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## Luminescence dating of kilns pottery quarter at Paykend (Uzbekistan)

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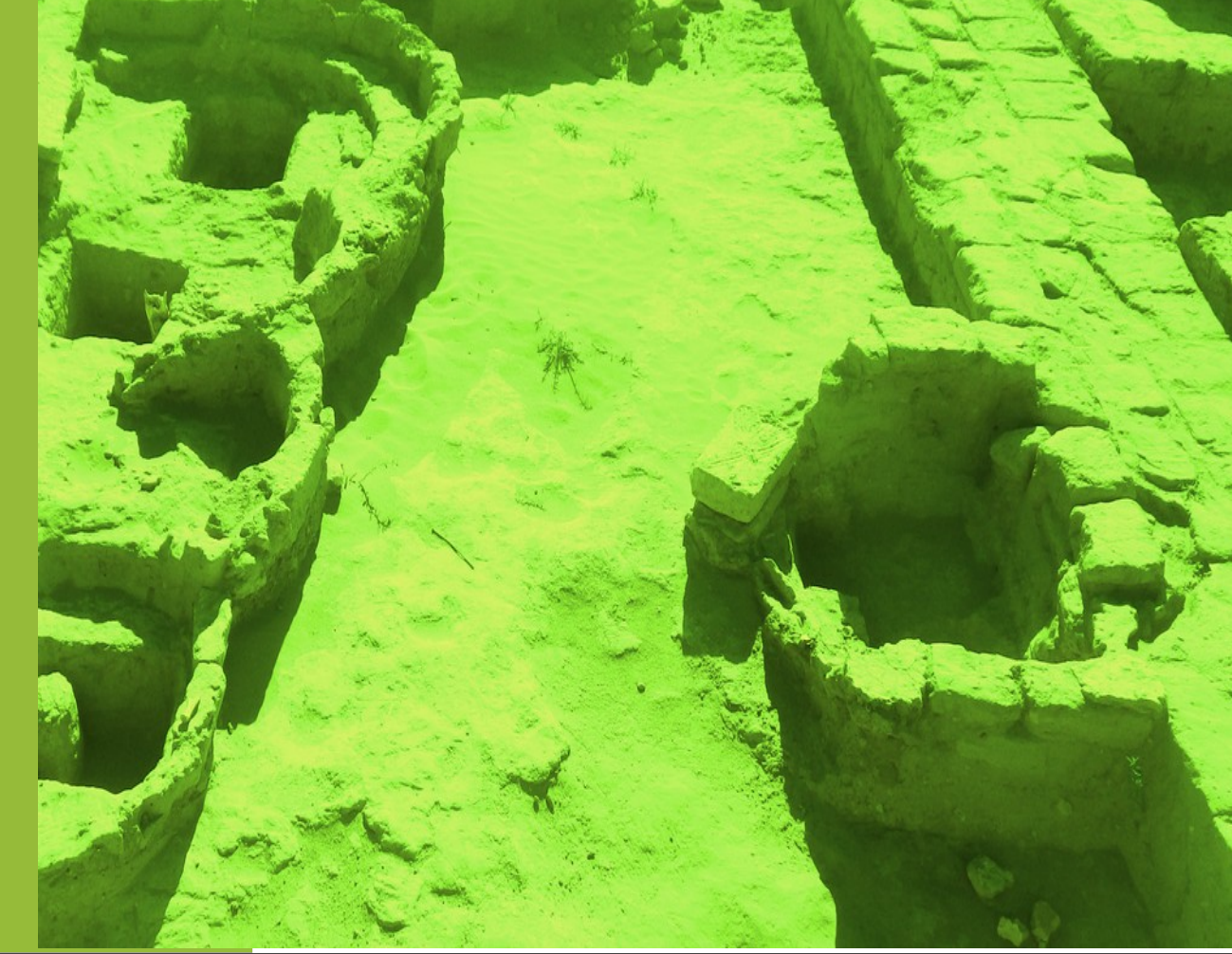
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In order to understand the chronology of occupation of the pottery quarter of Paykend (Uzbekistan, 8<sup>th</sup>- 14<sup>th</sup> c.), various elements of the kilns (walls, bricks and pillars) as well as shards from filling layers were dated (TL, BL- and IR-OSL).

## Archaeological Site Paykend and the Pottery's quarter

Paykend is located between the main oasis of Bukhara and the secondary oasis of Qaraqöl. The site includes a citadel, two walled downtowns (*sharestan 1 and 2*) as well as suburbs (*rabad*) to the south and east beyond the canal. The potters' quarter is located between the citadel and the canal (part of this quarter disappeared when the canal was enlarged in the 20th century).

Geographical map of Bukhara and Qaraqöl oasis with the excavated sites - ©ESRI Imagery/ R. Rante



Paykend, topography with excavated areas ©Rante s.r.l. / Porto 2011



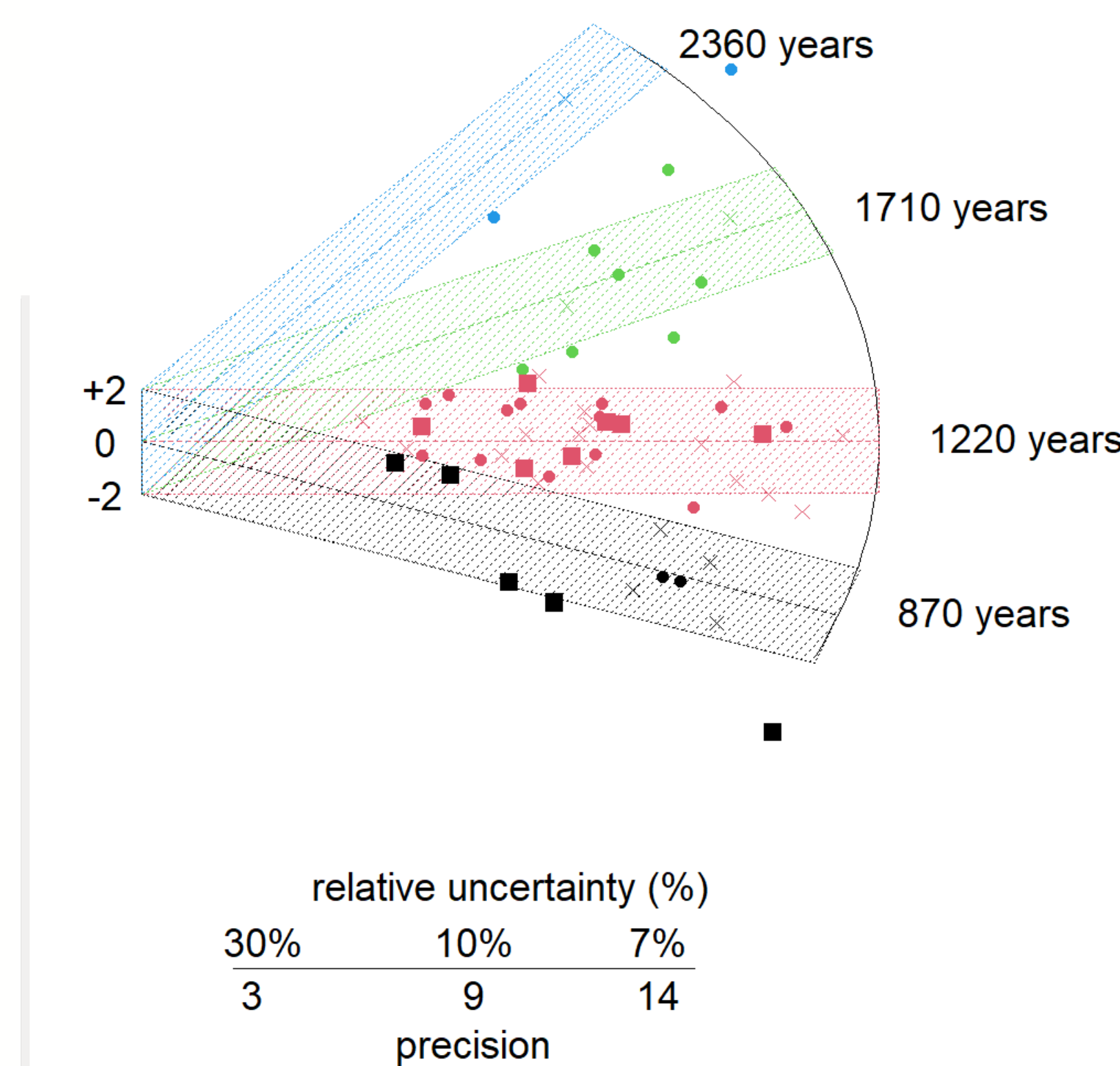
## the potter's quarter in the timeline of the site

Previous dating of shards from various parts of the site (citadel, sharestan, Eastern rabad; cross) identifies 4 periods (Zink et al., in press)

- > Pre-urban period 2nd-6th c. BC (1 sample)
- > Pre-Islamic period 3rd-4th c. (2 samples)
- > Early Islamic period 8th-10th c. (16 samples)
- > Late Islamic or Medieval period 12-13th c. (4 samples)

Dates from the potter's quarter complete this first chronology. The shards (filled circles) cover all periods (pre-urban +3; pre-islamic +6; islamic +13; Medieval +3), while the architectural elements (kiln walls and internal pillars; filled squares) are concentrated on the two Islamic periods.

Thus, the potters' quarter covers the medieval period, while the shards may come from underlying layers or from the cleaning of the canal used to backfill the kilns.



Radarplot of luminescence dating from Paykend. The color groups are based on shard dating (cross) from various part of the site (Zink et al., in press). The dating from the potter's quarter was added (filled circles; shards - filled squares; architectural elements) ©Zink

## studies of some relationships between kilns.

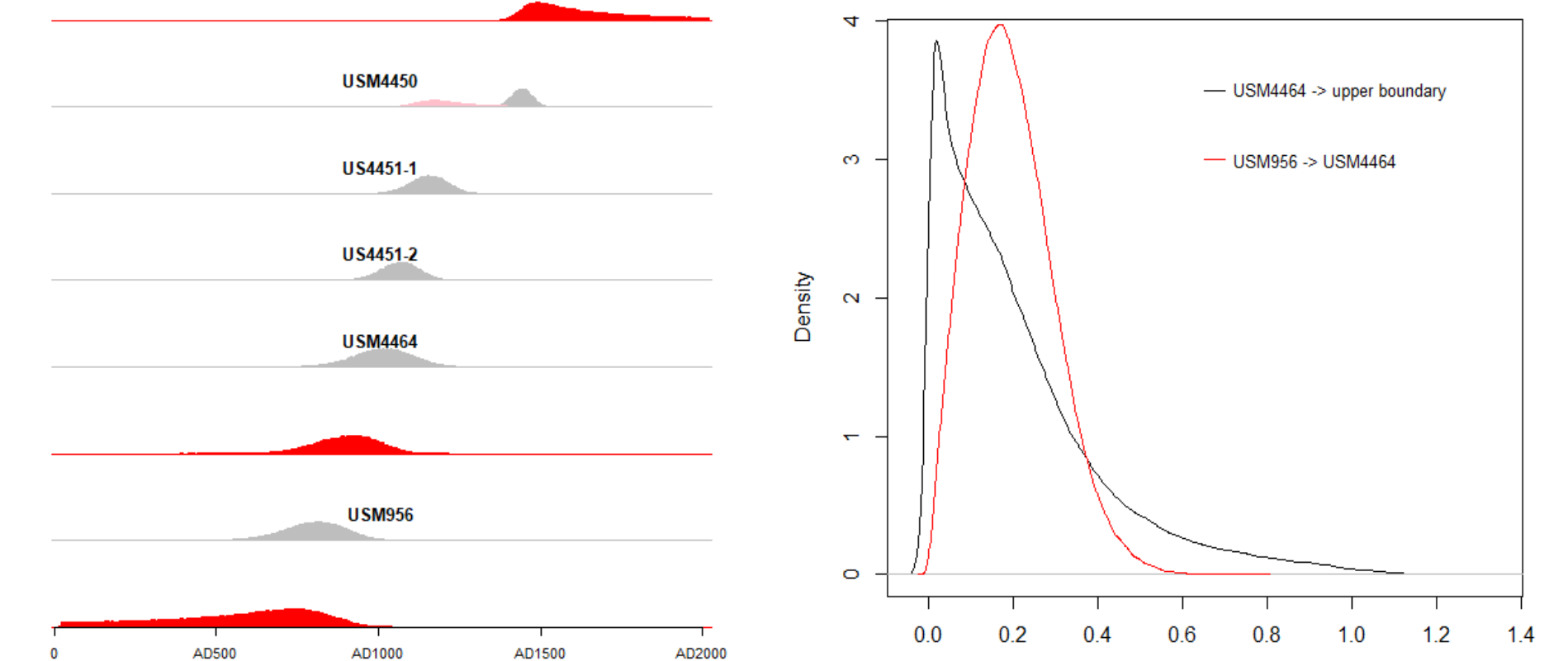
Case #1: Sector F

To the north of Sector F lies a large drying basin (USM956). A pyriform furnace (USM4464) was dug to a depth of 1.50 m to the south of this basin. It is cut in its northern part by a square oven (USM4450) covered by a demolition fill (US4451) (Rante, 2019; Bertier, 2012).

- > USM4450 has a particularly young age => IR-OSL and BL-OSL dates don't seem to pose a problem, but are not consistent with each other; The TL is unusable (spurious TL?) => age to be discarded.
- > The shards are younger than kiln USM4464, and was produced by a later furnace (USM4450?)
- > This furnace would have ceased to function at the earliest in the early 13th century.



Sector F with the corresponding Harris matrix - ©A. Zink



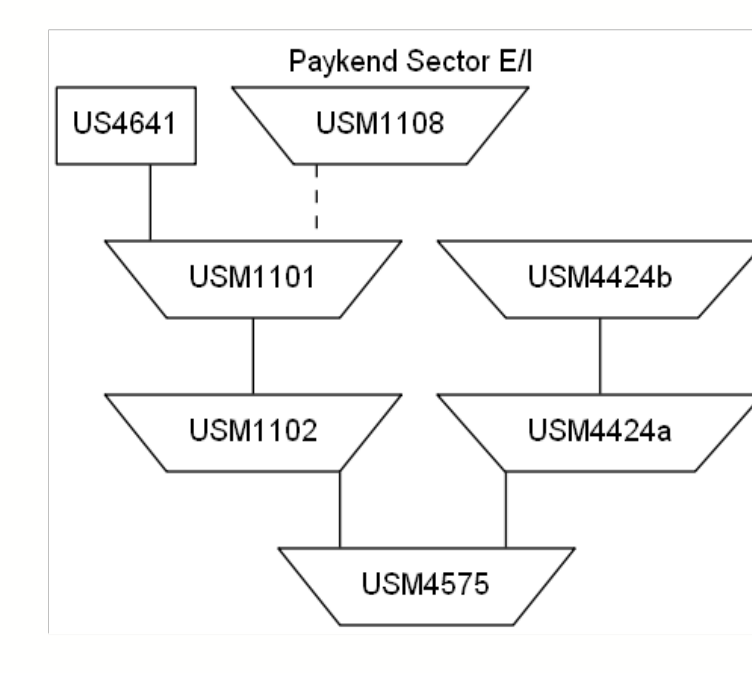
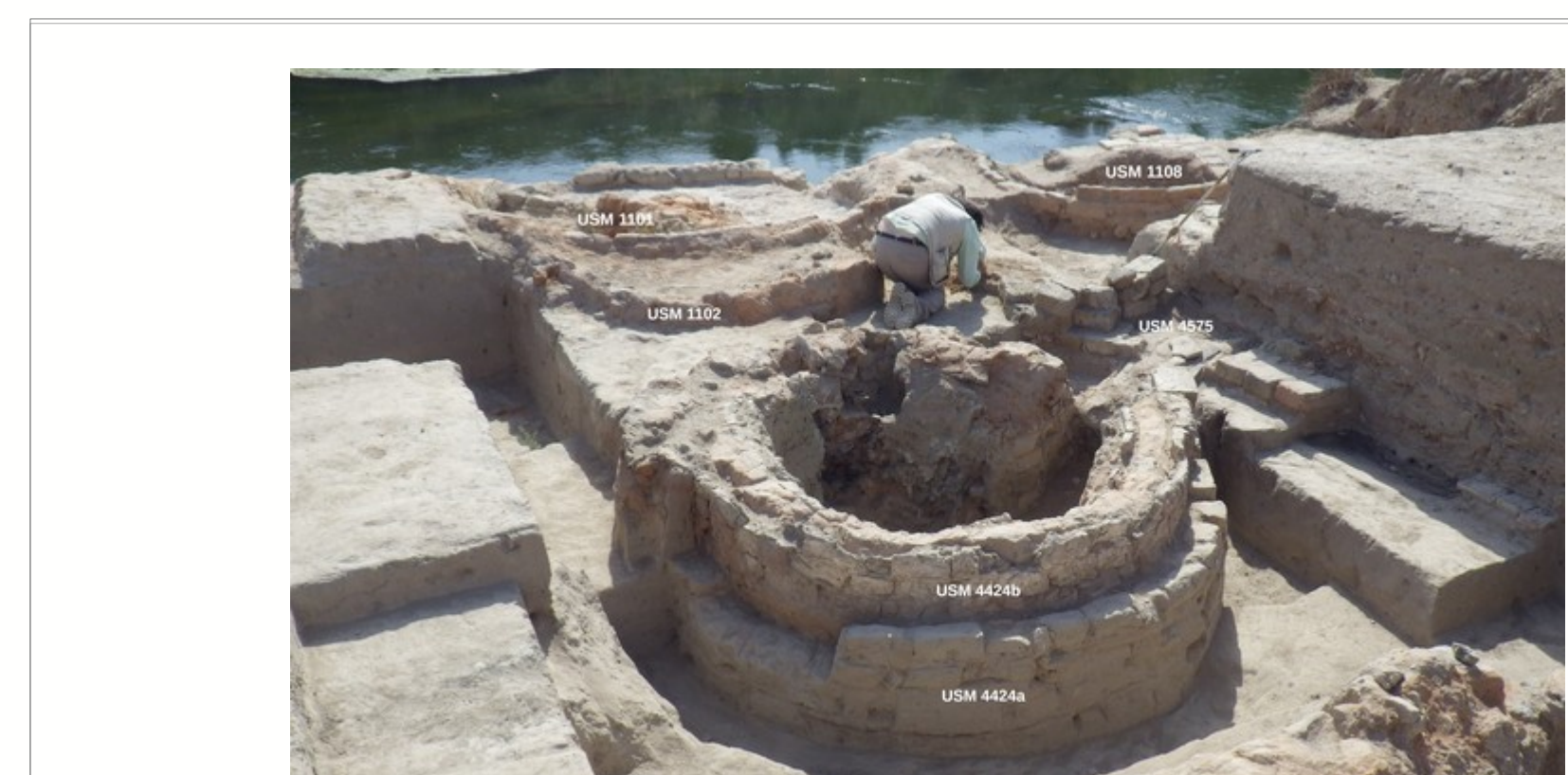
Luminescence dating sector F. In grey, the dating of the structures and shards, in red, the boundaries of the different phases in pink, the upper limit of the last phase without taking into account furnace USM4450, equivalent to the minimum date of the kiln that produced shards US4451 - ©A. Zink

potential occupancy times for kiln USM4464 (strictly speaking, the gap between the dating of the USM956 basin and that of the USM4464 furnace includes the uses of both) and for its successor (USM4450?) - ©A. Zink

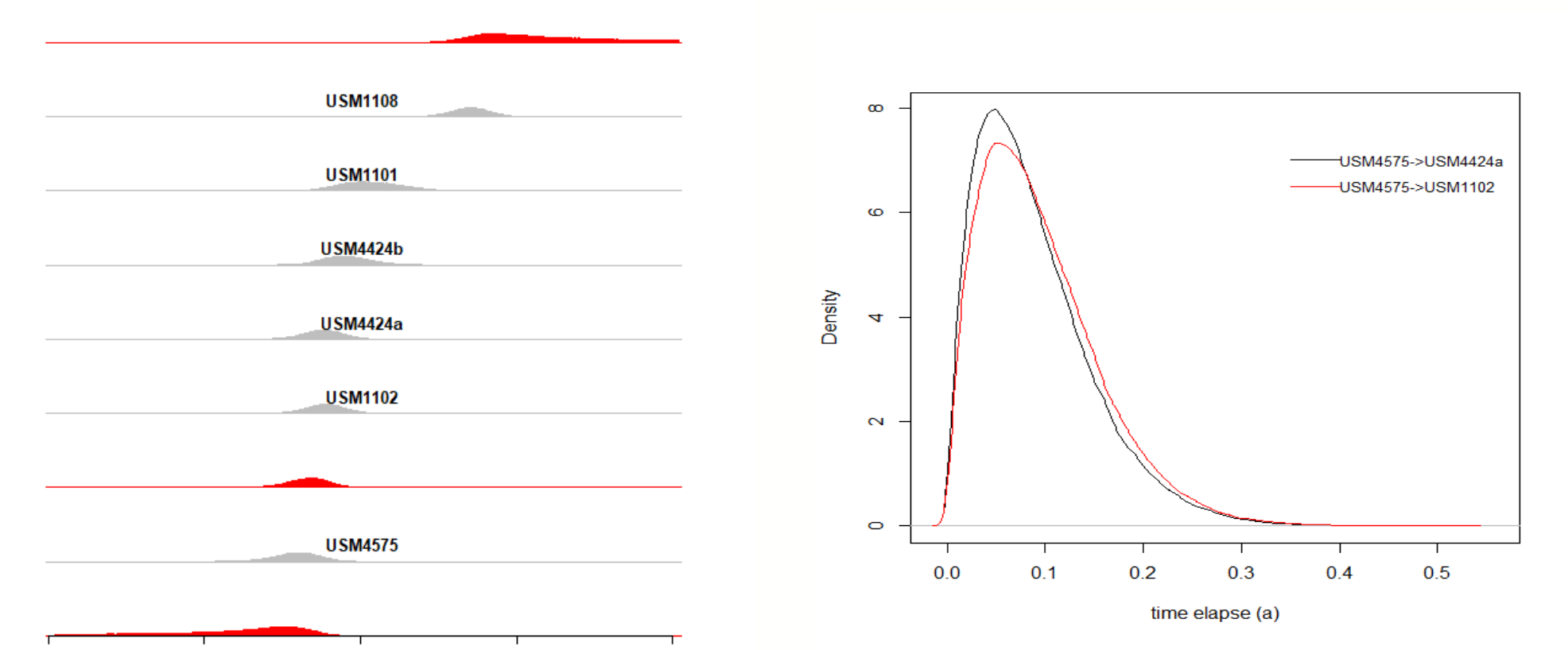
Case#2: Sector I/E

Kiln USM4575 is intersected to the east by kiln USM1102 and to the north by kilns USM4424a and USM4424b. Furnace USM1102 was partially destroyed during the creation of kiln USM1101. South of the USM1102/USM1101 complex is a later furnace USM1108. The shards on the filling level US4641 date from pre-Islamic times and have been discarded.

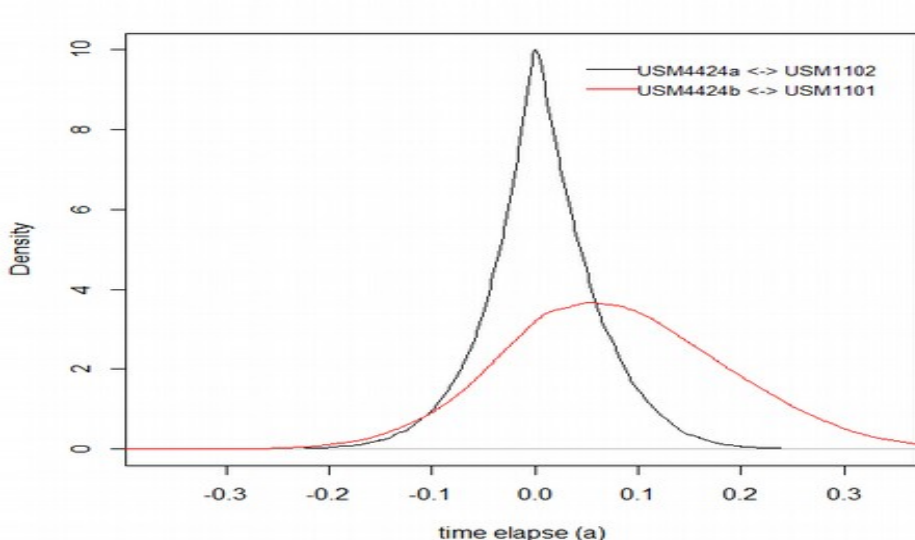
- > Furnace USM4575 dates from the 8th-9th centuries.
- > Furnaces USM1102 and 4424a were abandoned almost simultaneously.
- > USM4424a was replaced by furnace 4424b, which was itself quickly abandoned in less than a century.
- > USM1101 furnace, the successor to the USM1102, had a longer service life of around 150-200 years, and was abandoned almost a century after the USM4424b furnace.
- > USM1108 appears to have been in use much later, ceasing 350 years after furnace USM1101, during the 14th century.



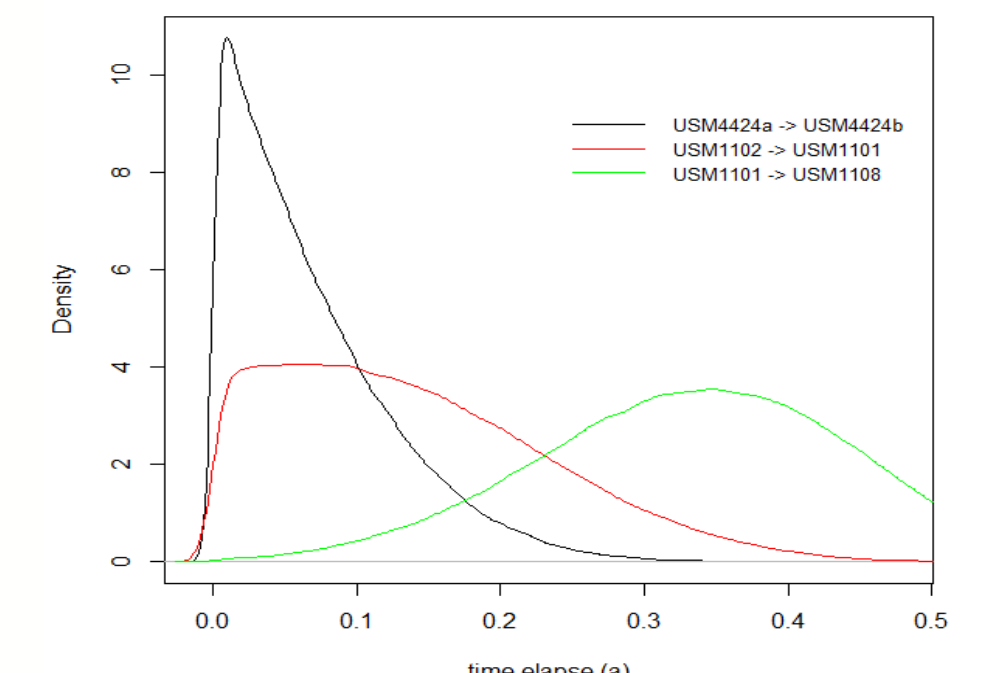
Sector I/E - © E. Porto



Luminescence dating Paykend Sector I/E - ©A. Zink



time differences between kilns USM1102 and USM4424a, and between kilns USM1101 and USM4424b - ©A. Zink



potential occupancy times for furnaces based on the time between last use of each furnace level - ©A. Zink

## Conclusion

The potters' quarter was active during the medieval period. Shards found in the fill levels may date back several centuries. They may come from earlier soil reused to fill the kilns after their production ceased; they may also come from canal cleaning. The use of movable objects to date archaeological layers should be avoided. The Bayesian approach enables us to estimate the duration of use of certain furnaces or their contemporaneity.