

Xavier Deru

CHRONOLOGICAL ANALYSIS OF THE SOUTHEAST SECTOR OF BAELO FORUM, TARIFA, SPAIN: A METHODOLOGICAL APPROACH

Between 2009 and 2011, collaboration between a Spanish and a French team led to the excavation of an area of 500 m² near the Baelo Claudia forum in Tarifa, Andalusia. The excavation yielded a significant pottery assemblage of 83,875 sherds (MNI 6,878), meticulously categorized by fabric and type. Using a methodology based on stratigraphy and assemblage similarity, we initially focused on our excavation data before extending our study to include pottery assemblages from the broader southern Iberian Peninsula.

Subsequently, three seriations allowing the comparison of terra sigillata from Baelo with regional and empire-wide samples enabled the transition from a relative to an absolute chronology, incorporating independent dating criteria such as coins and historical documents.

Southern Spain – Baelo Claudia – Roman Pottery – Chronology – Methodology

1. Introduction

During 8 years, from 2011 to 2019, collaboration between a Spanish and a French team led to the excavation of an area of 500 m² near the Baelo Claudia forum in Tarifa, Andalusia¹. The excavation revealed a phased development, beginning with the construction of a domus (phase 2) on previously unsettled land (phase 1). Subsequently, a public building emerged in the southern half of the domus (phase 6) (Rodríguez Gutierrez et al. 2023). Following a destructive earthquake, the town suffered devastation and pillaging (phase 7), leading to the occupation of small houses in the sector (phase 8) (Brassous et al. 2017). While prior publications have detailed structures from phases 6 and 8, only limited attention has been given to the pottery assemblage (Deru et al. 2018).

Pottery analysis involved identification by ware (Samian, Amphorae, etc.) and type, with samples taken for fabric analysis. The meticulous counting of sherds, employing rim comparisons to reduce counts to a minimum number of individuals (MNI), revealed a total of 83,875 sherds, with an MNI of 6,878. The final stages of the analysis benefited from the use of *ONICer*, a digital tool for recording ancient pottery (Onicer.org; Deru et al. 2019) used during the last two years of the study.

2. Theoretical framework

The chronology was determined in two steps, first by relative dating, then by absolute dating.

Relative dating is based on two axioms. The first defines that a topographical relationship (layer A on layer B) is equivalent to a chronological relationship (layer A on layer B), as everyone knows. The second axiom is less often quoted, but is unconsciously used. It states that a relation of similarity of pottery assemblages (pottery assemblage X is similar to pottery assemblage Y) is also equivalent to a chronological relation (pottery assemblage X is contemporary with pottery assemblage Y, or X and Y belong to the same period). This axiom is based on an economic model (pottery is a simple commodity): in a market area, people consume more or less the same things at the same time (Deru et al. 2007). In this way, the stratigraphic axiom emphasises post- or ante-relations and the similarity axiom synchronic relations.

These two axioms form the basis of relative dating. Relative dating remains a descriptive approach, based on observations and comparisons of layers in the field or sherds on the table. Absolute dating is more abstract because we often forget from which contextual finds dates are given.

In our approach, stratigraphic arguments take precedence over pottery assemblage comparisons. However, on excavations, many contexts lack connections, so assemblage comparisons allow contexts without stratigraphic connections to be linked. The combination of these two arguments leads to two concepts. First, we define the 'phases' of settlement development, in other words, a period from one new building to another or the cessation of occupation.

Secondly, the 'horizon' (H) is a less used concept. It means both the assemblage of finds and the period in which these finds were used. We use this concept in two scales. At a site (site horizon, HS), the assemblage is often formed during the period just before the end of the phase, when waste accumulates, and so is placed between phases. On a regional scale (regional horizon, RH), a horizon is a discrete period in the continuity of pottery history.

¹ X. Deru was Lucienne Domergue fellow at Madrid Institute of Advanced Study (Casa de Velázquez, Madrid). The excavation was conducted by L. Brassous, X. Deru and O. Rodríguez; the study of pottery by X. Deru, G. Florent, M. Gomes, S. Lemaître and S. Renard.

Within the Baelo excavations, stratigraphic analysis and pottery inventory identified eleven phases, with the last four numbered 8.1-8.4 due to the similarity of pottery within short temporal sequences.

To contextualise the Baelo horizons, pottery assemblages from 33 sites on the southern Iberian Peninsula were compared, from the 2nd century BC to the 6th century AD. A complete dataset of 17,082 vessels was assembled using *ONICer*, which facilitated a global analysis using correspondence analysis (CA) (Djindjian 1991: 167-200; Deru et al. 2007).

From the inventory, a contingency table (or cross-tabulation) was formed. Types unrepresented or poor assemblages were removed. The subtypes had often to be integrated in main types to improve the statistical weighting (for instance,



Hayes 61A, B, A/B, C to Hayes 61). A few types not relevant for chronology were taken out of the table. In same way, the process is empirical, at each step, we can test which identification is the more accurate. This method finally made it possible to group the assemblages by similarity, respecting both the stratigraphic sequences and the chronological order (**fig. 1**). The red dots represent assemblages and the blue dots represent types. While the CA orders assemblages according to the axiom of similarity, the stratigraphic sequence of each regional site and of Baelo has been respected.

The earliest contexts are clustered in the top right and the latest ones in the top left. The Baelo H.1 and H.2 are very close, H.3-5 are grouped, and H.6 is isolated, H. 7 and H.8.1-4 are mixed. A context from Merida “los Columbarios” is similar to H.1-2 (Bello: Rodrigo et al. 2010) whereas Valencia (Arena, 1384: Huguet i Enguita et al. 2014), Lisboa (Remédios 010/018 and Figueira 9033: Banha da Silva 2018) and Llíria (Furs, Pozo 4: Escrivà Torres 1995) provide the most similar pottery assemblage to our H. 3-5. For the late H. 7-8, are contemporary to a context of the Merida forum (Aquilué Abadías et al. 2009), one in Malaga (Teatro 7013: Corrales Aguilar et al. 2018) and two other contexts published by D. Bernal, one in Baelo (B. Industrial S7: Bernal Casasola et al. 2007b) and the other in Ceuta (Africa, 4020: Bernal Casasola et al. 2014). The coins discovered in Ceuta date of 425-450.

3.2. Terra sigillata in an extended area

The rest of the analysis focused on terra sigillata, comparing assemblages from the Iberian Peninsula, Italy and Gaul.

The method is optimal on the scale of a small market, but at present, the documentation forces us to work on a larger scale. The Matrix reorganisation revealed distinct horizons characterised by specific types of pottery, providing a better understanding of chronological evolution.

Horizons 1 and 2 from Baelo were characterized by *Italic Terra Sigillata* (TS-IT). 37 references from the Western Empire dating from the late 1 century BC and early 1st century AD have been added to the matrix. Ordering revealed three TS-IT horizons, with the Baelonian (H. 1-2) being located in the most recent (C) with, for example, Haltern Fort (von Schnurbein 1982), Ostia, Schola del Traiano (285: Deru et al. 2016) or Valencia. Alm. (Ritual and Pozo: Albiach et al. 1998; Ribera 2010) (**fig. 2**).

Horizons 3, 4 and 5 from Baelo were characterized by Samian from South Gaul, Spain and Africa (ARS-A). For this period, we only took 15 Iberian assemblages, because Sigillata Hispanica was not largely exported outside the Peninsula (**fig. 3**). Three TS-SG/HISP/A horizons (A'-C') cut the period. In A' and B', we find some Gaulish and Hispanic products whereas African only appears in C'. The Baelonian H. 3 and 4 belong to B' as the context 1384 from Valencia Arena (Huguet and Ribera 2014), one from Merida (43: Bello Rodrigo et al. 2010). The H. 5 is sorted to C' with contexts from Sevilla Banderas (Vázquez Paz et al. 2018) or from Baelo Claudia, Barrio industrial (2: Bernal Casasola 2007a).

For ARS-D, the amount of assemblages allowed a specific correspondence analysis (**fig. 4**). In the contingency table we globalized types of ARS-A and ARS-C found in these late contexts. In this graph, earliest assemblages are at the top right and the latest at the top left. Baelonian contexts are badly situated, in the middle of the seriation, due to contamination

[illegible]

Fig. 2. Matrix reordering of assemblages of *italic terra sigillata*. The Baelo horizons are framed and the assemblages participating in the general AFC are marked in bold.

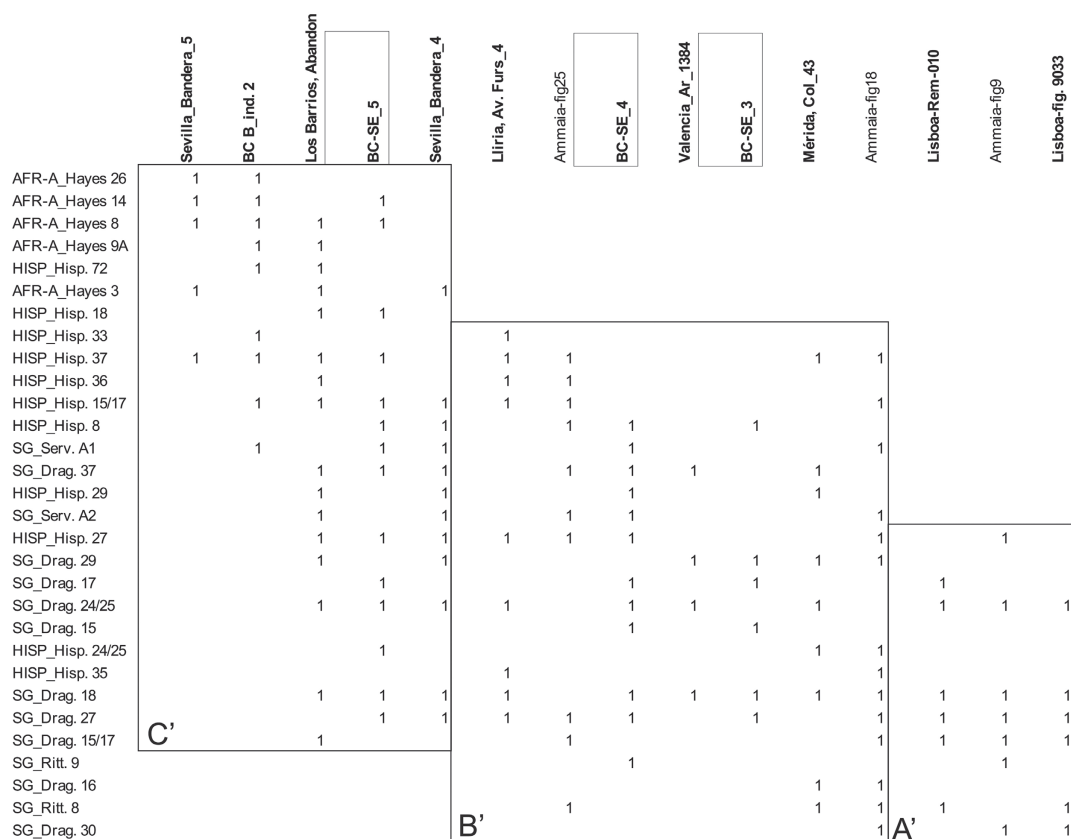


Fig. 3. Matrix reordering of assemblages of Gaulish, Hispanic and Early African terra sigillata. The Baelo horizons are framed and the assemblages participating in the general AFC are marked in bold.

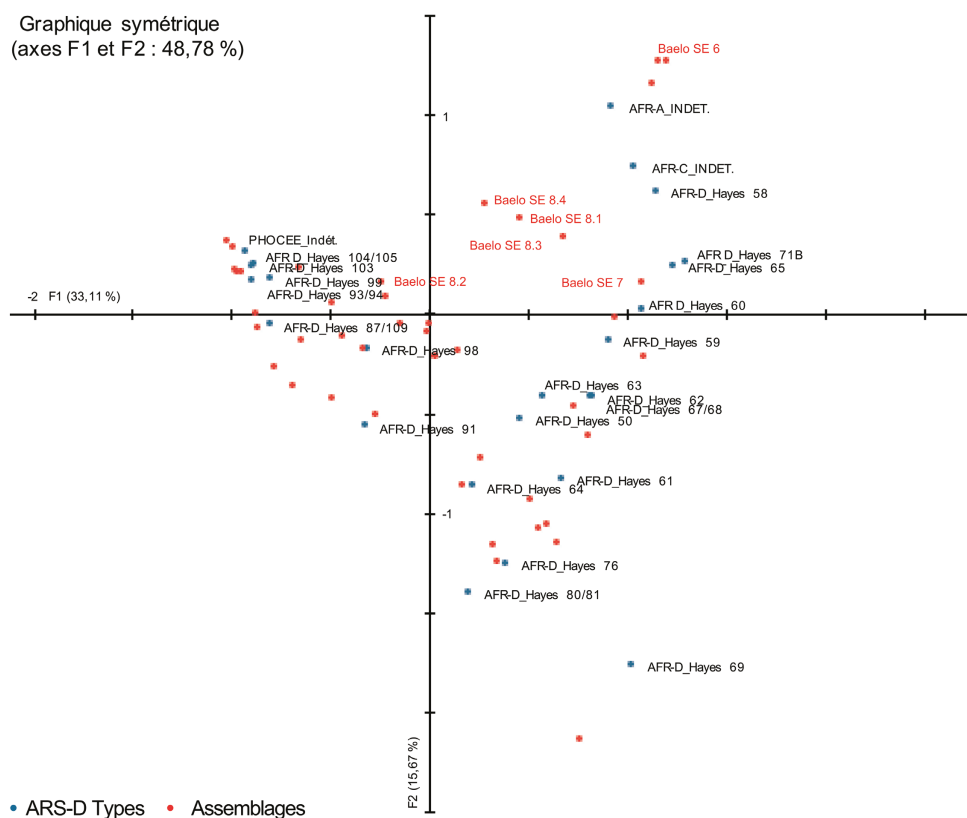


Fig. 4. Correspondence analysis of assemblages of African terra Sigillata.

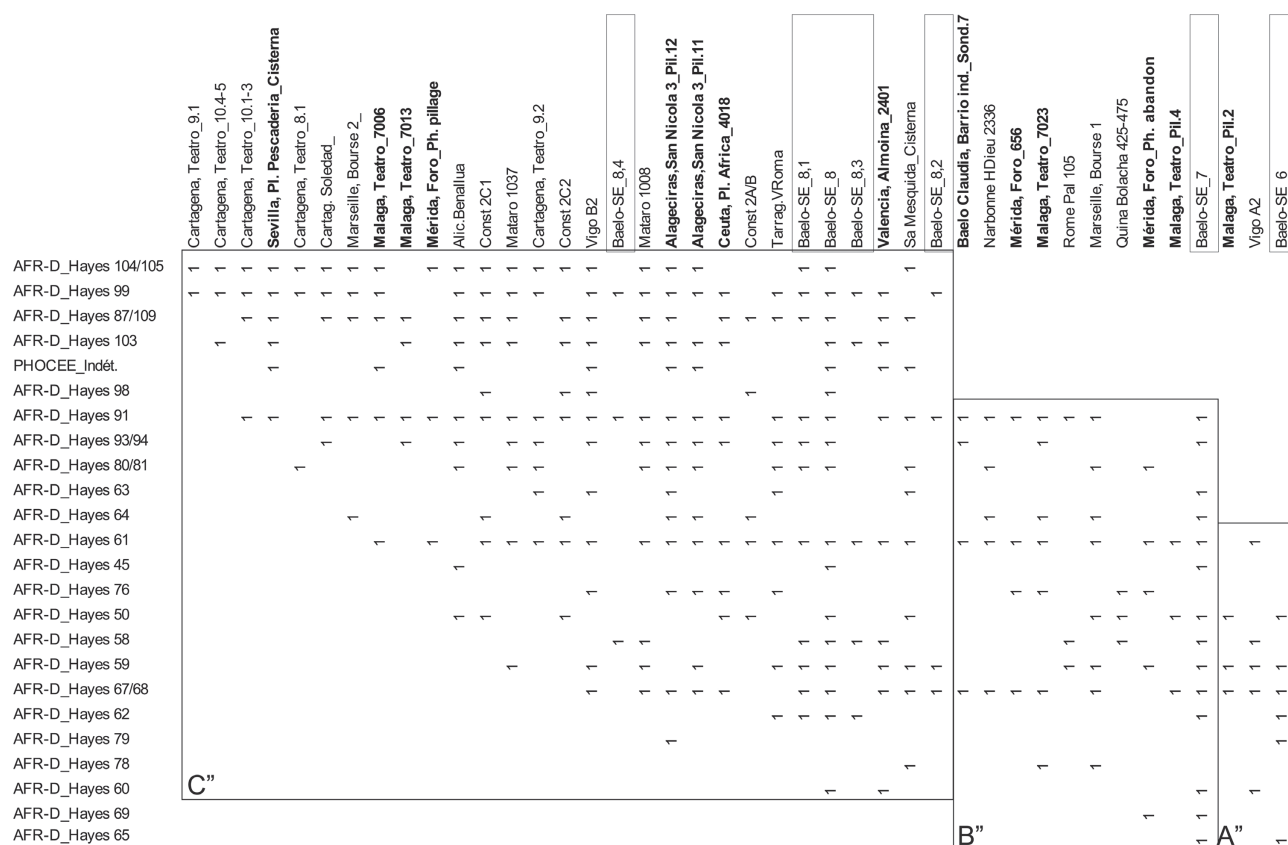


Fig. 5. Matrix reordering of assemblages of african terra sigillata. The Baelo horizons are framed and the assemblages participating in the general AFC are marked in bold.

by residual pottery, though in matrix reordering the stratigraphic sequence is globally respected (**fig. 5**). Once more, three horizons (A"–C") are observed. Besides the assemblages already cited, the association Baelo H.6 belongs to A" with Vigo A2 (Fernandez 2014). H. 7 is placed in B" with context excavated in Marseille (1 : Bonifay 1983) or Narbonne (Ginouvez 1996–1997) and H. 8.1–4 in C" with more contexts in particular from Cartagena (Ramallo et al. 1996).

4. Absolute dating

At Baelo, absolute dating was based mainly on coins, 80% of which were found in the contexts of phases 6 and 7. Although these coins provided valuable dating evidence, difficulties persisted in the dating of phases 1-5 and 8.1-8.4 due to the circulation of coins over long periods. Coins from other comparative contexts offer new perspectives for proposing dates for the Baelonian horizons (**Table 1**).

Although the occupation is continuous and the site horizons are punctual elements, the uncertainty inherent in dating leads to gaps and overlapping phases in the chronology. These uncertainties are inherent in archaeology, but should diminish with further research.

Horizon	Date
1	1-25
2	1-40
3	40-60
4	60-90
5	100-130
6	360-400
7	420-470
8.1-4	500-530

Tab. 1. Dating proposal.

5. Conclusion

Although this paper does not provide a definitive chronology for the south-east sector of Baelo, it does highlight the methodological process used to establish chronological frameworks. Emphasising the ongoing nature of chronological research, our approach combines stratigraphic analysis and assemblage similarity, enriching our understanding of temporal sequences within the Baelo Claudia site and its wider regional context.

Xavier Deru
University of Lille
Xavier.deru@univ-lille.fr

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