

# Evolution of archaeometric studies on ceramics and glass in Ceramic Science and Technology journals: A comparative analysis from BSECV, JECerS and JACerS in the period 2000–2023

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## ABSTRACT

Studies of ceramics and glass from an archaeometric perspective have considerably increased during the last few decades in Ceramic Science and Technology journals. This paper presents a bibliometric study undertaken on 147 archaeometric articles published between 2000 and 2023 in the Q1 high impact journals Boletín de la Sociedad Española de Cerámica y Vidrio (BSECV), Journal of the European Ceramic Society (JECerS) and Journal of the American Ceramic Society (JACerS). The study was carried out with the aim at determining the impact and evolution of Archaeometry in these journals, the characteristics of the materials studied, and the level of interdisciplinarity and interinstitutional collaboration in the archaeometric works published. The main parameters analyzed were: number of archaeometric publications, materials studied, authors, and institutions. Resulting data indicated that journals have experienced an increase in archaeometric works on historical and archeological ceramics and glass, and BSECV is the journal with the highest representation. Spanish universities and other public institutions have a very outstanding representation in all three journals. In recent years, archaeometric approaches have included more authors and institutions from different countries, which evidences a high level of interdisciplinarity and interinstitutional collaboration.

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## Evolución de los estudios arqueométricos de cerámica y vidrio en las revistas de Ciencia y Tecnología Cerámica. Un análisis comparativo de BSECV, JECerS y JACerS en el periodo 2000-2023

## RESUMEN

Los estudios de cerámica y vidrio desde una perspectiva arqueométrica han aumentado considerablemente en las últimas décadas en las revistas de Ciencia y Tecnología Cerámica.

### Palabras clave:

Cerámica

Vidrio

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Arqueometría  
Estudio bibliométrico  
Publicaciones

Este trabajo presenta un estudio bibliométrico de 147 artículos arqueométricos publicados entre 2000 y 2023 en las revistas Q1 de alto impacto Boletín de la Sociedad Española de Cerámica y Vidrio (BSECV), Journal of the European Ceramic Society (JECerS) y Journal of the American Ceramic Society (JACerS). El estudio se llevó a cabo con el objetivo de determinar el impacto y la evolución de la arqueometría en estas revistas, las características de los materiales, y el grado de interdisciplinariedad y de colaboración interinstitucional en los trabajos publicados. Los principales parámetros analizados fueron: número de trabajos arqueométricos, materiales estudiados, autores e instituciones. Los resultados indicaron que las revistas han experimentado un incremento en las publicaciones arqueométricas de cerámica y vidrio históricos y arqueológicos, siendo el BSECV la revista con una mayor representatividad. Las universidades y otras instituciones públicas españolas tienen una representación muy destacada en las tres revistas. En los últimos años, las aproximaciones arqueométricas incluyen más autores e instituciones de distintos países, lo cual evidencia un alto grado de interdisciplinariedad y de colaboración interinstitucional.

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## Introduction

Ceramic and glass are two widely used materials throughout history. Ceramic was the first synthetic material created by humans and is the most abundant in the archeological record of societies over the last ten thousand years. Glass, which appeared later in mid 3<sup>rd</sup> millennium BC in the Near East, has been particularly appreciated for its exceptional properties and has become a versatile material for the production of both ornamental and everyday objects [1].

Due to the interest of Archaeology and Cultural Heritage studies in these materials, there has been an exponential growth in archaeometric investigations related to the characterization of archeological and historical materials through the application of advanced chemical-physical techniques in recent decades. This trend is confirmed by the increase of archaeometric works in technological and experimental science journals, as well as in international congresses, which aim to know their technological characteristics, the properties and origin of their raw materials, and their state of preservation [2–4]. Within this framework, ceramic and glass societies such as SECV (the Spanish Ceramic and Glass Society), ECerS (the European Ceramic Society) and ACerS (the American Ceramic Society) should play an important role in publication of investigations focused on Cultural Heritage, by incorporating archaeometric articles in their journals.

Giving this general trend, a bibliometric study on 147 archaeometric articles published in three high impact Materials Science journals in the category of ceramics during the period 2000–2023 has been carried out, namely: *Boletín de la Sociedad Española de Cerámica y Vidrio* (BSECV), *Journal of the European Ceramic Society* (JECerS), both published by Elsevier, and *Journal of the American Ceramic Society* (JACerS), published by Wiley-Blackwell. The specific goals of the study were to determine the contribution and the impact of archaeometric works on ceramics and glass in the scientific societies engaged in these materials, the characteristics of the materials studied, the level of interdisciplinarity and interinstitutional collaboration in archaeometric publications, and their evolution and trends over the last two decades. The

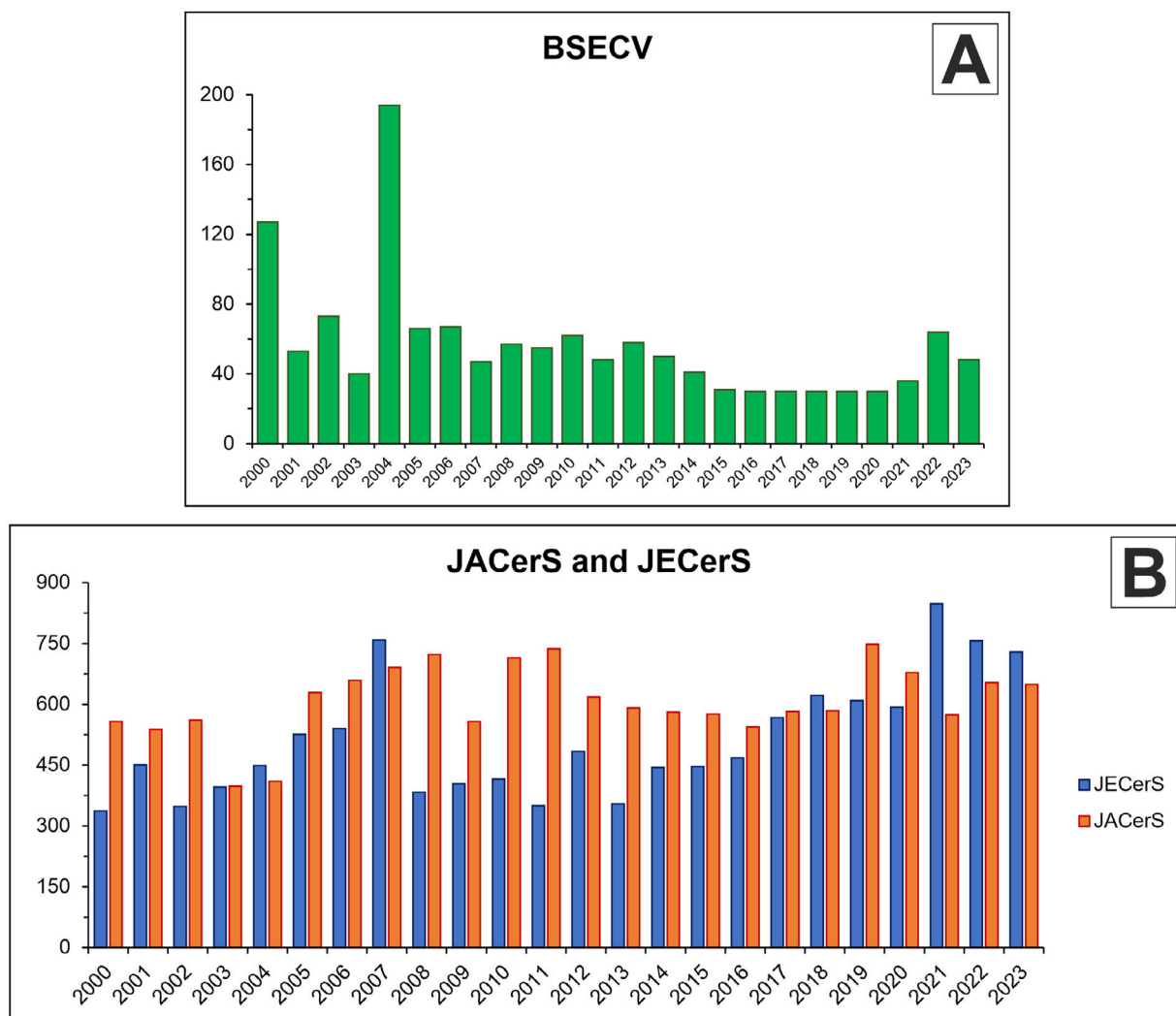
interest in these three journals is due to the following characteristics:

- They are comparable journals within the group of Materials Science in the category of ceramics and all of them belong to ceramic and glass societies with an international scope. These societies have specific sections and working groups devoted to Art, Archaeometry and Cultural Heritage: BSECV <https://secv.es/secv/#secciones>; JECerS <https://ecers.org/en/ec/working-groups> and JACerS <https://ceramics.org/members/member-communities/divisions/>.
- They are journals with a high impact in Materials Science, ranked Q1 by Journal Impact Factor (JCR 2023) in the category of 'Materials science, ceramics' (BSECV at 7/31; JECerS at 2/31; JACerS at 4/31).
- No previous specific bibliometric studies on archaeometric works have been carried out taking into account such journals. Other bibliometric studies focused on the BSECV were concerned with more general issues about the journal such as the compliance of formal standards and coverage by databases [5,6], its impact factor [7,8] or its thematic distribution [9]. Only a few bibliometric studies included all three scientific journals in their analyses [10,11].

The number of archaeometric works and the type, chronology and provenance of materials studied were analyzed. Given the importance of interdisciplinarity and interinstitutional collaborations in archaeometric work, other parameters such as the number of authors, and the number, type and origin country of institutions were also analyzed.

## Methodology

To carry out the bibliometric study, the titles of all the articles, technical notes and communications published during the last two decades in the three scientific journals BSECV, JECerS and JACerS, were consulted. Those works on archaeometric characterization were selected for a more detailed analysis. On the contrary, those works that put forward methodological



**Fig. 1 – Annual evolution (2000–2023) of the number of publications. (A) BSECV. (B) JECerS and JACerS.**

proposals for determining absolute dating of ceramic materials were not taken into consideration [12–15].

To shed new light on the evolution of recent archaeometric investigations, it has been considered to limit the study to the last 24 years (2000–2023), a representative period in which archaeometric works have experienced a significant growth in either national or international journals.

To evaluate the articles consulted, a data management spreadsheet was created for each journal containing all the archaeometric works and their most relevant information including issue, year, volume, title, number of authors, filiation, material studied and techniques applied. The generated spreadsheets have enabled the construction of a database with all the parameters studied, thereby allowing comparison between the three journals.

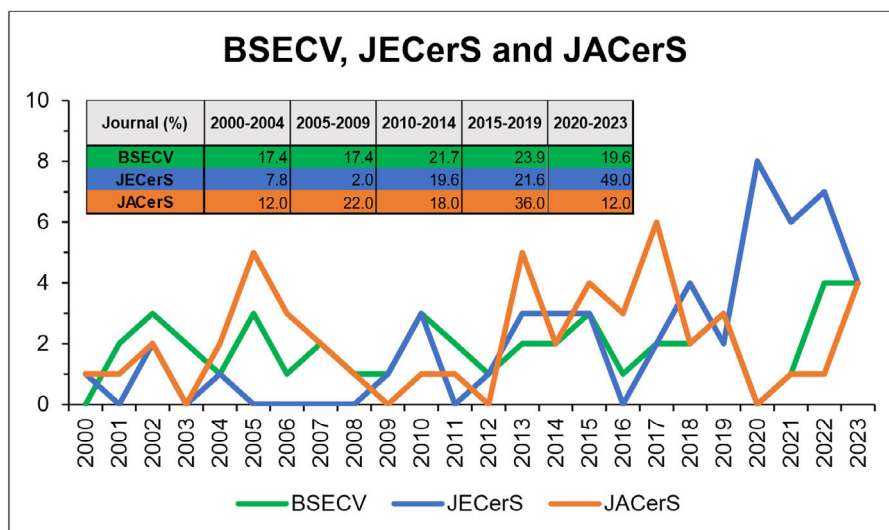
## Results and discussion

### Number of publications

During the period 2000–2023, 1,367 publications (articles and technical notes) have been identified in BSECV, 12,282 pub-

lications (articles and review articles) in JECerS, and 14,556 publications (articles, communications, and rapid communications) in JACerS. Despite the difference in the volume of publications between BSECV (the journal of a professional society from a European country) and both JECerS and JACerS journals (bigger professional societies with significant international impact), in all of them the results show a trend toward stabilization or an increase in annual publications in the last four years (2020–2023) compared to the immediately preceding years (Fig. 1).

Of the total number of publications during the period 2000–2023, 46 archaeometric works have been identified in BSECV (3.4%), 51 in JECerS (0.4%) and 50 in JACerS (0.3%). Therefore, in percentage terms, the archaeometric investigations show a higher impact in BSECV, while lower representativeness is documented in the JECerS and JACerS journals. Furthermore, a progressive increase in the volume of archaeometric works in the journals is appreciated over the last few years. Thus, the highest number of archaeometric publications is identified in the five-years period 2015–2019 in BSECV (23.9%) and in JACerS (36.0%), and in the four-years period 2020–2023 in JECerS (49.0%) (Fig. 2).



**Fig. 2 – Annual evolution (2000–2023) of the number of archaeometric works. The table shows the percentage of archaeometric works for every five-years period (except the last period 2020–2023 = four years).**

## Materials

### Originals and replicates

Archaeometric works of all three journals analyzed show common goals in their investigations: by studying the original materials (archeological, historical and/or traditional ones), authors try to determine the characteristics and provenance of the raw materials, the technological processes and their state of preservation. In addition, there is a very significant percentage of samples in the JECerS and JACerS journals that are replicates or reproductions of archeological and historical materials synthesized in the laboratory (JECerS: 17.7%; JACerS: 28.0%, Table 1). Replicates are characterized to determine their technological processes or the chemical–physical reactions that take place under different simulated conditions.

### Analytical techniques

Archaeometric works of all three journals include the application of conventional and widely used analytical techniques in the field of Materials Science:

- Ceramics are mostly studied by applying: SEM-EDS (Scanning Electron Microscopy – Energy Dispersive X-ray spectroscopy) to determine the microstructure and the sintering process; XRD (X-ray Diffraction) to identify crystalline phases and to estimate firing temperatures; and XRF (X-ray Fluorescence) or any other elemental chemical composition technique used along with multivariate statistical analysis to identify different chemical profiles. Petrographic analysis by thin section is mainly applied in the BSECV and JECerS journals, while thermogravimetric analysis (TGA and derivatives) and RHX (Rehydroxylation dating) are especially applied in JACerS.
- Glass and ceramic glazes are mostly studied by applying: SEM-EDS to determine their microstructure; XFR or any other elemental chemical composition technique to determine elemental composition; XRD and  $\mu$ -XRD to especially

identify crystalline compounds in enamels and ceramic glazes, devitrification processes or even crystalline phases in weathering layers and dirt deposits; UV–Vis spectroscopy to identify the chromophores, and reflected light optical microscope for general observations. Raman spectroscopy and TEM-EDS are mainly applied in the JECerS and JACerS journals.

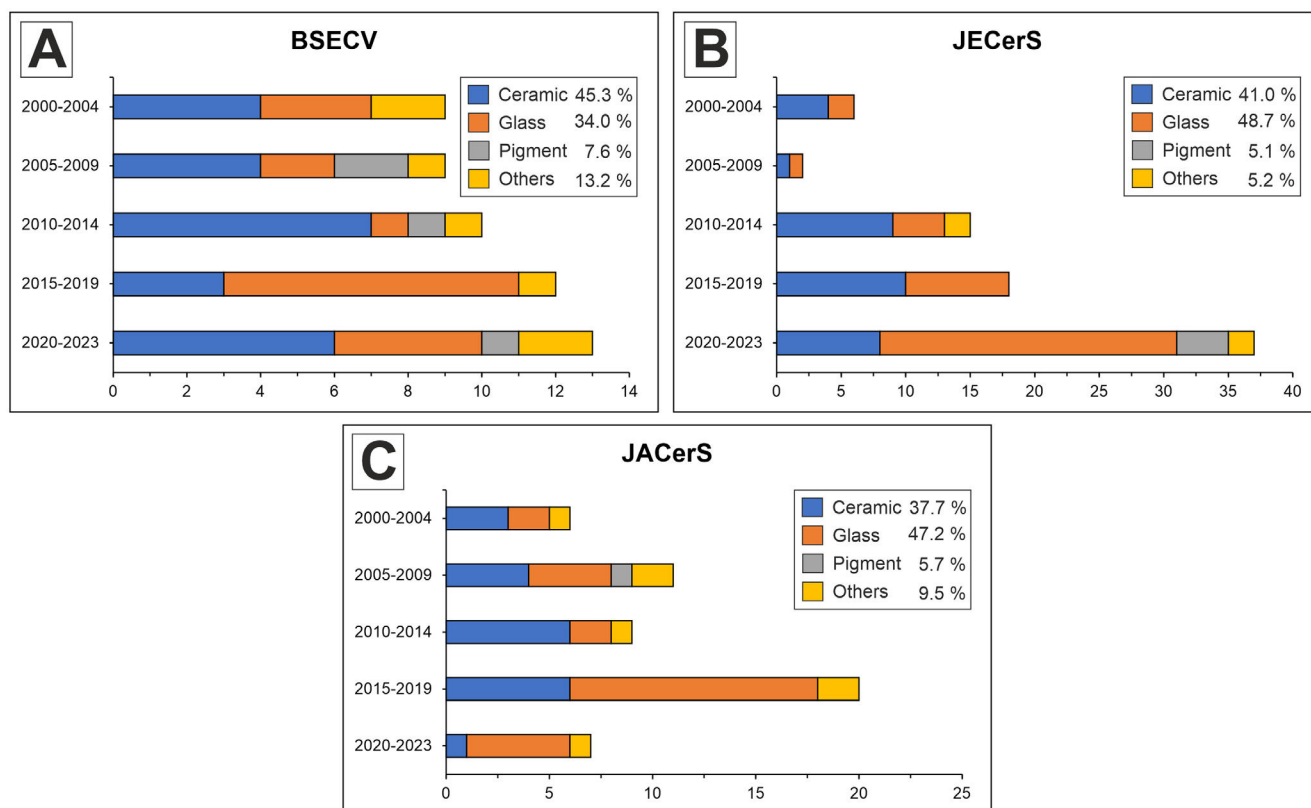
### Type of materials

In all three journals there is a predominant percentage of ceramic materials and glass, which represent between 79.3 and 89.7% of the total number of materials studied.

- In BSECV (Fig. 3A), ceramics represent 45.3% and correspond mainly to vessels [16], building elements [17] and other items such as terra-cotta figurines [18]. 34.0% corresponds to glass such as stained-glass windows from cathedrals and churches [19], ceramic glazes [20] and beads [21]. The rest of materials are less numerous: 7.6% corresponds to pigments applied to wall paintings, building elements or ceramic glazes (pigment enamels) [22]; 3.8% corresponds to mortars and the remaining 9.4% to other materials such as bones, minerals and shells [23].
- In JECerS (Fig. 3B), ceramics represent 41.0% and correspond mainly to vessels (especially Chinese porcelain) [24], building elements [25] and figurines [26]. 48.7% corresponds to glass, ceramic glazes, as well as stained-glasses and mosaics [27]. The remaining materials are less numerous: 5.1% corresponds to pigments applied to painted ceramics and grisaille applied to stained-glasses [28]; 1.3% corresponds to mortars [25] and the remaining 3.9% to other materials.
- In JACerS (Fig. 3C), ceramics represent 37.7% and corresponds mainly to vessels such as European and Asian porcelain [29], but also building elements [30], kilns and crucibles [31]. 47.2% corresponds to glass, ceramic glazes [32], as well as stained-glasses [33], enamels on metal [34] and even photographic plates [35]. The remaining materials are

**Table 1 – Number and percentage of the original materials, replicates and both in the archaeometric works.**

Journals	Original		Replicate		Both		Total	
	No.	%	No.	%	No.	%	No.	%
BSECV	42	91.3	1	2.2	3	6.5	46	100.0
JECerS	36	70.6	9	17.7	6	11.8	51	100.0
JACerS	2	4.0	14	28.0	34	68.0	50	100.0

**Fig. 3 – Type of materials studied in the archaeometric works for every five-years period (except the last period 2020–2023 = four years) and general percentage. (A) BSECV. (B) JECerS. (C) JACerS.**

less numerous: 5.7% corresponds to pigments applied on ceramic materials [36]; 1.9% corresponds to lime mortars and the remaining 7.6% to other materials such as stone tools, limestone or Roman concrete [37].

From a diachronic perspective, ceramic is the most studied material in all three journals until the period 2015–2023, when publications focused on glass and other materials begin to be more numerous due to the growing interest in the study of ceramic glazes and other types of glasses.

#### Cultural and chronological classification of ceramic materials and glass

Ceramic materials and glasses characterized in the archaeometric works belong to a wide range of cultures and chronologies, which can be grouped in specific periods.

Ceramic materials. In all three journals there is a noticeable interest in the study of ceramics vessels such as amphorae and *terra sigillata* from Classical Antiquity (Ancient Greece and Rome), especially in BSECV (26.9% of the total num-

ber of ceramics studied, Fig. 4A) [38] and in JACerS (29.6%, Fig. 4C) [39]. In both journals there is also a high percentage of ceramics from the Late Modern period such as Buen Retiro [40] and Meissen [41] porcelains or building elements [42] (Fig. 4C). On the contrary, in JACerS there is a noticeable interest in the study of Early Modern ceramics such as majolica [43] and crucibles [44] (Fig. 4C). The distribution between the different periods is more homogeneous in JECerS, especially from Classical Antiquity to the Late Modern period (Fig. 4B). However, the highest percentages of JECerS were found in medieval ceramics, mainly Islamic luster wares [45], and Chinese porcelain with a wide chronological range from the 1<sup>st</sup> to the 15<sup>th</sup> centuries AD [46] (Fig. 4B). Archaeometric works on ceramics dated before the Classical Antiquity (Neolithic, Chalcolithic, Bronze Age and Iron Age) are not abundant in JACerS (7.4%, Fig. 4C) [47], while the studies of pre-Roman Iron Age ceramic vessels in BSECV (15.4%, Fig. 4A) [48], and Chalcolithic and Bronze Age figurines and other potsherds in JECerS (9.8%, Fig. 4B) [26] are more abundant.



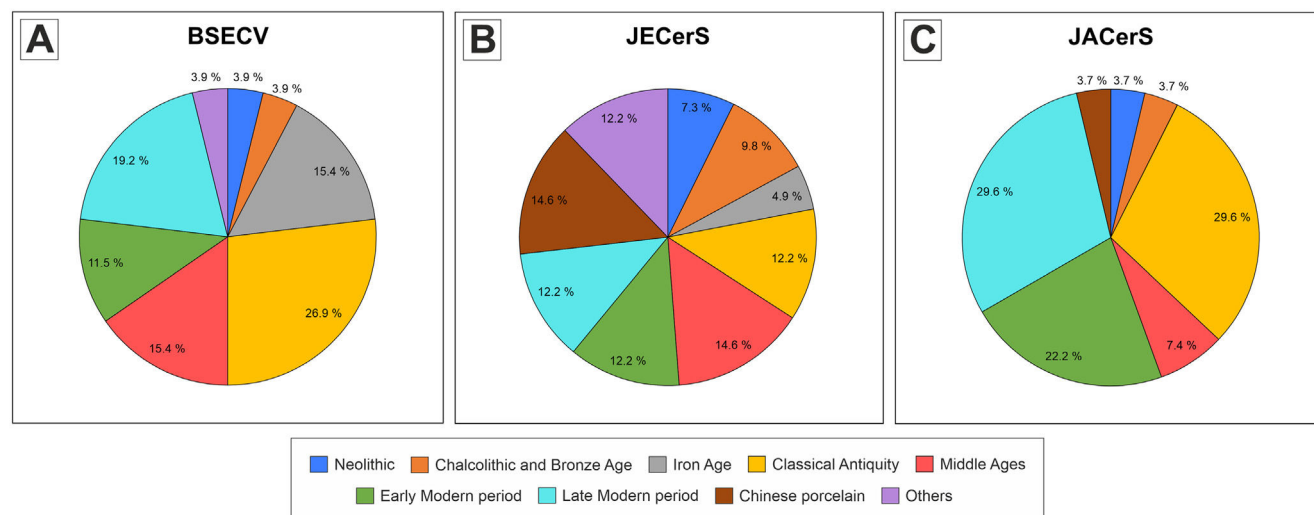


Fig. 4 – Percentages of the cultural-chronological classification of ceramics studied. (A) BSECV. (B) JECerS. (C) JACerS.

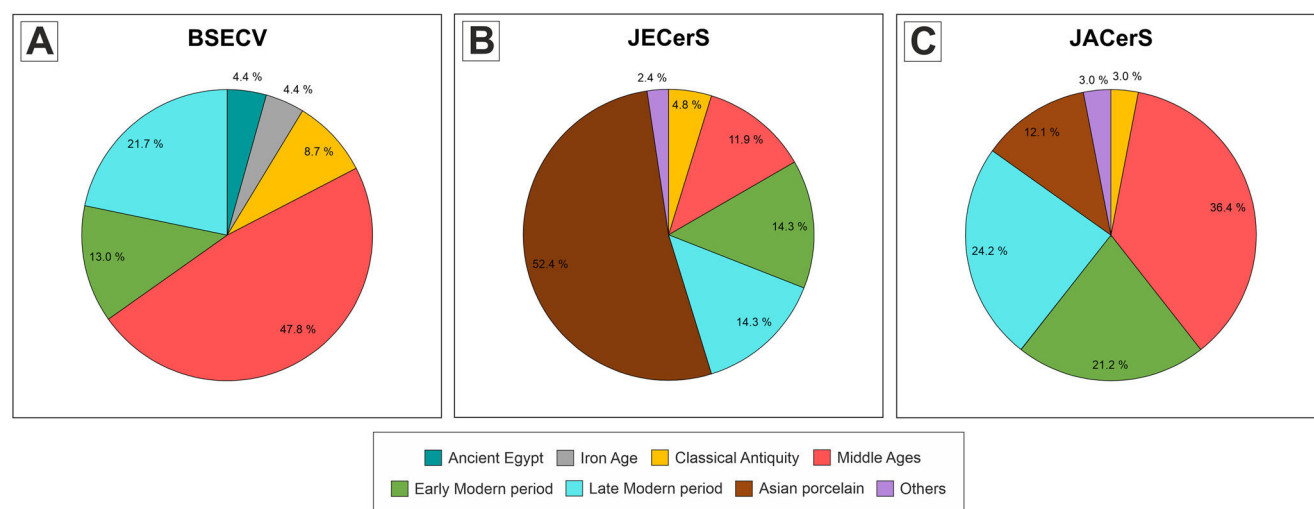


Fig. 5 – Percentages of the cultural-chronological classification of glasses studied. (A) BSECV. (B) JECerS. (C) JACerS.

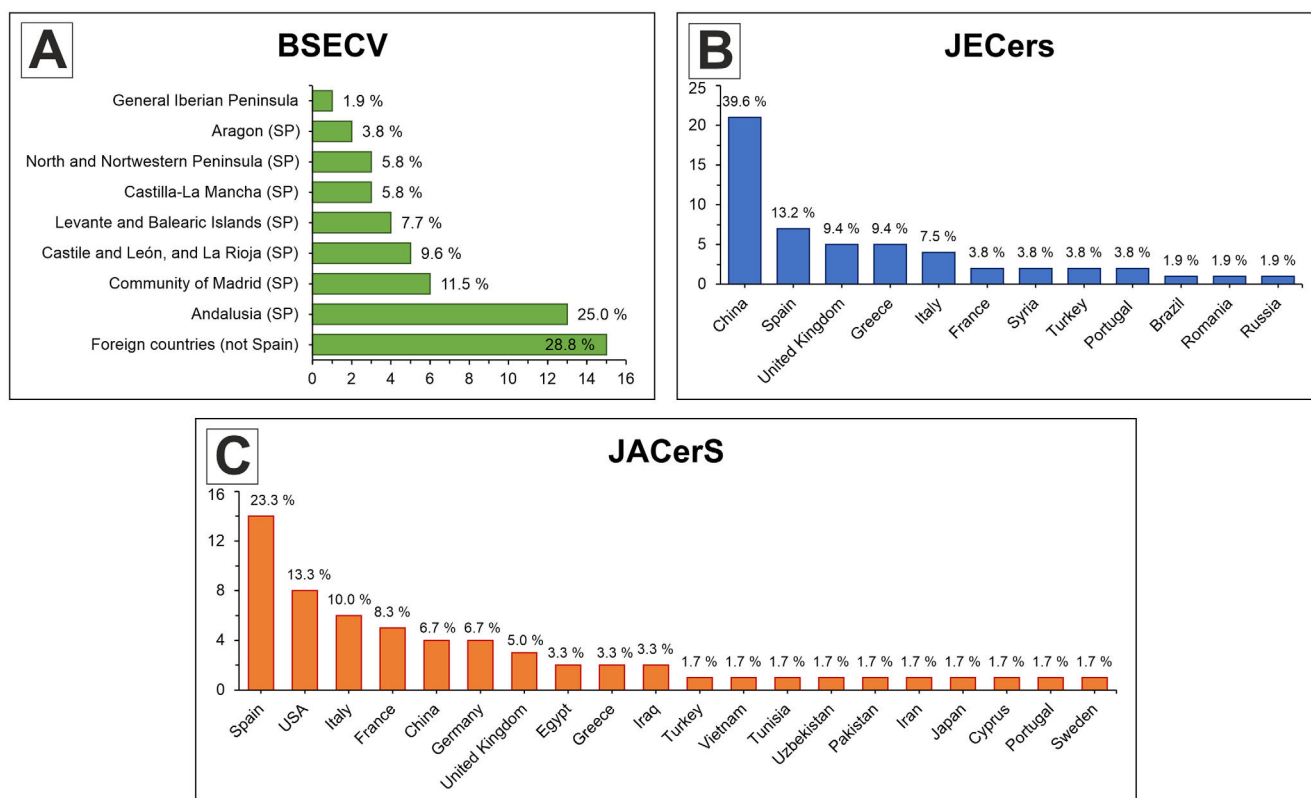
Glass. In all three journals there is a noticeable interest in the study of glass dated from the Middle Ages to the Late Modern period, including samples of different types such as stained-glass windows from cathedrals and churches [49], ceramic or porcelain glazes [50], tesserae from mosaics [27] and even photographic plates [35]. The predominance of this period is particularly evident in BSECV (82.5%, Fig. 5A) and JACerS (81.8%, Fig. 5C) with a significant contribution of medieval glass. In JECerS, more than half of the glasses studied (52.4%, Fig. 5B) corresponds to Asian porcelain glazes with a chronological range from the 1<sup>st</sup> to the 17<sup>th</sup> centuries AD, which have been mostly studied by Chinese research teams. The JECerS and JACerS journals have not published any work on archaeological glass dated to a period before the Roman times (Fig. 5B and C).

#### Material provenance

Considering the geographical origin of the archaeological and historical materials studied, there is a clear difference

between the international scope of BSECV and the global scale of both JECerS and JACerS journals.

- In BSECV (Fig. 6A), 71.2% of the total number of materials comes from different Spanish regions. They are mostly Roman ceramics, building elements of medieval historical buildings, and modern pigments and supports from Andalusia (25.0%) [51]. Although less abundant, there is also a noticeable percentage of porcelains and medieval and Early Modern building elements from the Regional Community of Madrid (11.5%) [40]. It is important to note that 28.8% of materials come from other countries such as Egypt, France and Italy, most of them studied through collaborations with Spanish institutions [52].
- In JECerS (Fig. 6B), materials come from different European, American and Asian countries. Materials from China predominate with 39.6% due to the interest in the study of Asian porcelain [53]. The second country in terms of material provenance is Spain with 13.2%, and includes a range



**Fig. 6 – Percentages of the geographic provenance of materials studied. (A) BSECV. (B) JECers. (C) JACerS. Abbreviation: SP = Spain.**

of materials such as Islamic luster ware, Roman amphorae and modernist stained-glasses [49]. The remaining 47.2% of materials come from other countries such as the UK, Greece, Italy and France [54].

- In JACerS (Fig. 6C), materials come from 20 different countries. It is the most international of the three journals in terms of materials provenance. The first country is Spain with 23.3% works. They include a range of materials such as Islamic luster ware, Buen Retiro porcelain [29] or stained-glass windows. The second country is the USA with 13.3% works, and includes a wide variety of materials such as Late Modern period vessels and building elements [42], Meissen porcelain [41] or even historical glass flutes [55]. The remaining 63.4% of materials come from a large number of countries such as medieval, Etruscan and Roman ceramics from Italy (10.0%) [30] and European porcelain or medieval stained-glasses from France (8.3%) [41].

### Authors and institutions

Considering the importance of interdisciplinarity in archaeological works, the data on the number of authors and their affiliations have been evaluated to determine the level of inter-institutional collaboration in the publications.

#### Number of authors

Most of the archaeometric works (around 98.0% of the total) are written by several authors, while the number of works

written by a single author is very low (1 article in the BSECV and JACerS journals, Fig. 7A and C; 2 articles in JECers, Fig. 7B). Those works written by 2 authors constitute a small percentage in all journals (between 8.0 and 11.0%), mainly concentrated in the period 2000–2019 and followed by works with 3 authors (13.7–15.2%, Fig. 7A–C). The journal JACerS stands out for its high number of works with 4 authors (24.0%, Fig. 7C), which is slightly lower in the BSECV and JECers journals (15.2–15.7%, Fig. 7A and B). Those publications written by 5 authors do not exceed 18.0% in any of the three journals and start to be more numerous especially in the BSECV and JECers journals during the period 2010–2023 (Fig. 7A and B). Archaeometric works of all three journals are mostly written by 6 or more authors, exceeding 40.0% and especially concentrated in the period 2005–2023 (Fig. 7A–C).

Therefore, publications with more authors are more numerous during the last decades, which confirms the interdisciplinary feature of archaeometric works. Furthermore, from a diachronic perspective, an increase of works with more than 5 authors can be noticed in the last years (2020–2023), especially in the BSECV (Fig. 7A) and in JECers (Fig. 7B) journals, although this trend is not evident in JACerS due to the small number of archaeometric works during this period (6 publications, Fig. 7C).

#### Number of institutions

Regarding the authors' affiliation, all three journals show a predominance of archaeometric works including collaboration

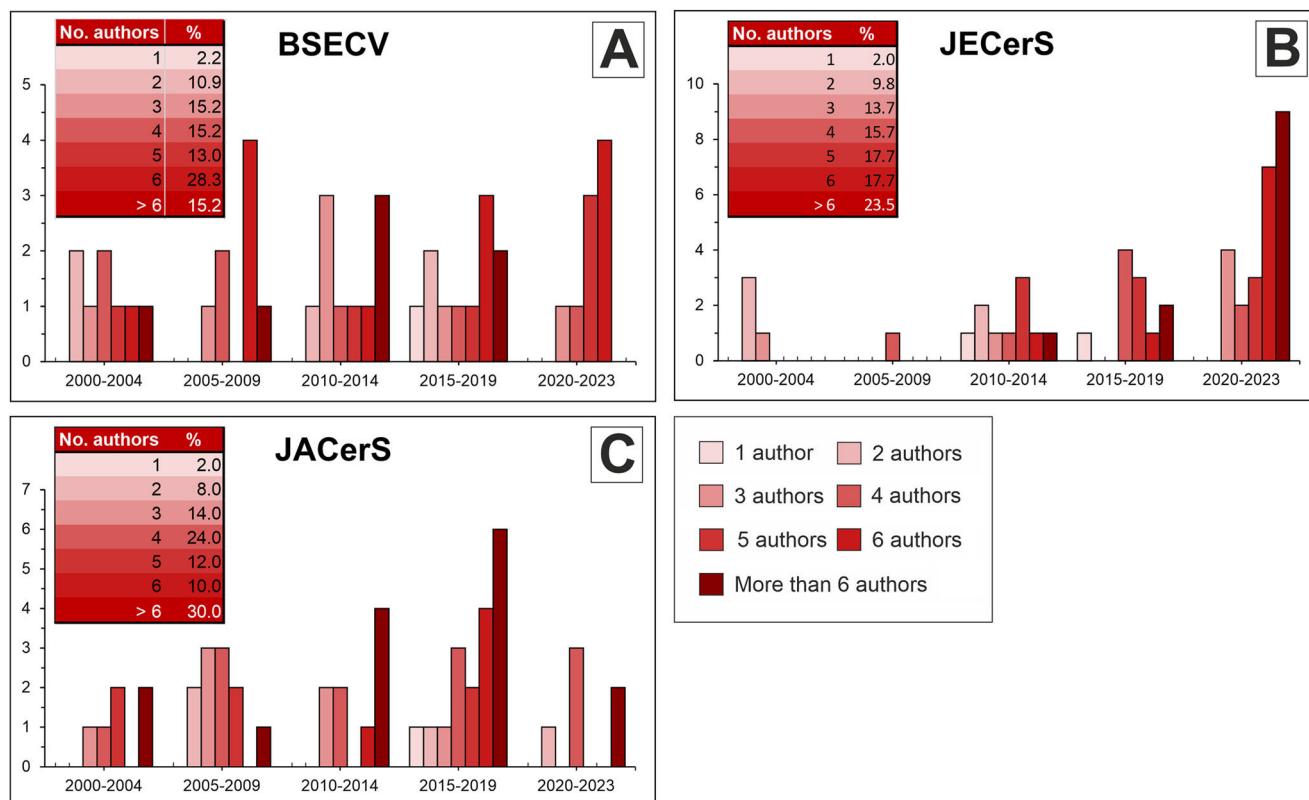


Fig. 7 – Evolution of the number of authors publishing archaeometric works for every five-years period (except the last period 2020–2023 = four years) and general percentage. (A) BSECV. (B) JECerS. (C) JACerS.

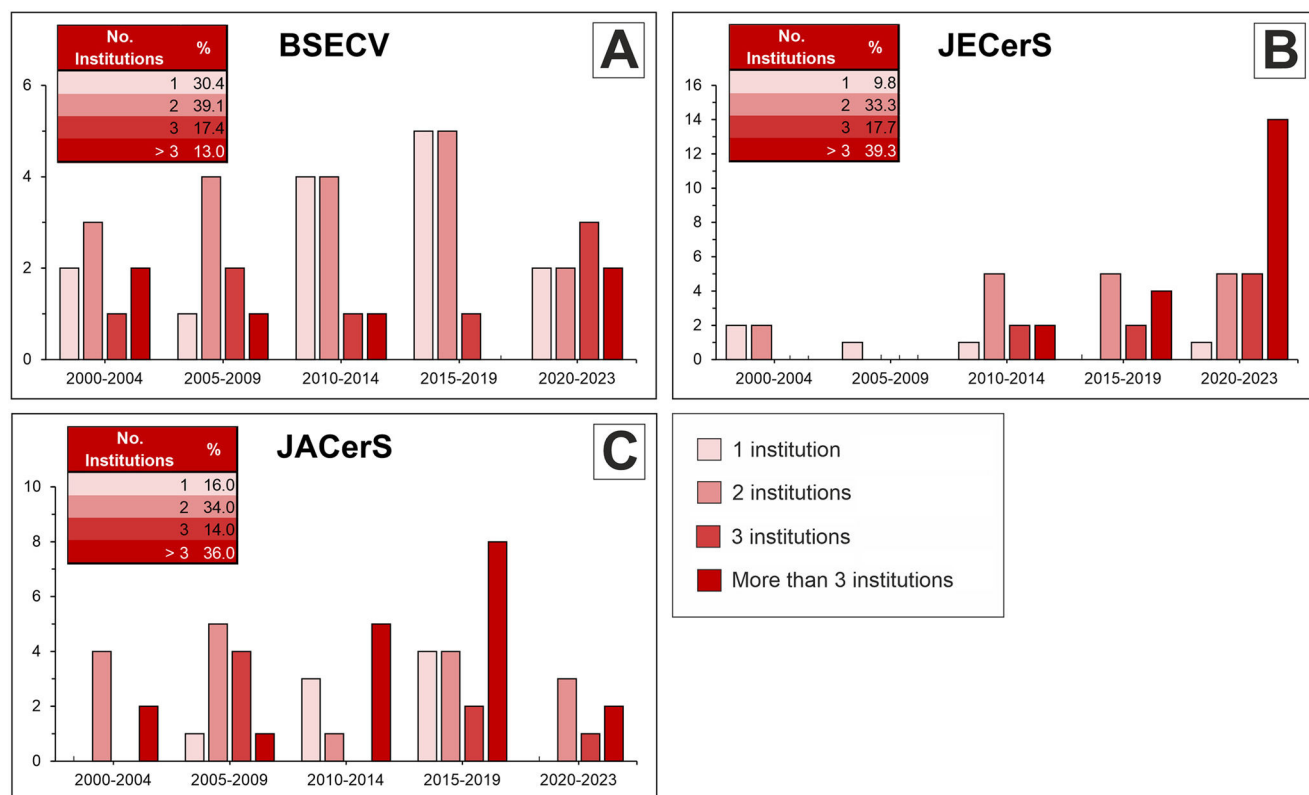
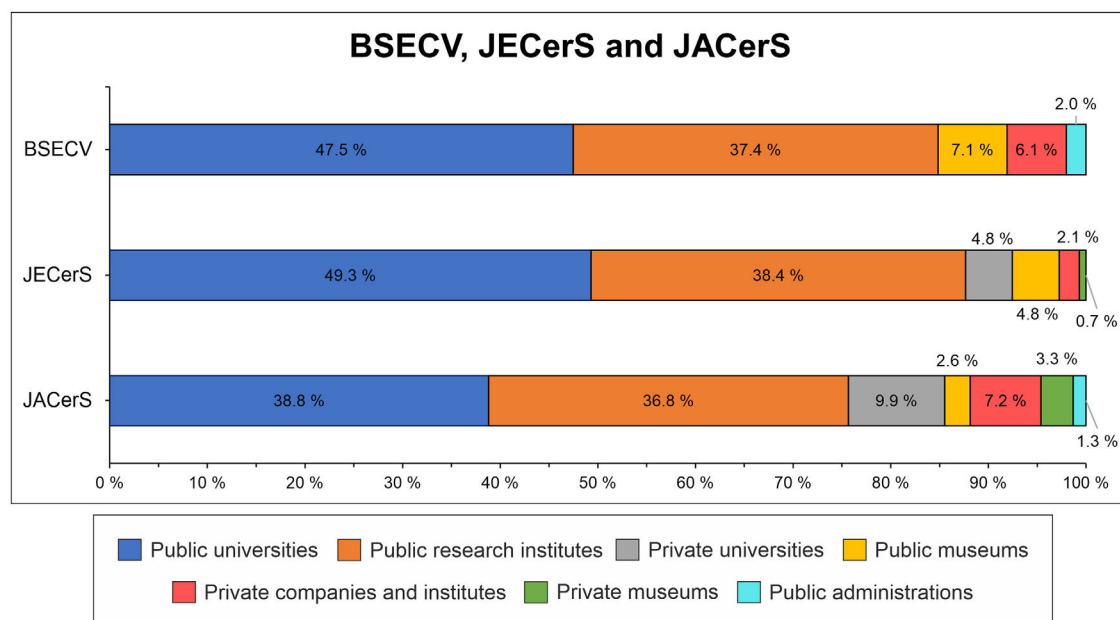


Fig. 8 – Evolution of the number of institutions publishing archaeometric works for every five-years period (except the last period 2020–2023 = four years) and general percentage. (A) BSECV. (B) JECerS. (C) JACerS.





**Fig. 9 – Percentage of the type of institutions publishing archaeometric works.**

of at least 2 institutions (over 70.0% of the total number of works), although a significant percentage of BSECV publications are written by a single institution (30.4%, Fig. 8A). Those works with collaboration of 2 institutions represent significant percentages in all three journals (between 33.3 and 39.1%), distributed more or less homogeneously over the years, although particularly relevant in the last decade (2010–2023) in JECerS (Fig. 8B). Between 14.0 and 17.7% of the publications in the three journals have collaborations between 3 institutions (Fig. 8A–C). The JECerS and JACerS journals stand out for their noticeable number of publications with more than 3 institutions (36.0–39.3%, Fig. 8B and C), especially observed in the last four years (2020–2023). The data show that the JECerS and JACerS journals, with larger projects and more funding, commonly publish articles with larger collaborations than BSECV due to the high number of institutions involved, above all in recent years (2015–2023).

#### *Type of institutions and public-private collaboration*

**Public sector.** In all three journals there is a predominance of public universities collaborations with a percentage between 38.8 and 49.3% of the total number of institutions (Fig. 9). The most represented public universities in the archaeometric works are the University of Seville (Spain) and the University of Barcelona (Spain) in BSECV, the Polytechnic University of Catalonia (Spain) and the Shaanxi University of Science and Technology (China) in JECerS, and the University of Barcelona (Spain) and the Michigan Technological University (USA) in JACerS.

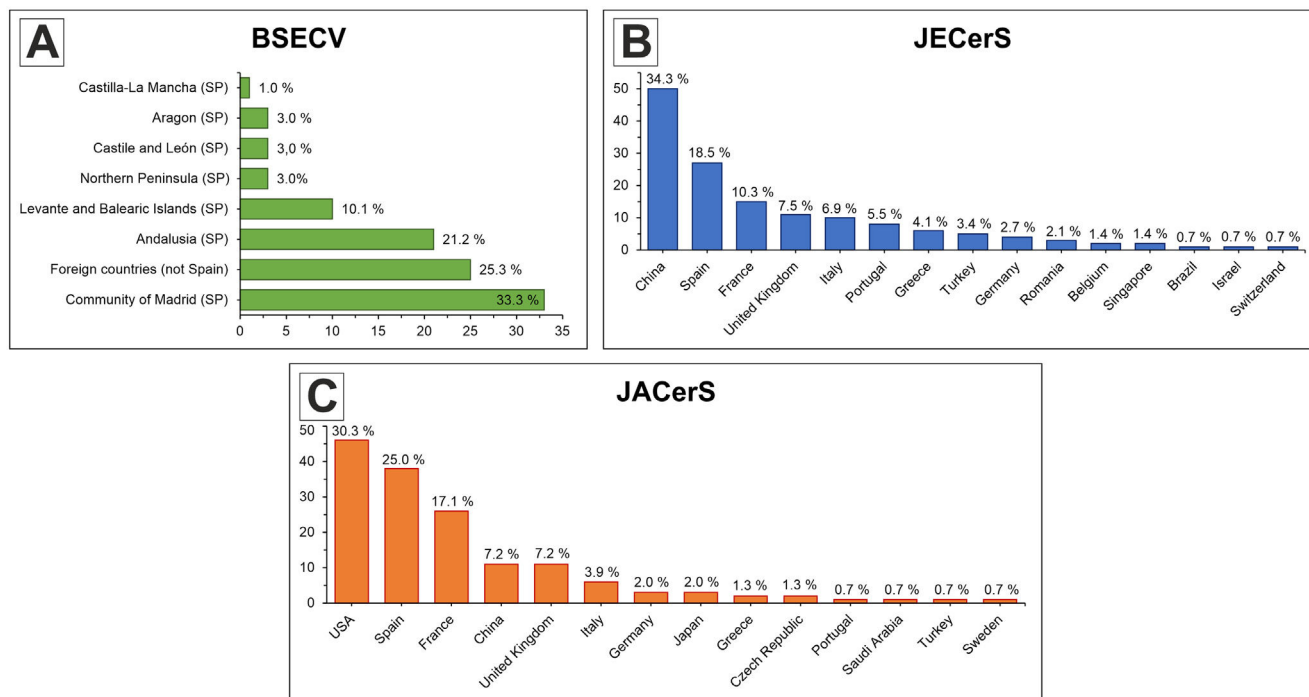
This is followed by other public research centers, including national research institutions such as CSIC in Spain and CNRS in France, concentrating between 36.8 and 38.4% (Fig. 9). The most represented research centers in BSECV are the Institute of Materials Science of Seville (ICMS-CSIC, Spain) and

the Institute of History (IH-CSIC, Spain). The CSIC centers and institutes represent 27.3%. In both JECerS and JACerS journals, the most represented research centers are the CNRS (France), in collaboration with French universities, and the Chinese Academy of Science (China).

**Public museums** represent less than 7.5% of the total number of institutions in all three journals (Fig. 9). The most represented public museums in BSECV are the National Archaeological Museum (MAN, Spain) and others such as the Regional Archaeological Museum of Madrid (MARPA, Spain). The most represented in JECerS are the Palace Museum (China) and the Museu Nacional do Azulejo (Portugal). Finally, the most represented in JACerS are the Muséum National d'Histoire Naturelle (France) and the National Museum of American History (USA).

**Private sector.** Regarding the representativeness of private institutions, private foundations and associations concentrate 7.2% of the total number of institutions in JACerS, 6.1% in BSECV and 2.1% in JECerS. Furthermore, the contribution of private universities such as the Northwestern University stands out in JACerS, with 9.9%. Private museums represent less than 3.5%, highlighting the case of the JACerS journal where private museums predominate (J. Paul Getty Museum and Art Institute of Chicago) in comparison with the BSECV and JECerS journals (Fig. 9).

**Public-private collaboration.** In all three journals there is an important percentage of public-private collaboration, that is, a noticeable number of archaeometric works with the presence of both public and private institutions. This collaboration is more evident in the JECerS and JACerS journals, with more than 21.0% of articles with public-private presence, compared to 13.0% in BSECV. In these articles, most of the companies, foundations and private universities collaborate with public institutions (universities, research centers, museums), and there is only one case in the JACerS journal where a private



**Fig. 10 – Percentage of the provenance of institutions publishing archaeometric works. (A) BSECV. (B) JECerS. (C) JACerS. Abbreviation: SP = Spain.**

American university publishes with no public collaborations [56].

#### Provenance of institutions

BSECV shows a high presence of Spanish institutions in the archaeometric works, representing 74.7% of the total number of institutions (Fig. 10A). Spanish institutions exhibit a very important second position in the JECerS and JACerS journals (18.5 and 25.0%, respectively, Fig. 10B and C), which indicates an important representation of Spanish filiations in archaeometric works. Regarding the Spanish impact in the JECerS and JACerS journals, Catalonia, Madrid and Andalusia are the most represented regions (44.7–59.3% Catalonia; 21.2–22.2% Madrid; 11.1–15.8% Andalusia). The JECerS journal is dominated by Chinese institutions (34.3%, Fig. 10B) due to predominance of Chinese porcelain studies, while the JACerS one is dominated by USA institutions (30.3%, Fig. 10C). Other countries with notable number of publications in the JECerS and JACerS journals are France (10.3–17.1%), the UK (7.2–7.5%) and Italy (3.9–6.9%) (Fig. 10B and C). All these countries are among the top 10 list of countries that publish on the Cultural Heritage topic according to recent studies [4]. A significant number of archaeometric works in all three journals indicates an important collaboration between institutions from 2 or more countries (40.6–60.9%). In all cases, Spanish institutions tend to collaborate with Italian, French and UK institutions, as well as with Chinese (importance of Chinese porcelain studies in the JECerS and JACerS journals) and Portuguese ones.

On the whole, the provenance of materials and the home country of at least one of the institutions studying such materials coincide geographically, which means that institutions prefer to study materials from sites or museums located

in the same region. However, there are some cases where institutions such as universities or research centers centralize samples for archaeometric characterization from other regions or countries.

## Conclusions

The results of a bibliometric study undertaken on archaeometric works published in the BSECV, JECerS and JACerS journals provide the following conclusions:

- There has been an increase of archaeometric works in the three journals over the last two decades (2000–2023).
- BSECV shows a higher ratio of archaeometric works with respect to the total number of publications (3.4%) than in the JECerS (0.4%) and JACerS (0.3%) journals, which means that both the impact and representativeness of archaeometric studies on ceramics and glass in the BSECV journal are higher than in its European and American counterpart.
- In all three journals there is a predominance of studies on ceramics and glass over other Cultural Heritage materials such as pigments or mortars. The predominance of studies on ceramic materials in all three journals ends in the 2015–2023 period, when studies on glass, ceramic glazes and other materials begin to drastically increase.
- The most studied ceramics in the three journals are vessels from Classical Antiquity, and building elements and porcelains from the Late Modern period. Medieval ceramics show also high percentages in the BSECV and JECerS journals.
- The most studied glass in the three journals are dated between the Middle Ages and the Late Modern period,

such as medieval stained-glasses, and European and Asian porcelain glazes. It should be highlighted a considerable number of studies on Chinese porcelain in the JECerS journal.

- Despite the wide range of geographical origins of materials, Spanish materials exhibit a very important representation, leading the percentages in the BSECV and JACerS journals. In the JECerS journal, most of materials are Chinese porcelain.
- Most of archaeometric works are carried out by public institutions (universities and research centers) and, to a lesser extent, by private entities that collaborate with public ones. Spanish institutions, mainly from Catalonia, Andalusia and Madrid, show a very high representation in the three journals: the first position in the BSECV journal and the second one in the JECerS and JACerS journals, in which Chinese and American institutions respectively predominate.
- Most of the studies are written by more than one author and during the last decade (2010–2023) those publications with 6 or more authors are more frequent in all three journals. This fact reflects the interdisciplinary nature of archaeometric research and the need for large research groups in this field.
- Most of the studies include collaborations between several institutions. In the last years (2020–2023) those articles with more than 3 institutions are more numerous in the JECerS and JACerS journals than in the BSECV one, which concentrate a large percentage of works published by only one institution. These data reflect a remarkable level of interinstitutional collaboration in all three journals.
- A large part of collaborations come from 2 or more countries, which reflects the capacity to produce research projects in Heritage Science between different countries and the noticeable international scope of all three journals.

## Conflict of interest

The authors declare that they have no conflict of interest.

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