

NEW TECHNIQUES for CONTAINERS' STUDIES: A 3D RECONSTRUCTION of the AMPHORAE CARGO of HELIOPOLIS 2 SHIPWRECK (2nd century BC - VAR, FRANCE)

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HELIOPOLIS 2 SHIPWRECK

Heliopolis 2 is a deep shipwreck found at -80m, located on the south-eastern Mediterranean coast of France and dated to the beginning of the 2nd century BC. It was briefly surveyed at the 80's by GISMER (a Department of the French Navy).

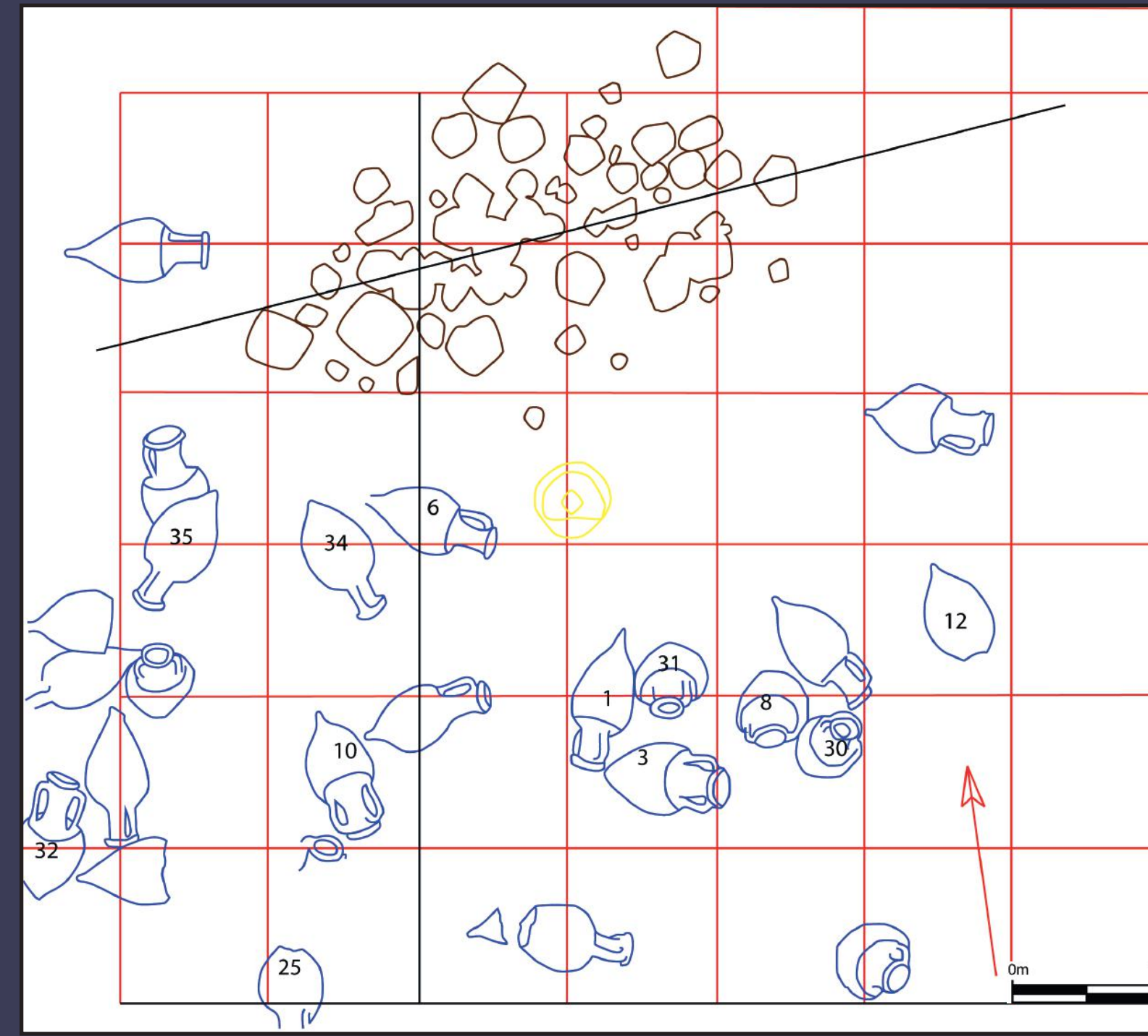
No remains of the wooden hull were discovered during the campaign and only a few amphorae were sampled and brought up to the surface. The cargo of the shipwreck was composed by Greco-Italic amphorae presenting a wide range of shapes, while some of them carried pitch.

According to the first interpretation, the ship was considered to transport a cargo of pitch (Joncheray & Long, 2002 : 153). This unusual type of freight reflected a commercial practice that it is not very well known for antiquity.

Heliopolis 2 probably was a regional redistribution vessel (Cibecchini, 2013: 245) that indirectly attests an established network of wine trade between Rome and the Iberian Peninsula. This network of exchanges was reinforced after the 2nd Punic War when the Romans wished to affirm their presence in this new territory.



Map with the location of the Greco-Italic shipwrecks in the Western Mediterranean and the main ports during the Late Roman Republic period.

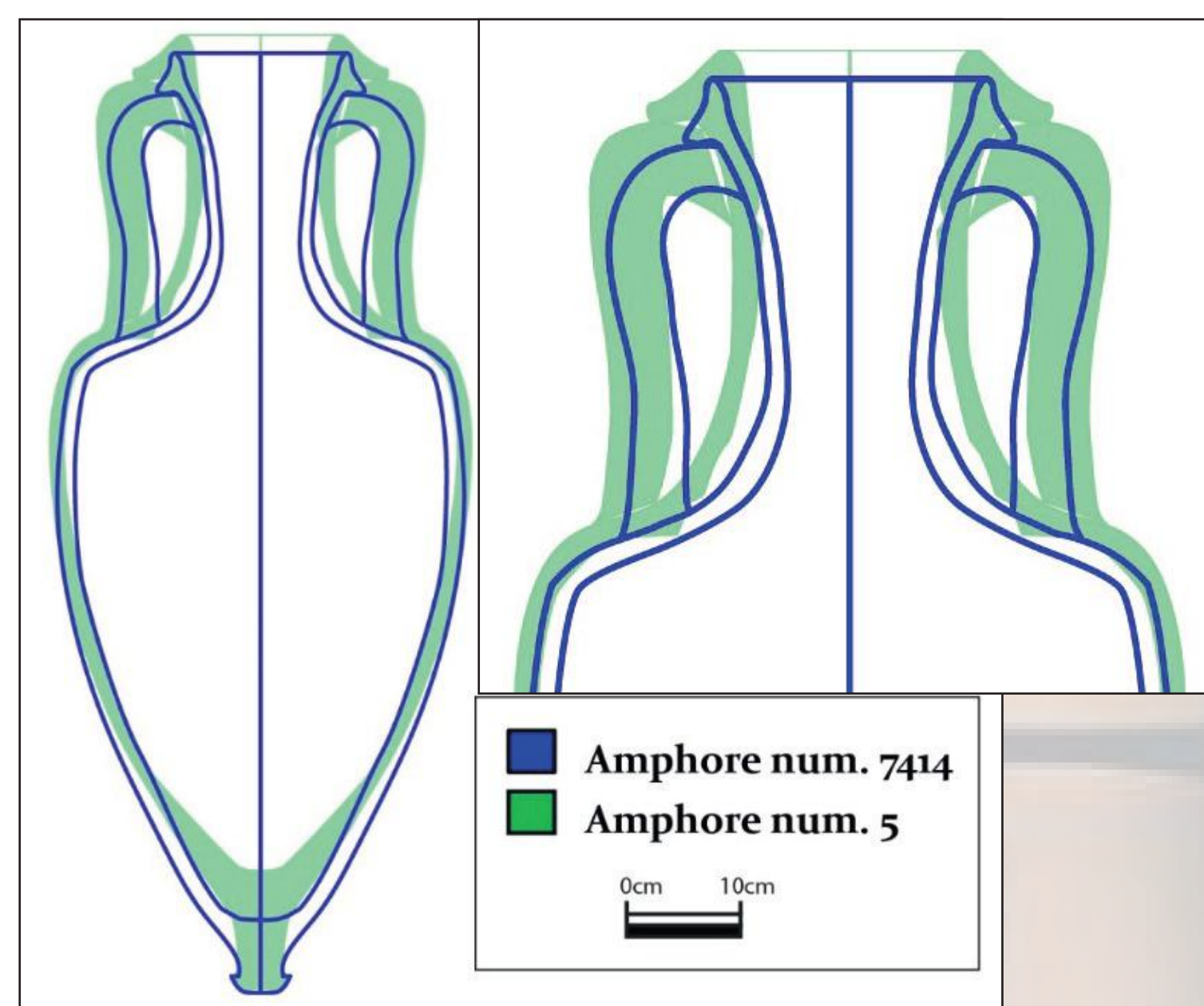


Plan of Heliopolis 2 site. DAO: M. Orts Ibañez based on the original drawing of L. Long (Joncheray & Long, 2002: 132).



Heliopolis 2 amphora containing pitch (Joncheray & Long, 2002: 147).

CARGO REASSESSMENT



Overlapping sections of amphorae n° 7414 and 5, that were initially thought to be the same container.

Attributed Amphora Subtype	Amphora Number	Constant
Gr.-Ita Vc	1	1,94
	3	2,10
	15	2,63
Gr.-Ita VIa	16	2,72
	7412	2,49
Gr.-Ita VIb	5	2,29
	6/7415	2,12
	10	2,21
	11	2,33
	12/7413	2,31
	7414	2,34
	13/7411	2,38
Late Gr.-Ita	13/7411	2,38

Table of amphorae modules = the constant result of dividing height and diameter of the amphorae.

The cargo of Heliopolis 2 was reassessed as a case study of Roman Republican maritime trade in the framework of my M.A. dissertation. A containers' morphological study was undertaken following the sub-groups classification proposed by Cibecchini and Capelli (2013), which was based on Vandermersch's typology (1994) of Greco-Italic amphorae. In addition, we compared our containers with other shipwreck cargos of the same period.

To complete this study, an hypothetical 3D reconstruction of the amphorae cargo has been attempted based on 3D photogrammetric recordings. The main objective was to obtain the maximum of information possible from the few amphorae available to analyse. At the same time, we decided to test this technique for the archaeological study of containers in general, in terms of saving time and getting more accurate data. Through the overlapping of photogrammetric documentation, 3D reconstructions and traditional drawings we were able to detect mistakes, demonstrating how useful this technique can be during the post-excavation research process.

Finally, volumetric calculations and ceramic analysis of Heliopolis 2 amphorae have been carried out, allowing the comparison between all the containers, as well as the detailed observation of their morphological differences. Their diversity lead us to assume a cargo of recycled amphorae, a new interpretation for this unique shipwreck cargo.

Container number	Length (cm)		Diameter (cm)	Weight empty cont. (Kg)	Ceram. Volume (L)		Density (Kg/L)	Internal Volume (L)
	preserved	reconstr.			preserved	reconstr.		
1	72,4	79,98	41,20		11,08	11,21		33,05
3	66,12	75,27	35,91		8,43	8,67		25,22
5	77,94	84,67	36,99		9,23	9,33		32,02
6/7415	73	75,51	35,64	10,80	7,63	7,81	1,41	24,45
10	70,85	78,59	35,52		8,43	8,58		25,23
11	73,18	82,23	35,31		10,85	11,10		25,82
12/7413	77,8	82,65	35,72	20,20	8,56	8,58		26,24
13/7411	70	82,65	34,78	14,50	9,23	9,62	1,57	26,12
15	90,3	90,31	34,37		9,37	9,37		25,23
16	88,5	88,47	32,56		9,67	9,67		23,13
7412	84,1	87,22	34,99	14,50	8,9	8,95	1,62	27,9
7414	80,2	83,48	35,72	13,50	9,09	9,13	1,48	29,23

Table containing the results from the calculations that were possible to derive from the 3D modelling of the amphorae.

CONCLUSIONS

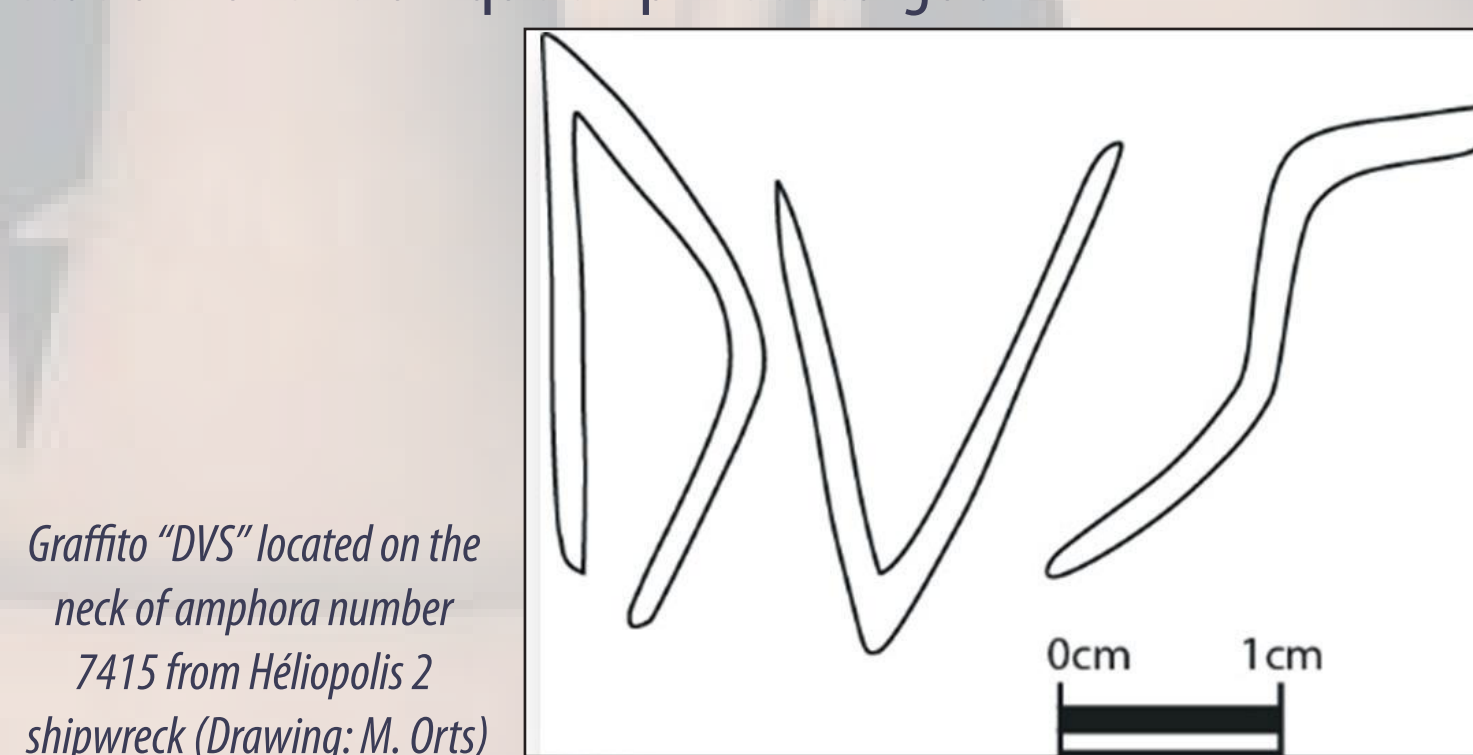
The 3D reconstruction provided new data about the containers morphological characteristics, that lead us to confirm the already formulated hypothesis of the existence of a new subgroup division of the Greco-Italic amphorae (Cibecchini & Capelli, 2013).

Overall, the archaeological reassessment of the Heliopolis 2 shipwreck has revealed new information, allowing us to reach a new interpretation considering it as a **cargo of reemployed amphorae**. As their different shapes and chronologies indicate, Heliopolis 2 amphorae would have carried several products, including pitch and other perishable goods.

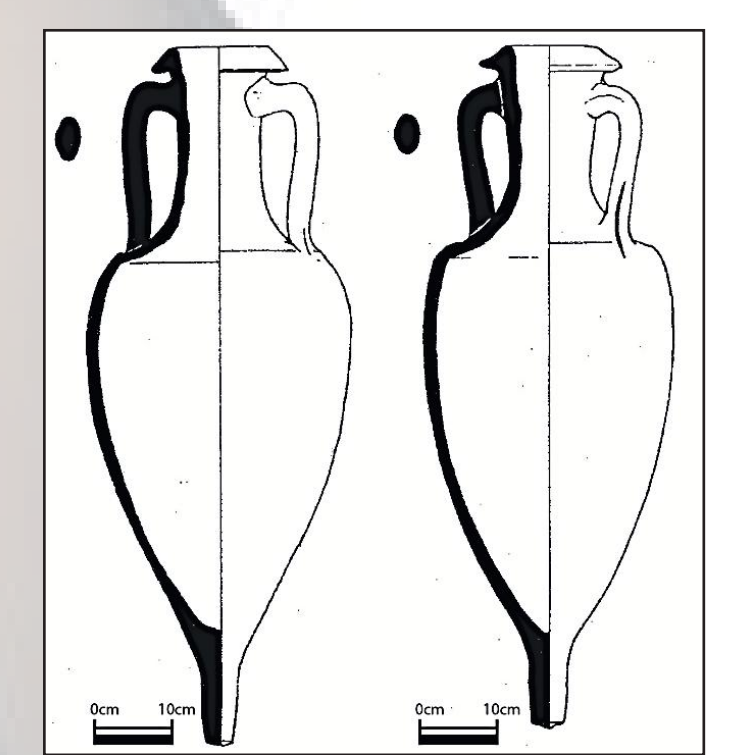
Finally, the historical context of Heliopolis 2 has been better defined, linking our ship with the group of Iberian shipwrecks, demonstrating a redistribution trade activity along the north-eastern part of the Iberian Peninsula, Narbonne and the Marseille's area, during the Late Roman Republic period.

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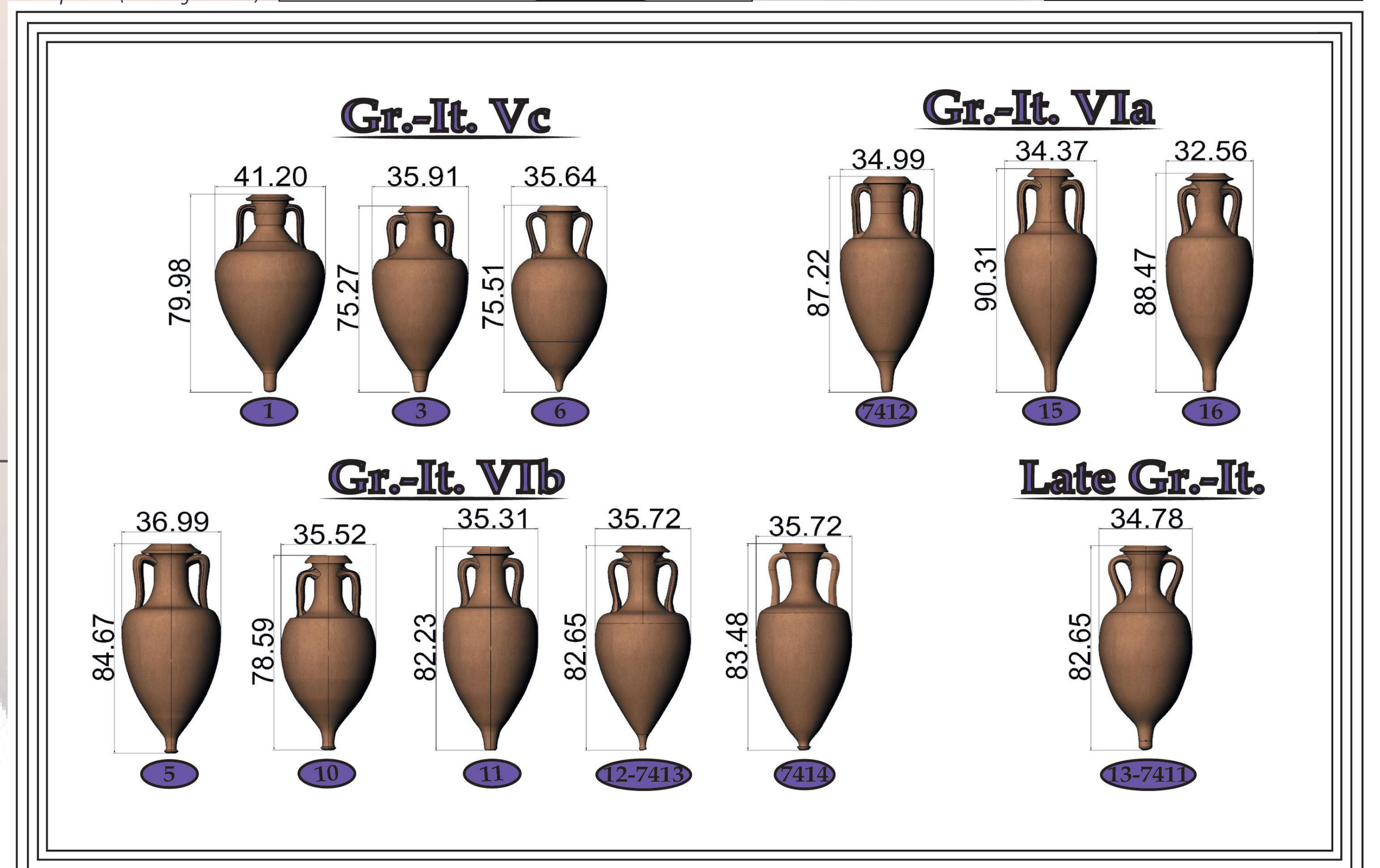
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Graffito "DVS" located on the neck of amphora number 7415 from Heliopolis 2 shipwreck (Drawing: M. Orts)



Heliopolis 2 Amphorae n° 5 & 6 - Group II (Rapport d'Expertise 1988, DRASSM).



Ensemble of 3D modelling amphorae with their main dimensions, sorted out the different assigned groups (DAO: M. Orts and P. Poveda).

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