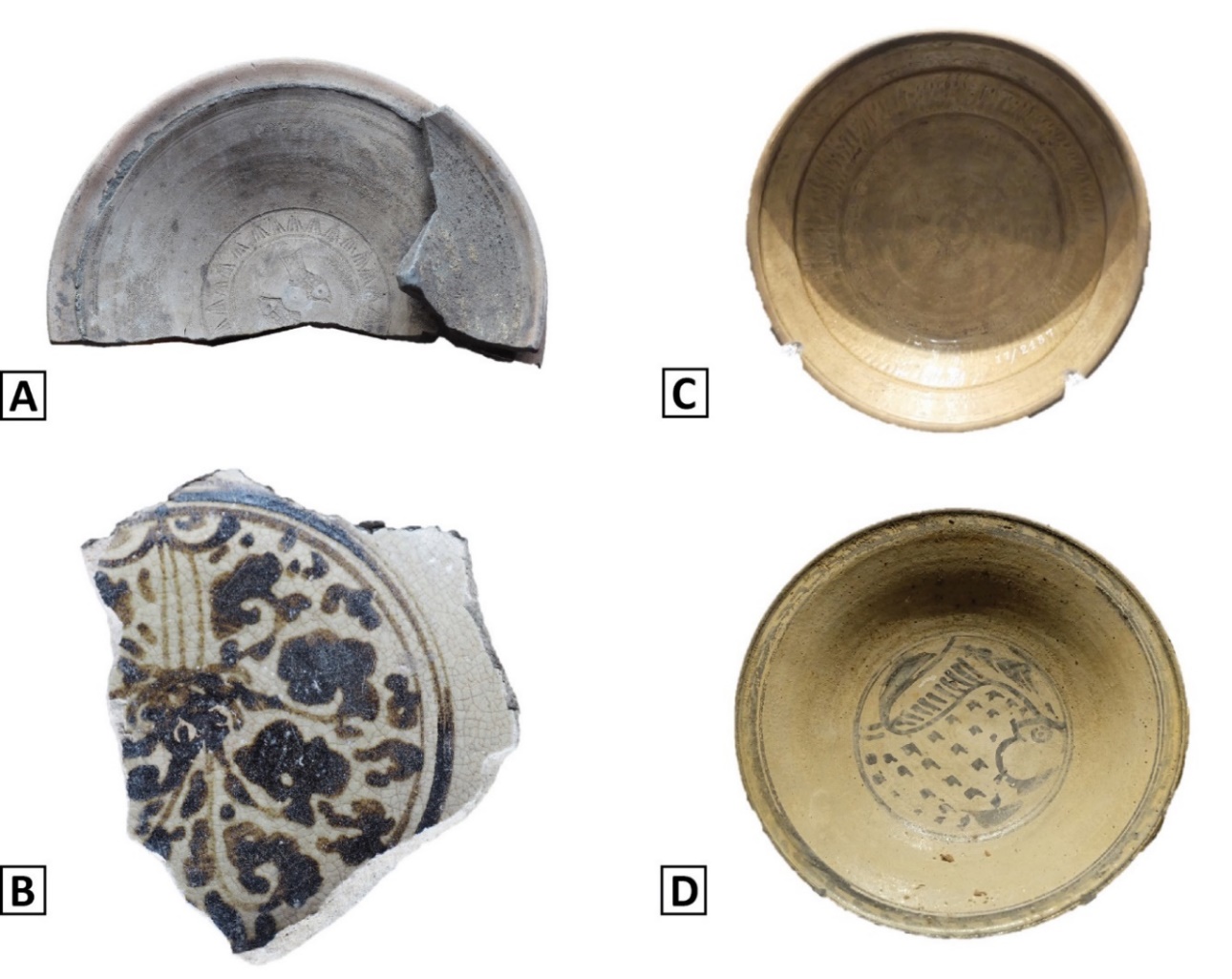
# Supplementary Information

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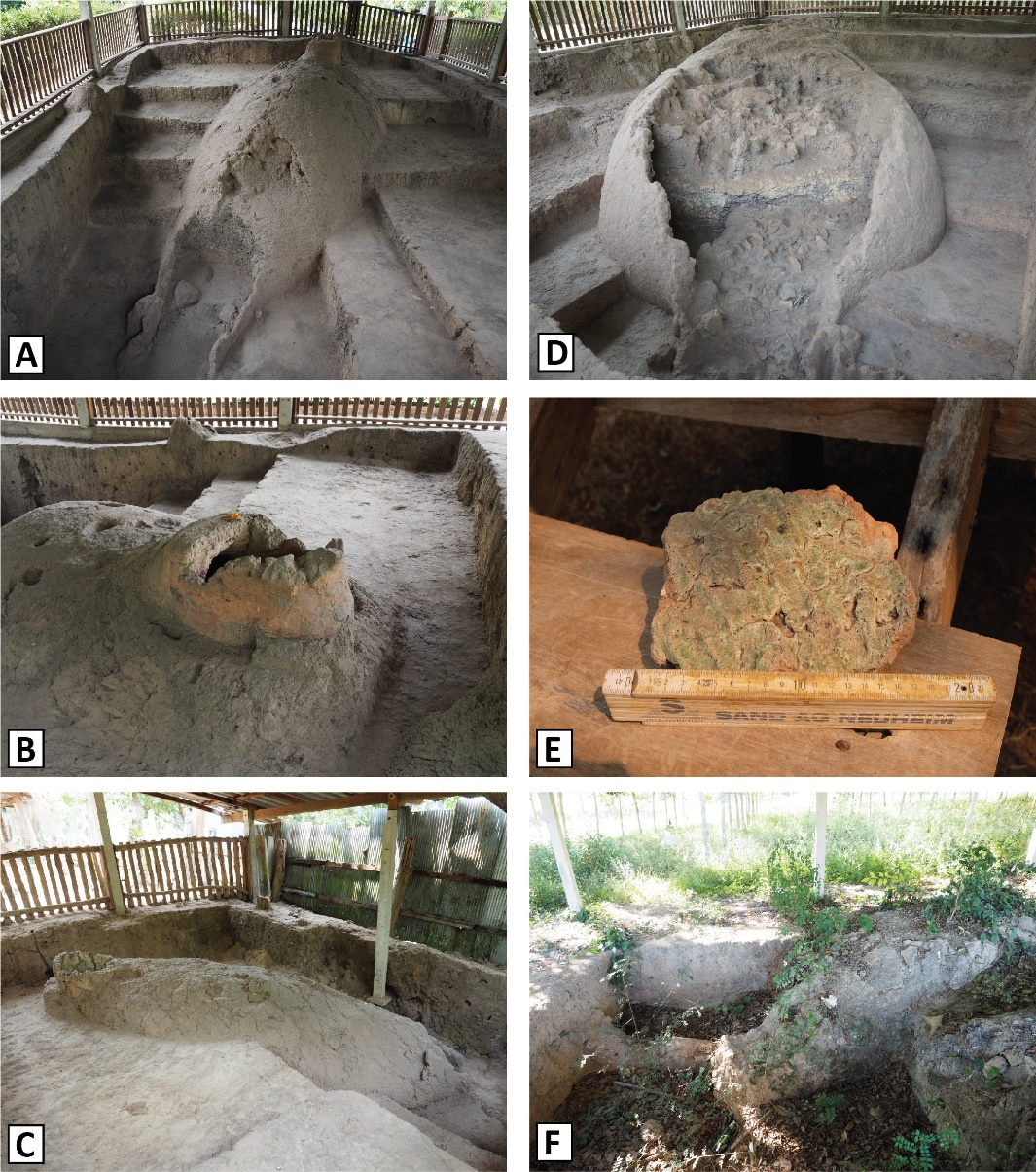
**Supplementary Figure 1 (A)** A green-glazed dish with fish motif and **(B)** a dish with black ornamental painting. Both were found at the JMK site (Ban Bo Suak, Nan) during the 1999 excavation (Praicharnjit 2011) and are displayed at the *Ancient Kiln Ban Bo Suak Museum* owned by Mr. Manus Tikham in Nan, Thailand. **(C)** A green-glazed dish and **(D)** an under-glazed dish with fish painting are from sites in Sukhothai (Ban Ko Noi), and are displayed at the *National Museum* (Phra Nakhon), Bangkok. (Photos were taken by P. Srisunthon with permission of the Fine Art Department of Thailand, Local office No. 7).

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**Supplementary Figure 2 (A)** Upper part of a jar decorated in “Nan Pattern” found at the JMK site (Praicharnjit 2011) which is displayed at the *Ancient Kiln Ban Bo Suak Museum* **(B)** A green-glazed jar that was produced at the Ban Ko Noi kiln complex (Sukhothai) and is displayed at the *National Museum (Phra Nakhon)* in Bangkok *.* (Photos were taken by P. Srisunthon with permission of the Fine Art Department of Thailand, Local office No. 7)*.*

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**Supplementary Figure 3** A “Saggar” from the Ban Bo Suak kiln complex. It is displayed at the *Nan National Museum* (Thailand). (Photo was taken by P. Srisunthon with permission of the Fine Art Department of Thailand, Local office No. 7).

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**Supplementary Figure 4** Photos of the sampling sites (taken by P. Srisunthon): **(A)** JMK1 kiln; **(B)** the clay-slab structure of the JMK1 chimney was constructed by a mix of locally sourced silty clay and water that was added onto the structure and stabilising during firing. Here, the chimney discloses two different layers which may relate to the renovation of the kiln during the manufacturing time. **(C)** JMK 2 kiln; **(D)** Sunan kiln located on the JMK site. The celling of this chamber had collapsed but many broken pieces of ceramics were preserved inside. **(E)** Part of the firing chamber (JMK site). This fragment shows a glassy coating on the surface which might be the result of heating to high temperatures; **(F)** NTO kiln.

**Supplementary Table A** Radiocarbon dating results from Sisatchanalai, Sukhothai and Phisanulok kilns published by Barbetti and Hein (1989).

| **No.** | **Kiln site location\*** | **Lab code** | **Collection year** | **Material** | **Description** | **Age (BP)** |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | KN130 | SUA-2504 | 1984 | Charcoal | Charcoal found in fire box | 210±120 |
| 2 | KN61 | OAEP-691 | 1984 | Charcoal | 580±60 |
| 3 | KN61 | OAEP-692 | 1984 | Charcoal | 490±80 |
| 4 | KN61 | OAEP-693 | 1984 | Charcoal | 590±100 |
| 5 | KN61 | OAEP-775 | 1984 | Charcoal | 650±90 |
| 6 | KN61 | OAEP-777 | 1984 | Bone | 660±130 |
| 7 | KN61 | OAEP-778 | 1984 | Bone | 450±80 |
| 9 | KN176 | OAEP-690 | 1984 | Bone | - | 430±130 |
| 10 | KN54 | SUA-2744 | 1987 | Charcoal | Charcoal from trench excavation | 130±60 |
| 11 | KN54 | SUA-2664 | 1987 | Charcoal | Base of fill | 350±60 |
| 12 | KN54 | SUA-2665 | 1987 | Charcoal | Charcoal sealed in ash layer | 390±60 |
| 13 | KN59 | SUA-2086 | 1983 | Charcoal | Charcoal between chimney linings | 720±170 |
| 14 | KN59 | SUA-2696 | 1983 | Charcoal | 620±80 |
| 15 | KN109 | SUA-2193 | 1984 | Charcoal | Charcoal from the pit II | 1250±40 |
| 16 | KN42 | SUA-2596/NZA-412 | 1984 | Charcoal | Charcoal from the pit I | 750±130 |
| 17 | KN42 | Beta-23346/ETH-3536 | 1985 | Charcoal | 965±100 |
| 18 | KN42 | SUA-2192 | 1984 | Charcoal | 970±100 |
| 19 | KN42 | SUA-2747 | 1985 | Charcoal | Charcoal from the pit II | 680±60 |
| 20 | KN187 | SUA-2693 | 1986 | Charcoal | Charcoal from firebox, upper fill | 580±50 |
| 21 | KN187 | SUA-2694 | 1986 | Charcoal | Charcoal from firebox, middle fill | 620±60 |
| 22 | KN187 | SUA-2695 | 1986 | Charcoal | Charcoal from firebox, basal fill outside | 640±60 |
| 23 | Phitsanulok site | SUA-2211 | 1984 | Charcoal | Charcoal found between kilns | 570±40 |

\* KN= Ban Ko Noi kiln complex site.

**Supplementary Table B** Thermoluminescence dating results from the Sisatchanalai, Sukhothai and Phisanulok kiln sites published by Robertson and Prescott (1988).

| **No.** | **Kiln site location\*** | **Age determination TL code** | **Material** | **Palaeo dose (Gy)** | **Int. dose**  **(Gy ka-1)** | **Env. Dose (Gy ka-1)** | **Total dose**  **(Gy ka-1)** | **Age (AD)** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | KN110 | 85003 | Material from under kiln floor | 2.37±0.16 | 1.96 | 1.25 | 3.21 | 1200±60 |
| 2 | KN110 | 85004 | Stoneware jar | 2.56±0.25 | 1.88 | 1.25 | 3.13 | 1170±110 |
| 3 | KN110 | 85006 | Flat support stoneware jar | 2.23±0.56 | 1.84 | 1.25 | 3.08 | 1270±200 |
| 4 | KN109/110 | 87001 | Material from under kiln floor | 1.88±0.13 | 1.74 | 1.40 | 3.14 | 1400±70 |
| 5 | KN109/110 | 87002 | Material from behind fire wall | 2.16±0.07 | 2.27 | 1.40 | 3.67 | 1400±60 |
| 6 | KN109/110 | 87003 | Material from under kiln floor | 2.07±0.09 | 1.36 | 1.40 | 2.76 | 1240±80 |
| 7 | KN109/110 | 87004 | Material from under kiln floor | 2.24±0.07 | 2.12 | 1.40 | 3.52 | 1240±60 |
| 8 | KN109 | 85005 | Stoneware jar | 1.75±0.22 | 1.84 | 1.25 | 3.08 | 1400±75 |
| 9 | KN111 | 87009 | Material from under kiln floor | 1.30±0.20 | 2.34 | 1.47 | 3.81 | 1600±60 |
| 10 | NH118 | 87005 | Sherd | 1.92±0.05 | 1.96 | 1.38 | 3.49 | 1400±60 |
| 11 | NH120 | 87006 | Sherd | 2.28±0.19 | 2.48 | 1.42 | 3.90 | 1400±70 |
| 12 | KN61 | 85002 | Sherd | 2.53±0.20 | 2.28 | 1.07 | 3.35 | 1200±70 |
| 13 | WDL (KN171) | 87007 | Firing chamber floor | 2.02±0.08 | 2.09 | 0.92 | 3.01 | 1300±130 |
| 14 | WPPL | 87008 | Stoneware jar | 2.39±0.07 | 2.18 | 1.20 | 3.38 | 1300±100 |

\* KN= Ban Ko Noi kiln complex site, NH= Ban Nong O site, WDL= Wat Don Lan site, WPPL=Wat Phra Phai Luang site.

**Supplementary Table C** Radiocarbon data from Sako (2017).

| **No.** | **Kiln site location\*** | **Lab code** | **Collection year** | **Material** | **Description** | **Age (BP)** |
| --- | --- | --- | --- | --- | --- | --- |
| 1\*\* | SKT-001 | Wk-45201 | 2017 | Charcoal | Charcoal buried with pottery (Sukhothai style) in Baray | 578±15 |
| 2\*\* | SKT-046 | Wk-45202 | 2017 | Charcoal | 613±15 |

**\*** SKT= Sukhothai Historical National Park.

**Supplementary** Table DNumber of measured, accepted and rejected aliquots for De determination. The rejection criteria were applied to exclude aliquots as follows: recycling ratio >10%, maximum test dose error >20%, maximum recuperation (% of N) >20%, Tn signal >3\*σ background (BG). Further aliquots were rejected when infinite De values (Inf.) were obtained, the extrapolation of the dose response curve would have been necessary (EXPLT.) and dose response curve fitting failed (DS curve).

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample name** | **Aliquot sizea** | **nacc/**  **nmeas** | **nrej** | **Max. test dose error >20%** | **Tn signal >3\*σ**  **above BG** | **Recycling ratio**  **>10%** | **Max. recup.**  **>20%** | **Inf.** | **EXPLT.** | **DS curve** |
| ***JMK site*** | |  |  |  |  |  |  |  |  |  |
| JMK1-1 | SA | 48/48 | 0 | - | - | - | - | - | - | - |
|  | MA | 46/72 | 26 | 7 | 5 | 13 | - | - | 1 | - |
| JMK1-2 | SA | 48/48 | 0 | - | - | - | - | - | - | - |
|  | MA | 48/108 | 60 | 40 | 4 | 10 | 3 | 1 | - | 2 |
| JMK2-1 | SA | 48/48 | 0 | - | - | - | - | - | - | - |
|  | MA | 45/72 | 27 | 15 | 1 | 7 | 1 | 3 | - | - |
| JMK2-2 | SA | 48/48 | 0 | - | - | - | - | - | - | - |
|  | MA | 47/84 | 37 | 16 | 1 | 19 | 1 | 2 | 2 | - |
| JMK2-3 | SA | 48/48 | 0 | - | - | - | - | - | - | - |
|  | MA | 49/96 | 47 | 28 | 4 | 10 | 1 | 4 | - | - |
| BS1 | SA | 48/48 | 0 | - | - | - | - | - | - | - |
|  | MA | 35/120 | 85 | 36 | 8 | 15 | 1 | 3 | 2 | - |
| BS2 | SA | 48/48 | 0 | - | - | - | - | - | - | - |
|  | MA | 43/108 | 65 | 26 | 26 | 7 | 4 | 1 | 1 | - |
| BS3 | SA | 48/48 | 0 | - | - | - | - | - | - | - |
|  | MA | 35/82 | 47 | 25 | 7 | 12 | 1 | 2 | - | - |
| ***NTO site*** | |  |  |  |  |  |  |  |  |  |
| NTO1 | SA | 48/48 | 0 | - | - | - | - | - | - | - |
|  | MA | 48/72 | 24 | 13 | 2 | 3 | 1 | - | 5 | - |
| NTO2 | SA | 48/48 | 0 | - | - | - | - | - | - | - |
|  | MA | 52/72 | 20 | 9 | 3 | 6 | 2 | - | - | - |
| NTO3 | SA | 48/48 | 0 | - | - | - | - | - | - | - |
|  | MA | 45/60 | 15 | 5 | 2 | 5 | 1 | 1 | 1 | - |

a MA= mini-aliquot (ca. 10-15 grains) and SA= small-aliquot(ca. 130 grains).