiquity, 69: 969-980.

DELGADO RAACK, S.; GÓMEZ-GRAS, D.; RISCH, R. (2008), "Las propiedades mecánicas de los artefactos macrolíticos: una base metodológica para el análisis funcional", en Rovira S., Montero Ruiz I. & García Heras M. (eds.), Actas del VII Congreso Ibérico de Arqueometría (Madrid, 8-10 octubre de 2007). Madrid, Digital publication of the CSIC: 330-345.

MARTINEZ, F. y RISCH, R. (1999), "Caracterización y procedencia de los recursos líticos de Gatas", en Castro et al., "PROYECTO GATAS, 2", Junta de Andalucía, Consejería de Cultura, Sevilla: 326-337.

OROZCO-KÖHLER, T. (2000), Aprovisionamiento e intercambio: análisis patológico del utillaje pulimentado en la Prehistoria Reciente del País Valenciano (España), B.A.R. Int. Ser., Oxford.

RICQ-DE BOUARD, M. (1996), Pétrographie et sociétés néolithiques en France méditerranéenne. L'outillage en pierre polie, Monographies du CRA, 16, Editions du CRNS, Paris.

RICQ-DE BOUARD, M. y FEDELE, F.G. (1993), "Neolithic rock resources across the western Alps: circulation data and models", Geoarchaeology, 8, 1: 1-22.

RISCH, R. & MARTÍNEZ FERNÁNDEZ, F. (2008) "Dimensiones naturales y sociales de la producción de hachas en el noreste de la península Ibérica", Trabajos de Prehistoria, vol. 65, 1, pp. 47-71. 4.3. Análisis funcional:

ADAMS, J.L. (1989), "Methods for improving ground stone artifacts analysis: experiments in manowear patterns", en D.S. Amick y R.P. Mauldin (eds), Experiments in Lithic Technology, B.A.R., Int. Ser., 528, Oxford: 259-281.

ADAMS, J.L. (1993), "Mechanisms of wear of ground stone surfaces", Pacific Coast Archaeological Society Journal, Quarterly, 29(4): 60-73.

CLEMENTE, I., RISCH, R. y ZURRO, D. (2002), "Complementariedad entre el uso de residuos y rastros de uso para la determinación de los instrumentos de producción: su aplicación a un ejemplo etnográfico del país Dogón (Mali)", en CLEMENTE, I., RISCH, R. y GIBAJA, F. (eds.), Análisis funcional: su aportación al conocimiento de las sociedades prehistóricas. British Archaeological Reports, 1073, Archaeopress, Oxford: 87-96.

DELGADO RAACK, S. y RISCH, R. (2006b) "Lithic perspectives on metallurgy: an example from Copper and Bronze Age south-east Iberia", en

L. Longo y N. Skakun (eds), "Prehistoric Technology" 40 years later: Functional Studies and the Russian Legacy. Proceedings of the International Congress, Verona (20th-23rd April 2005), B.A.R. IS1783, Archaeopress, Oxford (2008), pp. 235-251.

IBÁÑEZ, J.J. y GONZÁLEZ, J.E. (1995), "Utilización de algunos cantos rodados en el yacimiento magdalenense de Laminak II (Berriatua, Bizkaia)", Kobie, 21: 172-193.

MENASANCH, M., RISCH, R. y SOLDEVILLA, J.A. (2002), Las tecnologías del procesado de cereal en el sudeste de la Península Ibérica durante el III y II milenio ANE, en Procopiu, H. y Treuil, R.(ed.),Mouldre et Broyer, Publications du C.R.N.S., Paris: 81-110.

RISCH, R. (2008), "From production traces to social organisation: towards an epistemology of Functional Analysis", en L. Longo y N. Skakun (eds), "Prehistoric Technology" 40 years later: Functional Studies and the Russian Legacy. Proceedings of the International Congress, Verona (20th-23rd April 2005), B.A.R., IS 1783, Archeopress, Oxford (2008), pp. 513-521.

RISCH, R. (2003), "Los artefactos macrolíticos del yacimiento talayótico y postalayótico de Son Ferragut (Sineu, Mallorca)", en P. Castro, T. Escoriza y M.-E. Sanahuja (eds), Mujeres y hombres en espacios domésticos: trabajo y vida social en la Prehistoria de Mallorca (c. 700-500 cal ANE),B.A.R., Oxford: 306-319.

3. Metallurgy and study of metals.

3.1.-General works

GARCÍA CALCEDO, F. (1984), Fundamentos tecnológicos de la minería y la metalurgia. Madrid.

GIARDINO, C. (2002),I metalli nel mondo antico, Laterza, Roma.

JUNGHANS, S. (1955), "Sobre la cuestión de la investigación por medio del análisis espectral de objetos prehistóricos de cobre y bronce",Caesaraugusta, 6, pp. 51-54.

MOHEN, J. P. (1992), Metalurgia prehistórica. Introducción a la paleometalurgia. Masson, Barcelona.

MORDANT, C., PERNOT, M. y RYCHNER, V. (eds.) (1998),

L'Atelier du Bronzier en Europe du XXe au VIIIe Siècle Avant Notre Ère, Vol. III.Comité des Travaux historiques et scientifiques, Paris.

NORTHOVER, P. (1989), "Non-ferrous metallurgy", en HENDERSON, J. (ed.),Scientific analysis in Archaeology.Oxford University Committee for Archaeology, Monograph No. 19, Exeter, pp.213-248.

OTTAWAY, B. S. (1994), Prähistorische Archäometallurgie.Liedorf, Espelkam.

ROVIRA, S. (1985), "Métodos analíticos aplicados al estudio y conservación de materiales arqueológicos", Revista de Arqueología, 47, pp. 13-19.

SCOTT, D. (1987),Metallography of ancient metallic artifacts. Institute of Archaeology, Londres.

TYLECOTE, R. F. (1979), A history of metallurgy.The Metals Society, Londres.

3.2. The first metallurgies of copper and bronze

CRADDOCK, P. T. (1995),Early metal mining and production.Edinburgh University Press,Edimburgo.

CHERNYKH, E.N. (1992),Ancient metallurgy in the USSR: the Early Metal Age, Cambridge University Press, Cambridge.

GALE, N. H. (ed.)(1991),Bronze Age trade in the Mediterranean .Studies in Mediterranean Archaeology, 90, Jönsered.

JOVANOVIĆ, B. (1971), "Los orígenes de la minería del cobre en Europa", Investigación y Ciencia, Julio 1971, pp. 94-101.

KRAUSE, R. (1997), "Vom Erz zur Bronze: Bergbau, Verhüttung und Bronzeguss",en Goldene Jahrhunderte:die Bronzezeit in Südwestdeutschland, K. Theiss, Stuttgart: 26-40.

MADDIN, R. (ed.) (1988),The beginning of the use of metals and Alloys. Massachusetts Institute of Technology, Cambridge-Massachusetts.

MAGGI, R. y PEARCE, M. (2005), "Mid fourth-millennium copper mining in Liguria, north-west Italy: the earliest known copper mines in Western Europe", *Antiquity*, 79: 66-77.

MONTERO, I. (1999), *Arqueometalurgia en el Mediterráneo*. Ediciones Clásicas. Centro de Estudios del Próximo Oriente, Madrid.

SARABIA, F.J. (1992), "Arqueología experimental: la fundición de bronce en la prehistoria reciente", *Rev. de Arqueología*, 130, pp. 12-22.

YENER, K.A. (2000), *The domestication of metals: the rise of complex metal industries in Anatolia* Brill, Leiden.

3.3. The tin problem

MUHLY, J.D. (1985), "Sources of Tin and the Beginnings of Bronze Metallurgy", *A.J.A.*, 89,2, pp.275-291.

PENHALLURICK, R.D. (1986), *Tin in antiquity*, The Institute of Metals, London.

SPINDLER, K. (1991), "Zur Herstellung der Zinnbronze in der frühen Metallurgie Europas", *Acta Praehistorica et Archaeologica*, 2, pp. 199-253.

3.4. Iron metallurgy

BENOIT, P. y FLUZIN, Ph.(eds) (1995), *Paléometallurgie du fer et Cultures-Symposium International du Comité pour la Siderurgie Ancienne*. Vulcain, Belfort.

BLOC B. The Study of Knappable lithic artefacts .

Andrefsky jr, W. (2007). "The application and misapplication of mass analysis in lithic debitage studies." *Journal of Archaeological Science* 34: 302-402.

Andrefsky jr, W., Ed. (2008). *Lithic Technology*. Cambridge, Cambridge University Press.

Andrefsky jr, W. (2009). "The Analysis of Stone Tool Procurement, Production, and Maintenance." *J Archaeol Res* 17: 65-103.

Andrefsky, J. W. (2000). *Lithics. Macroscopic approaches to analysis*, Cambridge University Press.

Williams, J. P. y Andrefsky Jr, W. (2011). "Debitage variability among multiple flint knappers." *Journal of Archaeological Science* 38(4): 865-872.

Boëda, E., J. M. Geneste, et al. (1990). "Identification des chaînes Operatoires lithiques du Paléolithique Ancien et Moyen." *Paleo* 2: 43-80.

Boëda, E. (1994). *Le concept Levallois: Variabilité des méthodes*. Paris, CNRS.

Brezillon, M. (1977). *La denomination des objets de pierre taillée. Matériaux pour un vocabulaire des préhistoriens de langue française*. Paris, CNRS.

Debénath, A. and H. Dibble (1994). *Paleolithic Typology. Lower and Middle*

Paleolithic of Europe. Philadelphia, University of Pennsylvania.

Demars, P.-Y. and P. Laurent (1992). *Types d'outils lithiques du Paleolithique superieur en Europe*. Paris, CNRS Plus.

Gibson, K. R. and T. Ingold (1993). *Tools, language and cognition in human evolution*. Cambridge, University Press.

Inizan, M. L., M. Reduron, et al. (1995). *Technologie de la pierre taillée. Prehistoire de la pierre taillée*. Meudon, Cercle de recherches et d'études préhistoriques.

- Inizan, M.-L., M. Reduron, et al. (1995). *Technologie de la pierre taillée*. Meudon Cedex. France, Cercle de Recherches et d'Etudes Préhistoriques.CNRS.
- Karlin, C., Ed. (1992). *Connaissances et savoir faire: Comment analyser un processus technique en Préhistoire: Introduction*. Tecnologia y Cadenas Operativas Líticas. Bellaterra, UAB.
- Laplace, G. (1972). "La typologie analytique et structurale: Base rationnelle d'étude des industries lithiques et osseuses."
- Laplace, G. (1974). "De la dynamique de l'analyse structurale ou la typologie analytique."
- Leakey, M. D. (1971). Olduvai Gorge. Excavations in Beds I and II, 1960-1963.
- Merino, J. M. (1994). *Tipologia Lítica*. San Sebastian, Munibe.
- Mora, R., X. Terradas, et al. (1992). *Tecnologia y Cadenas Operativas Líticas*. Bellaterra, UAB.
- Mora, R., J. Martínez-Moreno and J. Casanova (2008). "Abordando la noción de "variabilidad musteriense" en Roca dels Bous (Prepirineo suroriental, Lleida)." *Trabajos de Prehistoria* 65(2): 13-28.
- Piel-Desruisseaux, J. L. (1989). *Instrumental Préhistorico. Forma, fabricación, utilización*. Paris, Masson.
- Revillion, S. and A. Tuffreau (1994). *Les industries laminaires au Paléolithique moyen*. Paris, CNRS-CRA.
- Sonneville-Bordes, D. and J. Perrot (1955). "Lexic typologique du Paléolithique Supérieur." *B. S. P. F. L-LI-LII*.
- Tixier, J., M. L. Inizan, et al. (1980). *Préhistoire de la pierre taillée. Terminologie et technologie*. Valbonne.
- Tixier, J. (1984). *Préhistoire de la Pierre Taillée. Economie du débitage laminaire*. Valbonne, Cercle de recherches et d'études préhistoriques.
- Tixier, J. (1988). *Technologie Préhistorique. Journée d'études technologiques en préhistoire*, CNRS.
- VanPeer, P. (1992). *The Levallois reduction strategy*. Madison, Prehistory Press.

BLOC C. Study of pottery

1. The analysis of pottery: general works

- AA.VV. 1992. *Tecnología de la cocción cerámica desde la Antigüedad a nuestros días*, Asociación de Ceramología, Alicante: 19-38.
- Arnold, D.E. 1985. *Ceramic Theory and Cultural Process*, Cambridge University Press, Cambridge.
- Balfet, H.; Fauvet, M. F.; Monzon, S. (1989). *Lexique et typologie des poteries*. Presses du CNRS; 1ª ed.; París.
- Bey, G.J. y Pool, C.A. (eds) 1992, *Ceramic production and distribution-an integrated approach*, Westview Press, Boulder.
- Cumberpatch, C.G. y Blinkhorn, P.W. (eds) 1997. *Not so much a pot, more a way of life*, Oxbow Monograph 83, Oxford.
- Dedet, B.; Py, M. (1975). *Classification de la céramique non tournée protohistorique du Languedocméditerranéen*. Supplément 4; *Revue Archéologique de Narbonnaise*. París.
- Miskovski, J.-C. (Ed.)(2002). *Géologie de la Préhistoire: méthodes, techniques, applications*. Géopré; 1ª ed.; París.
- Orton, C., Tyers, P. y Vince, A. 1997. *La cerámica en arqueología*, Ed.Crítica, Barcelona

Rice, P. (1987). Pottery analysis-a sourcebook, University of Chicago Press, Chicago.

Rice, P. (1996a). Recent Ceramic Analysis: 1. Function, Style and Origins. *Journal of Archaeological Research*, vol 4, nº 2: pp 133-163.

Rice, P. (1996b). Recent Ceramic Analysis: 2. Composition, Production and Theory. *Journal of Archaeological Research*, vol 4, nº 3: pp 165-202.

Rye, O. S. (1988). Pottery technology. Principles and reconstruction. *Manuals on Archaeology*, 4; Ed. Taraxacum; 2ª ed.; Washington.

Shepard, A. 1980/1954. Ceramics for the archaeologist, Carnegie Institution of Washington, Washington.

2. Characterization studies

Aguayo, P.; Barahona, E.; Garrido, O.; Padial, B. (1998). Estudio preliminar de los depósitos de arcilla utilizados para la elaboración de cerámicas arqueológicas en la depresión natural de Ronda. In Bernabeu, J.; Orozco, T.; Terradas, X. (eds) (1998). Los recursos abióticos en la prehistoria. Caracterización, aprovisionamiento e intercambio: pp 173-188. Col·lecció Oberta, 2; 1ª ed.; Universitat de València.

Arnal, G.-B.; Gril, C.; Lalanne, J.-F. (1986). Caractérisation des céramiques préhistoriques par l'étude du dégraissant. Experimentation et analyses en céramologie préhistorique. *Archéologie Expérimentale. Cahier 2*: pp 69-82; Association pour la promotion de l'archéologie de Bourgogne; Meursault-Archéodrome.

Clop, X. (2007). Materia prima, Cerámica y Sociedad. BAR International Series 1660 (Oxford, Gran Bretanya).

Convertini, F. (1996). Production et signification de la céramique campaniforme à la fin du 3ème millénaire av. J.-C. dans le Sud et le Centre-Ouest de la France et en Suisse Occidentale. BAR International Series, 656; 1ª ed.; Oxford.

Courtois, L. (1976). Examen au microscope pétrographique des céramiques archéologiques. Notes et Monographies techniques, 8; C.R.A.; C.N.R.S.; 1ª ed.; París.

Echallier, J.-C. (1984). Elements de technologie céramique et d'analyse des terres cuites archéologiques. Documents d'Archéologie Méridionale; Methodes et Techniques, 3; 1ª ed; Association pour la Diffusion de l'Archéologie Méridionale; Lambesc.

Eiland, M. y Williams, Q. (2000), "Infra-red spectroscopy of ceramics from Tell Brak, Siria", *Journal of Archaeological Science*, 27: 993-1006.

Gómez-Gras, D. y Risch, R. 1999. "Análisis petrográficos de cerámicas de la Cova des Càrritx", en Lull, V., et al., La Cova des Càrritx y la Cova des Mussol-Ideología y sociedad en la prehistoria de Menorca, Consell Insular de Menorca, Barcelona: 567-580.

Hoard, R.J., O'Brian, M.J., Ghazavy, M. y Gopalaratnam, V.S. (1995), "A materials-science approach to understanding Limestone-tempered Pottery from the Midwestern United States", *Journal of Archaeological Science*, 22: 823-832.

Hunt, P.N. y Griffiths, D.R. 1989. "Optical petrology in the field", *World Archaeology*, 21 (1): 165-172.

Kilikoglou, V., Vekinis, G., Maniatis, Y. y Day, P.M. (1998), "Mechanical performance of quartz-tempered ceramics: part I, strength and toughness", *Archaeometry*, 40.2: 261-279.

Levi, S.T. y Loschi Ghittoni, A. (1997), "Gli impasti ceramici di siti terramaricoli del territorio modenese", en Bernabó Brea, M. et al. (eds), Le Terramare: La più antica civiltà Padana. Electa, Milano, pp. 487-497.

Lindahl, A. y Stilborg, O. (eds.) (1995), The aim of laboratory analyses of ceramics in Archaeology, Konferenser 34, Vitterhets, Lund. London, G. 1981. "Dung tempered clay", *Journal of Field Archaeology*, 8: 189ss.

Magetti, M. y Schwab, H. (1982), "Iron age pottery from Châtillon-S-Glâne and the Heuneburg", *Archaeometry*, 24, 1: 21-36.

Middleton, A. y Freestone (eds) 1991. Recent developments in ceramic petrology, British Museum Laboratory, London.

Navarrete, M^a. S.; Capel, J.; Linares, J.; Huertas, F.; Reyes, E. (1991). Cerámicas neolíticas de la provincia de Granada. Materias primas y técnicas de manufacturación. Monográfica Arte y Arqueología, 9;1^a ed.; Universidad de Granada.

Olaetxea, C. 2000, La tecnología cerámica en la protohistoria vasca, Munibe-Suplemento^o 12, Donostia.

Rye, O.S. (1976), "Keeping your temper under control: materials and manufacture of Papuan pottery", *Archaeology and Physical Anthropology in Oceania*, 11: 106-137.

Stimmell, C. (1978), "A preliminary report on the use of salt in shell tempered pottery of the upper Mississippi Valley", *The Wisconsin Archaeologist* 59: 226-274.

3. Function and use of pottery

Braun, D. P. (1983). Pots as tools.

Moore, J. A.; Keene, A. S. (Eds.) (1983). *Archaeological hammers and theories*: pp 107-134. Academic Press; 1^a ed.; New York.

Bronitsky, G. (1986). The Use of Materials Science Techniques in the Study of Pottery Construction and Use. *In* Schiffer, M. B. (1986). *Advances in Archaeological Method and Theory*, vol 9: pp 209-276. Academic Press; Orlando.

Bronitsky, G.; Hamer, R. (1986). Experiments in ceramic technology: The effects of various tempering materials on impact and thermal-shock resistance. *American Antiquity*, 51, 1: pp 89-101.

DeBoer, W.R. 1974. "Ceramic longevity and archaeological interpretation", *American Antiquity*, 39: 335-343.

Dugay, L. 1996, "Specialised pottery production on Bronze Age Cyprus and pottery use-wear analysis", *Journal of Mediterranean Archaeology*, 9.2: 167-192.

Ericson, J.E. y Stickel, E.G. 1973. "A proposed classification system for ceramics", *World Archaeology*, 4 (3):357-367.

Evershed, R.P. 1995. "Analysis of organic residues from ceramic vessels", en Shennan, S.J., *Bronze Age copper producers of the Eastern Alps-excavations at St.Veit-Klingberg*, Rodolf Habelt, Bonn.

Hagstrum, M.B. y Hildebrand, J.A. 1990. "The two-curvature method for reconstructing ceramic morphology", *American Antiquity*, 55: 388-403.

Henrickson, F.E. y McDonald, M.M. 1983. "Ceramic form and function: an ethnographic search and an archaeological application", *American Anthropologist*, 85:630-643.

Juhl, K. (1995). *The Relation between Vessel Form and Vessel Function. A methodological Study*. AmS-Skrifter 14; Arkeologisk museum i Stavanger.

Lesure, R.G. 1998. "Vessel form and function in an Early Formative ceramic assemblage from coastal Mexico", *Journal of Field Archaeology*, 25: 19-36.

Mills, B.J. 1989. "Integrating functional analyses of vessels and sherds through models of ceramic assemblage formation", *World Archaeology*, 21: 133-147.

Skibo, J.M. 1992 *Pottery Function: a use alteration perspective*, Plenum Press, Nueva York. Whalen.

Software

No specific software is necessary

