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Archaeology of a Lagoon: the anthropogenic landscapes of Aquileia (Italy) between land and sea

Arqueología de una laguna: los paisajes antropogénicos de Aquileia (Italia) entre la tierra y el mar

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Abstract: Aquileia (Italy), once one of the largest cities of the Roman Empire, was located at the head of the Adriatic Sea, about 20 km from the modern sea coast line. Nowadays, Aquileia sits at the edge of a brackish water lagoon that largely occupies its once vast southern suburban landscape. Using sophisticated remote sensing (RS) techniques over both coastal and lagoon areas, research undertaken within the «Beyond the city walls» project has revealed a number of previously unrevealed supplementary canals connected to well known ancient features and a number of not-as-yet identified coastal settlements adjoining them, as well as a number of underwater traces that can be interpreted as preserved archaeological structures. This poster showcases some of the most recent discoveries at those sites and explores the challenges and the opportunities connected with using remote sensing techniques in a lagoon and in a semi-humid environment.


Key words: Tidal archaeology, semi-humid archaeology, remote sensing, hyperspectral imagery, Aquileia.

Resumen: Aquileia (Italia), que fue una de las mayores ciudades del Imperio romano, estaba localizada junto al mar Adriático a unos 20 km de la línea de costa moderna. Hoy en día, Aquileia se sitúa en el borde de una laguna de agua salobre que ocupa gran parte de su vasto paisaje suburbano meridional antiguo. Usando sofisticadas técnicas de teledetección sobre ambas zonas, costeras y lagunares, la investigación realizada dentro del proyecto «Más allá de la muralla de la ciudad» (dirigida por la autora), ha descubierto una serie de canales complementarios previamente desconocidos conectados a elementos antiguos conocidos y un número de asentamientos costeros adyacentes a ellos aún no identificados, así como una serie de vestigios subacuáticos que pueden ser interpretados como estructuras arqueológicas. Este póster muestra algunos de los descubrimientos más recientes en estos yacimientos y explora los retos y las oportunidades del uso de técnicas de teledetección en una laguna y en un entorno semihúmedo.

Palabras clave: arqueología de las mareas, arqueología semihúmeda, teledetección, imágenes hiperespectrales, Aquileia.



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Archaeology of a Lagoon: the anthropogenic landscapes of Aquileia (Italy) between land and sea

Arianna Traviglia

ABSTRACT

Aquileia (NE Italy), once one of the largest cities of the Roman Empire, was located at the head of the Adriatic sea about 20 km from the modern sea coast line and was connected to it through a sophisticated network of artificial canals and natural waterways. Ancient sources celebrate Aquileia's famous fluvial port: soon after its foundation the original hydrological network surrounding the city was reshaped to maximise its navigability and integrate it with the impressive Roman road system, making the Aquileian port the nodal point of the trade traffic between the Danubian regions and the Mediterranean basin. Nowadays Aquileia sits at the edge of a brackish water lagoon which largely occupies its once vast Southern suburban landscape. The area South of the ancient city has been, in the past 4 years, the focus of the 'Beyond the city walls' project, a multidisciplinary project aiming to understand the complex relationships between the urban core of Aquileia and its dependent landscapes. Using sophisticated remote sensing (RS) techniques, including processing of hyperspectral and multispectral satellite data, over both coastal and lagoon areas, the research has revealed a number of previously unknown supplementary canals connected to well known ancient features and a number of not-as-yet identified coastal settlements adjoining them as well as a number of underwater traces within the lagoon that can be interpreted as preserved underwater archaeological structures. This poster will showcase some of the most recent discoveries at those sites and will explore the challenges and the opportunities connected with using remote sensing techniques in a lagoon and in a semi-humid environment.

- Aquileia was a major Roman city founded in 181 BCE
- 'Ninth amongst celebrated cities' of the Roman Empire in 4th cent.
- Located in a key area for commercial exchanges between the Danubian regions and the Mediterranean basin.




- "IN PALUDIBUS MOENIA CONSTITUTA": 'a city is built in a marshy situation' (Vit.)
- "MOENIBUS ET PORTU CELEBRATA": 'highly famed for walls and harbour' (Aus.)

- Local rivers played a fundamental function as part of the communication and trading network
- Large navigable rivers flowed into the Adriatic Sea few miles South of the city.

- Artificial canals were excavated to increase the potential of the river network.
- This hydraulic system complemented the road network.
- Aquileia was a nodal point in the distribution of goods in North East Adriatic.

- The coast line was modified by natural flow regimes of river alterations and subsidence phenomena after the Roman period
- Current lagoon was likely a plain above sea level
- Several archaeological sites were identified underwater.

Remote sensing data processing → Importing data into GIS → Visualising and inspecting data → Mapping features → Contrasting with existing datasets → Interpreting features

Hyperspectral MIVIS sensor provides excellent water penetration and produces imagery where channels and traces are easily identifiable.

- A large dataset of Remote Sensing data (including aerial and satellite panchromatic and multi-spectral imagery) was acquired and processed
- Processed imagery was imported in a GIS for analysis
- Underwater features were identified and mapped.

- All the identified underwater, and above sea level archaeological sites were mapped within the GIS and tagged
- Geological and hydro-morphological data were added
- Mapped features were contrasted to those datasets.

- Features were selected based on a 'reliability index'
- Features were interpreted based on shape, size, orientation, proximity to known sites etc.
- A reconstructive map of the landscape in Roman times was created using available datasets.

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