

Architecture, construction system and functioning of the Roman saltworks of O Areal (Vigo-Galicia-Spain)

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These Roman saltworks are part of the "O Areal" archaeological site, located in the city of Vigo, in the southern bank of the homonymous Ría, in a geographical area designated as Rías Baixas, which coincides with the southern coast of present-day Galicia, in the northwest of the Iberian Peninsula. The saltworks was in turn part of a larger industrial complex, dedicated to the production of sauces and salted fish, to whose factories most of the salt production was destined, and which give meaning to the need and construction of these saltworks.

Since the discovery of the O Areal saltworks up to the present, new facilities have been identified that clearly date back to antiquity, and there are also other probable ones, but at the moment they are few and little is known about them, with the sole exception of the "O Areal" in Vigo where you can glimpse the parts and the functioning of authentic Roman saltworks.

The information that has come to us in the classical texts is not specific enough and requires archaeological support to understand these facilities as a whole, more so with the existing constructive variability depending on whether they are Atlantic, Mediterranean or inland, and with the adaptation to specific topography and climates. This is why, to this day, the Roman saltworks of O Areal continue to be the best preserved in the Roman world and the ones that allow for a better understanding of the exploitation as a whole.

Along with the discovery of the Roman salt complex, the successive interventions have uncovered an occupational evolution of this urban space from protohistory to the present

day that we could summarize in the following phases for ancient times, already collected in several publications (the most recent in Castro Carrera *et alii* 2019):

- Late Republican period and beginning of the 1st c. A.D.: area of marsh, dunes and beach that works as an anchorage for the Castro de Vigo (an Iron Age hillfort).
- Early Imperial Period (1st-2nd centuries and beginning of the 3rd): construction and use of the saltworks, taking advantage of the marsh, beach and dunes. The salting industrial area is built (saltworks and salting factories).
- During the 3rd century: process of abandonment of the saltworks, flooding its northern part and subsequently filling it with a dune and other continental sediments.
- Late Antiquity Period (4th-7th centuries): human occupation is installed on the edaphized dune, characterized in the Western Sector by an incineration-burial necropolis and other structures that are difficult to interpret. In the Eastern Sector it is characterized by a port, residential and productive use and a necropolis associated with a possible church.

In order to know the approximate dates of construction and amortization of the O Areal saltworks, we have chronological data from the ceramic contexts and from the C14 dates. The former is based on the abundant imported materials recovered in the area. The second ones, the result of analysis of the organics rescued under and in the saltworks, work as a broader chronological arc, but which is of vital importance to date the abandonment, in the places where the materials are not present. Based on these data, we have concluded a period of use around the 1st-3rd c. A.D., which falls completely within what is known as the Warm Roman Period. We consider climatic changes as determining factors both in the decision to build the Roman *salina* and in its abandonment.

In the current state of knowledge, these saltworks could have had an area of at least 8 or 9 hectares.

The architecture of the salt complex is articulated through different types of ponds, of various dimensions and construction characteristics. They use different materials for their construction: stone, ceramics, silt, clay, wood or sand. Its characteristics and dimensions are in accordance with its function within the salt production cycle: decanters, evaporators and

crystallizers. Other architectural elements complete the ensemble and help to understand its functioning in detail.

The different types of ponds are linked to the three usual phases of the sea salt production circuit by solar evaporation in Atlantic salt flats, in which the sea water increases its saline concentration until finally the sodium chlorides are decanted; the salt. The particularity of this O Areal circuit is that it does not work with gravity as is usual in traditional Atlantic sea salt pans, but rather the water must be successively pumped from the settlers to the crystallisers, therefore, in an ascending direction.

Knowledge of the architecture of these saltworks has made it possible to identify others even when excavated on small surfaces, thanks to its detailed construction characterization, regardless of its stratigraphic context.