

# Stone materials from the Spina Necropolis: the tomb signs

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University of Ferrara has collaborated with the National Archaeological Museum of Ferrara in the creation of a museological and educational itinerary dedicated to the petrographic classification of the tomb signs in the Etruscan necropolis of Spina. In 1922, during the draining process of Lagunas basins "Valli di Comacchio" (Province of Ferrara) that led to the discovery of the Necropolis (Alfieri 1979), were collected a great number of the tomb signs and the petrographic characterization involved only on the deficiencies' artefacts. For this reason, despite the abundant series of recognized rocks, we cannot exclude the presence of a wider spectrum of rocks. Some of the representing samples were polished in order to facilitate the observation of the esthetical and compositional characters.



Figure 1 – Geomorphological reconstruction of the archeosurface of the Spina necropolis

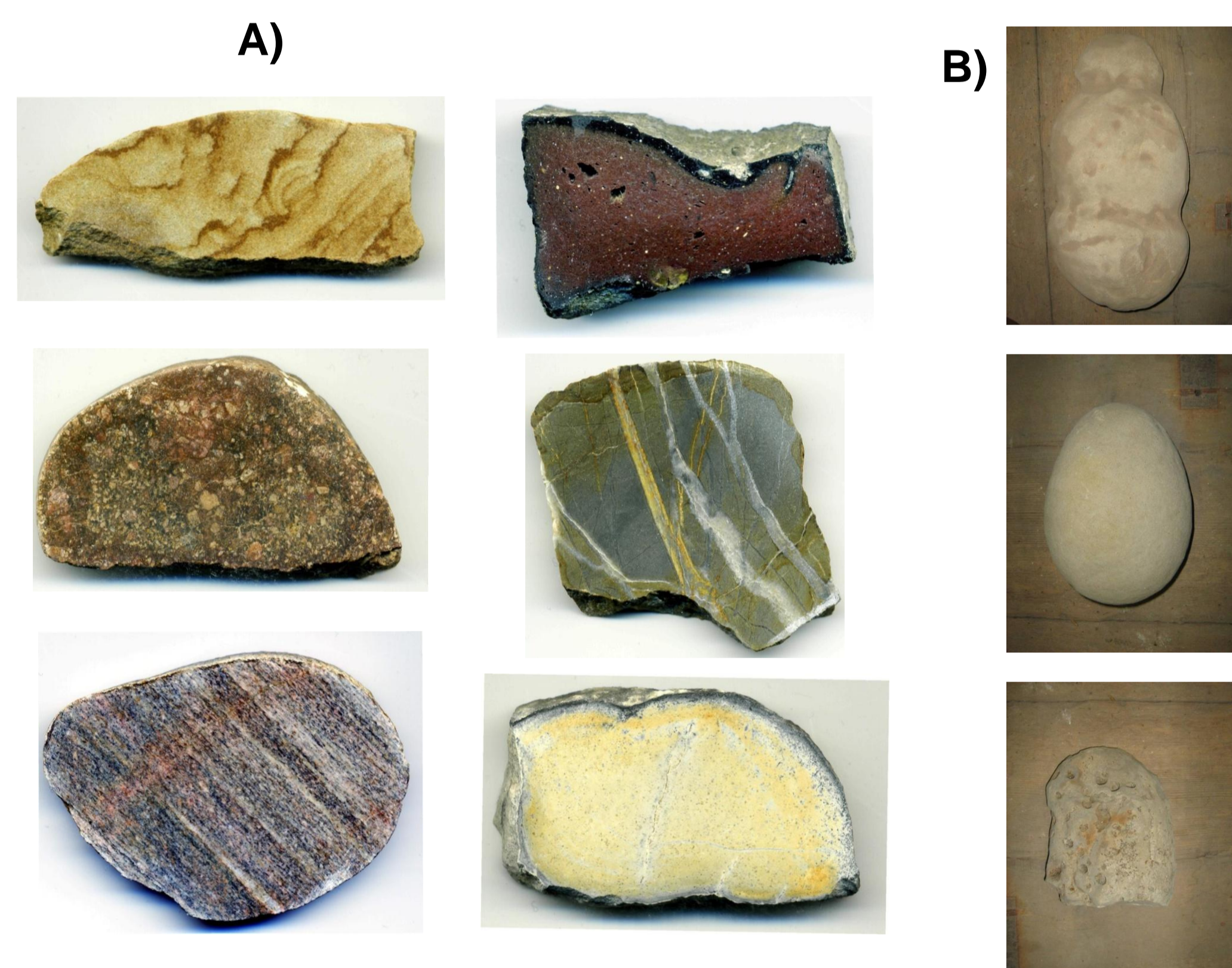
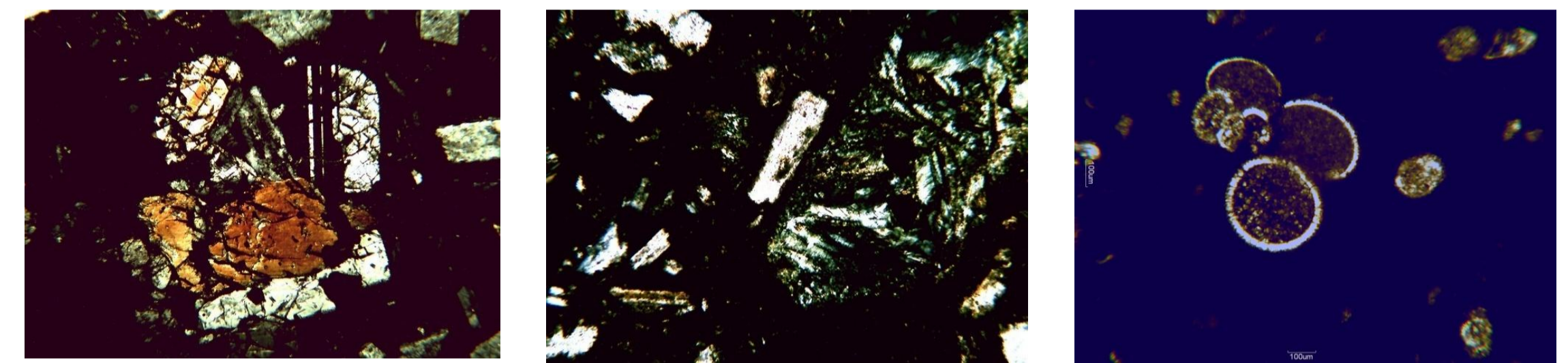


Figure 2 - A) representing samples polished to facilitate the observation of the esthetical and compositional characters; B) the typical ovoid shape of the tomb signs

The tomb signs are constituted mainly of terrigenous sedimentary rocks and followed by carbonate sedimentary rocks, metamorphic and magmatic ones.

Terrigenous sedimentary rocks are generally classified like **litharenites**; The rocce carbonatiche are defined as **wackestone**, with some samples as **packestone/grainstone**. There are also triassic carbonate rocks, usually called "**Portoro**" in s.s and brecciated varieties.



Images of the thin sections of the tomb signs by means of transmitted light microscope (magnification 10X)



Images of the tomb signs by means of reflected light (magnification 1.5X)

The igneous rocks are acid and basic extrusive volcanics, corresponding respectively to **porphyry** and **andesitic** and **trachi-andesitic lavas**. The metamorphic rocks are of low and medium metamorphic grade derived from sedimentary protoliths.

SiO <sub>2</sub> %	68,66	72,50
TiO <sub>2</sub> %	0,38	0,20
Al <sub>2</sub> O <sub>3</sub> %	15,29	13,54
Fe <sub>2</sub> O <sub>3</sub> %	2,70	2,30
MnO%	0,05	0,04
MgO%	0,15	0,41
CaO%	1,63	0,99
Na <sub>2</sub> O%	3,16	2,78
K <sub>2</sub> O%	5,82	5,92
P <sub>2</sub> O <sub>5</sub> %	0,13	0,07
LOI	2,03	1,25
TOTALE	100,00	100,00

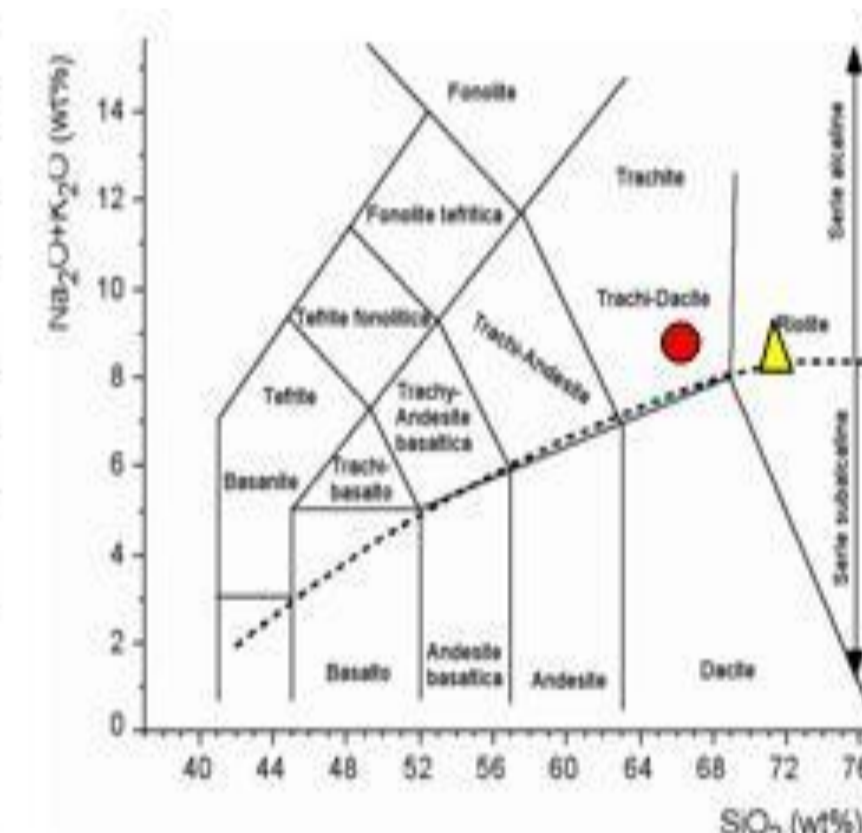
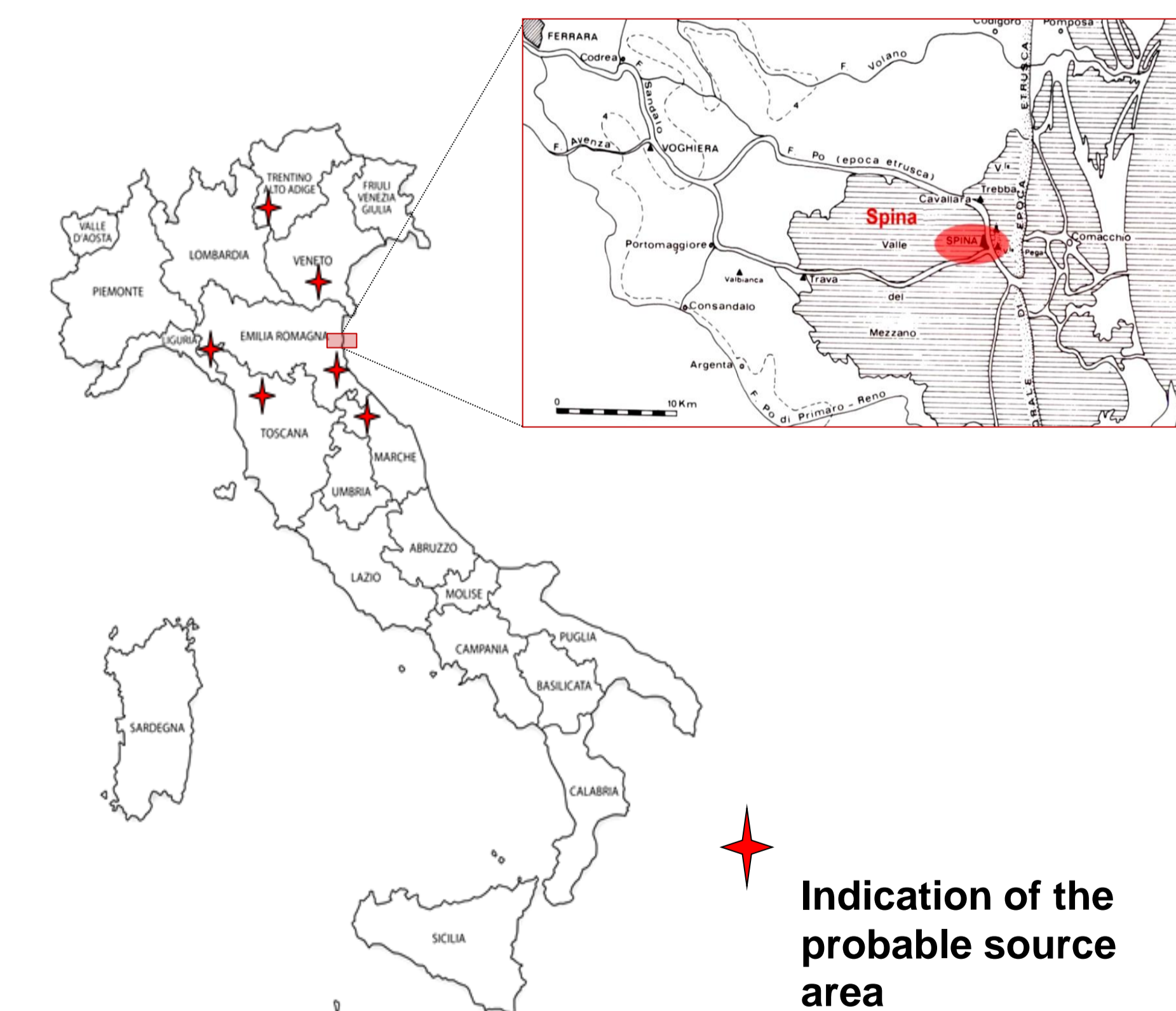


Figure 3 – Chemical analysis of the dominant elements of the porphyries and the correspondent petrographic classification through TAS (Total Alkali/Silice) chart

## Conclusions

The terrigenous sedimentary lithologies (generally litharenites) belonging to the Apennine zone located in Emilia-Romagna Region, and partially with a Tuscany-Emilia origin (e.g. Pietra Serena and Pietra Paesina). Another type of tomb signs have a calcareous origin. In this case, the petrographic and paleontological study (Luciani et al, 2011) revealed a correspondence with basin sequences like Scaglia Cinerea and Calcare di Chiusole from the Veneto and Trento region, and also the correspondence with a carbonate platform like Lessini shelf (Bosellini, 1989) and Monte Baldo Luciani, 1989). The Triassic lithic types, usually called "Portoro" and originally from Liguria are present in a smaller quantity, but having the same importance especially in determining the trade routes of the Etruscans from Spina. The basic extrusive igneous rocks and porphyry have a possible affiliation to the magmatic - lithic types of the Porfiric Atesino Complex. It also rocks have low to medium metamorphic grade also features of the Trento region (Val Sugana, Val di Non) so we can be assumed instead the possible supplying areas from the high valley of the Adige where emerge as the metamorphic basement as volcanic rocks derived from the Porfiric Atesino Complex; seems less probable the origin from formations of the metamorphic basement of Riolo Terme in degree and types of rocks emerging. In this paper, by geological and petrographic classification has started an educational and exhibition at the Archaeological Museum of Ferrara with which to encourage new generations to the earth sciences.



## REFERENCES

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