**Supplementary Online Materials (SOM) 1**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **LIA ID** | **Museum accession number** | **Country** | **Site** | **Site #** | **Context** | **Ceramic association** | **Provenance match** | **Weight (g)** | **Length (cm)** | **Preservation** | **Reference** |
| Fe-11 | Luano\_25\_7\_81 | Congo-Kinshasa | Luano River | - | Surface | EIA | Copperbelt | 700 | 27 | Whole | Rademakers *et al.* 2019 |
| Zam-Kuma-1 | - | Zambia | Kumadzulo | - | - | EIA | Copperbelt | - | - | Partial | Vogel 1971 |
| Zam-Kamu-1 | - | Zambia | Kamusongolwa | - | Locality B, 10in | EIA | Copperbelt | 480 | 30 | Whole | Daniels 1967 |
| Zam-Luano-4 | - | Zambia | Luano Main Site | - | - | EIA | Copperbelt | - | - | Partial | Bisson 2000 |

**SOM Table 1:** Catalogue of rectangular and fishtail (Ia type) ingots displayed in Figures 1 and 3.Data were assembled from the authors and the references given in the reference column.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **LIA ID** | **Museum accession number** | **Country** | **Site** | **Site #** | **Context** | **Ceramic association** | **Provenance match** | **Weight (g)** | **Length (cm)** | **Preservation** | **Reference** |
| Zim-Dul-1a,b | - | Zimbabwe | Dunlorne Farm | 1730 CB 7 | - | - | Copperbelt | 2129 | 22 | Whole | - |
| Zim-Riv-1 | - | Zimbabwe | Riverside Farm | 1730 CB 33 | - | - | Copperbelt | - | 18 | Whole | - |
| Zim-Riv-2 | - | Zimbabwe | Riverside Farm | 1730 CB 33 | - | - | Copperbelt | - | 19 | Whole | - |
| Zim-ZMHS-4 | QMIA 4464 | Zimbabwe | Karoi area | - | - | - | Kipushi | 679 | 18.5 | Whole | Swan 2007 |
| Zim-ZMHS-8a | QMIA 4456 | Zimbabwe | Zave | 1730 AA 8 | - | - | Copperbelt | 1125 | 20.5 | Whole | Swan 2007 |
| Zim-ZMHS-9 | QMIA 4459 | Zimbabwe | Graniteside | 1731 CC 3 | - | Harare | Copperbelt | 443 | 17.4 | Whole | Swan 2007 |
| Zim-ZMHS-10a,b | QMIA 4458 | Zimbabwe | Makwiro | 1730 CD 10 | - | - | Kipushi | 1114 | 18.3 | Whole | Swan 2007 |
| Zim-ZMHS-18 | QMIA 4498 | Zimbabwe | Horizon Farm | - | - | - | Copperbelt | 350 | 17.4 | Whole | Swan 2007 |
| Zim-ZMHS-23 | - | Zimbabwe | Mwami | 1629 DB 10 | - | - | Kipushi | 549 | 17.2 | Whole | Swan 2007 |
| Zim-ZMHS-24 | QMIA 4484 | Zimbabwe | Beatrice area | 1830 BD 12? | - | - | Copperbelt | 348 | 17.2 | Whole | Swan 2007 |
| Zim-Sitip-1 | - | Zimbabwe | Shipton Farm | 1730 CB 8 | - | - | Copperbelt | - | 20 | Whole | - |
| Not Sampleda | QMIA 4470 | Zimbabwe | - | - | - | - | - | 1341 | 20.2 | Whole | Swan 2007 |
| Not Sampledb | - | Zimbabwe | Chumnungwa | 2029 DC 4 | Burial described in Hall and Neal (1902, 229) | Zimbabwe | - | - | 13 | Whole | Hall and Neal 1902 |
| Not Sampled | - | Zimbabwe | - | 1629 DA 4 | - | - | - | - | 20 | Whole | Swan 2007 |
| Fe-12 | KUL\_T20\_U1 | Congo-Kinshasa | Kikulu | - | Burial 20 | Kabambian A | Copperbelt | 195 | 18.8 | Whole | Rademakers *et al.* 2019 |
| Fe-13w | KUL\_T15\_U1\_S | Congo-Kinshasa | Kikulu | - | Burial 15 | Kabambian A | Copperbelt | 220.5 | 17.5 | Whole | Rademakers *et al.* 2019 |
| Fe-14 | KUL\_T10\_U2\_L | Congo-Kinshasa | Kikulu | - | Burial 10 | Kabambian A | Copperbelt | 135 | 11.9 | Whole | Rademakers *et al.* 2019 |
| Fe-15 | KUL\_T10\_U2\_S | Congo-Kinshasa | Kikulu | - | Burial 10 | Kabambian A | Copperbelt | 76.32 | 9.6 | Partial | Rademakers *et al.* 2019 |
| Fe-16 | PO.0.0.79293 | Congo-Kinshasa | Sanga | - | Burial 11 | Kabambian A | Copperbelt | 100 | 11 | Whole | Rademakers *et al.* 2019 |
| K-17 | PO.0.0.47763 | Congo-Kinshasa | Bolela | - | Gravel Pit | - | Copperbelt | 143.46 | 18.6 | Partial | Rademakers *et al.* 2019 |
| K-18 | PO.0.0.47764 | Congo-Kinshasa | Bolela | - | Gravel Pit | - | Copperbelt | 147.4 | 18 | Whole | Rademakers *et al.* 2019 |
| - | - | Congo-Kinshasa | Malemba-Nkulu | - | Burial 27 | Kabambian A | - | 135.13 | 11.8 | Whole | de Maret 1992, data from T. Childs |
| Not Sampled | - | Zambia | Sinde Mission | - | Surface | - | - | - | 20 | Whole | Inskeep 1962 |
| Not Sampled | - | Zambia | Kansanshi | - | S.E.5, Sq. 5, 32cm | Luangwa | - | - | - | Partial | Bisson 1976 |

**SOM Table 2:**Catalogue of HIH ingots displayed in Figures 1, 3 and 6.Data were assembled from the authors and the references given in the reference column.   
a = Transitional HIH ingots based on length (cm) and weight (g)  
b = HIH ingots with flange

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **LIA ID** | **Accession #** | **Country** | **Site name** | **Site #** | **Context** | **Ceramic association** | **LIA source** | **Center mark** | **Weight (g)** | **Length (cm)** | **HXR size pattern** | **Preservation** | **Reference** |
| Zim-Kent-1 | - | Zimbabwe | Kent Estates | 1730 DC 22 | - | - | Magondi Belt (?) | 1 | - | - | - | Partial | - |
| Zim-ZMHS-1 | QMIA 4461 | Zimbabwe | Yeadon Farms | 1629 DA 6 | - | - | Kipushi | 1 | 4307 | 31.5 | 3 | Whole | Swan 2007 |
| Zim-ZMHS-2 | QMIA 4462 | Zimbabwe | Chedzurgwe (Rydings) | 1629 DC 5 | Surface | Ingombe Ilede | Kipushi | 1 | 3490 | 29.5 | 1 | Whole | Garlake 1970 |
| Zim-ZMHS-5 | QMIA 4463 | Zimbabwe | Unknown | - | - | - | Copperbelt | 1 or 3 | - | 27 | - | Partial | - |
| Zim-ZMHS-6 | QMIA 4455 | Zimbabwe | Zave | 1730 AA 8 | - | - | Kipushi | 2 | - | - | - | Partial | Swan 2007 |
| Zim-ZMHS-7 | QMIA 4457 | Zimbabwe | Kashwao East | 1730 BA 23 | - | - | Kipushi | 1 | 3273 | 29 | 1 | Whole | Swan 2007 |
| Zim-ZMHS-11 | QMIA 4454 | Zimbabwe | Zave | 1730 AA 8 | - | - | Kipushi | 2 | 1709 | 19.9 | 1 | Partial | Swan 2007 |
| Zim-ZMHS-12 | QMIA 3068 | Zimbabwe | Karoi Dixie farm | 1629 DC 24 | - | - | Kipushi | 4 | 3573 | 31 | 1 | Whole | Swan 2007 |
| Zim-ZMHS-13 | QMIA 4451 | Zimbabwe | Chedzurgwe (Rydings) | 1629 DC 5 | Surface | Ingombe Ilede | Kipushi | 3 | 3068 | 27.5 | 1 | Whole | Garlake 1970 |
| Zim-ZMHS-14 | QMIA 4453 | Zimbabwe | Bassett Farm | 1730 AB 3 | - | - | Kipushi | 1 | 3205 | 29.6 | 1 | Whole | Swan 2007 |
| Zim-ZMHS-15 | QMIA 4467 | Zimbabwe | Karoi area | - | - | - | Kipushi | 2 | 3347 | 29.9 | 1 | Whole | Swan 2007 |
| Zim-ZMHS-16 | QMIA 4465 | Zimbabwe | Karoi area | - | - | - | Copperbelt | 3 | 2967 | 29 | 1 | Whole | Swan 2007 |
| Zim-ZMHS-19 | QMIA 4496 | Zimbabwe | Karoi area | - | - | - | Kipushi | 1 | 3795 | 34 | 1 | Whole | Swan 2007 |
| Zim-ZMHS-21 | QMIA 4478 | Zimbabwe | Gil Gil Mine | 1629 CA 1 | - | - | Kipushi | 1 | - | - | - | Partial | Swan 2007 |
| Zim-ZMHS-22 | - | Zimbabwe | Easter Parade Farm | 1629 DA 24 | - | - | Copperbelt | - | - | - | - | Partial | - |
| Zam-II-7 | - | Zambia | Ingombe Ilede | - | Burial 8 | Ingombe Ilede | Kipushi | 1 | 4080 | 31 | 3 | Whole | Fagan *et al.* 1969 |
| Zam-II-14 | - | Zambia | Ingombe Ilede | - | Burial 8 | Ingombe Ilede | Copperbelt | 1 | 3970 | 36 | 1 | Whole | Fagan *et al.* 1969 |
| Zam-II-15 | - | Zambia | Ingombe Ilede | - | Burial 2 | Ingombe Ilede | Kipushi | 5 | 2310.5 | 31.5 | 2 | Whole | Fagan *et al.* 1969 |
| Not Sampled | QMIA 4468 | Zimbabwe | - | - | - | - | - | 2 | 4468 | 32.3 | 3 | Whole | Swan 2007 |
| Not Sampled | QMIA 4466 | Zimbabwe | - | - | - | - | - | 1 | 3595 | 32.5 | 1 | Whole | Swan 2007 |
| Not Sampled | QMIA 4495 | Zimbabwe | - | - | - | - | - | 1 | 3497 | 33.4 | 1 | Whole | Swan 2007 |
| Not Sampled | QMIA 4479 | Zimbabwe | - | - | - | - | - | - | - | - | - | Partial | - |
| Not Sampled | - | DRC | Lubumbashi area | - | - | - | - | 1 | - | - | - | Whole | de Maret 1995 |
| Not Sampled | - | DRC | Kafubu (Lubumbashi area) | - | - | - | - | 5 | - | - | - | Whole | de Maret 1995 |
| Not Sampled | - | Zimbabwe | ~~-~~ | - | - | - | - | 1 | - | - | - | Whole | Great Zimbabwe Museum |
| Not Sampled | Ingot #5 | Malawi | Dedza | - | Dedza hoard | - | - | 6 | 2471 | 35 | 2 | Whole | Cole-King 1973 |
| Not Sampled | Ingot #6 | Malawi | Dedza | - | Dedza hoard | - | - | - | 1757 | 32 | 2 | Whole | Cole-King 1973 |
| Not Sampled | Ingot #1 | Malawi | Dedza | - | Dedza hoard | - | - | - | 2052 | 33 | 2 | Whole | Cole-King 1973 |
| Not Sampled | Ingot #2 | Malawi | Dedza | - | Dedza hoard | - | - | - | 2057 | 33.8 | 2 | Whole | Cole-King 1973 |
| Not Sampled | Ingot #3 | Malawi | Dedza | - | Dedza hoard | - | - | - | 2071 | 31.5 | 2 | Whole | Cole-King 1973 |
| Not Sampled | Ingot #4 | Malawi | Dedza | - | Dedza hoard | - | - | - | 1367 | 30.7 | 2 | Whole | Cole-King 1973 |
| Not Sampled | Ingot #7 | Malawi | Dedza | - | Dedza hoard | - | - | - | 2200 | 33.8 | 2 | Whole | Cole-King 1973 |
| Not Sampled | Ingot #8 | Malawi | Dedza | - | Dedza hoard | - | - | - | 1894 | - | - | Whole | Cole-King 1973 |
| Not Sampled | - | Zimbabwe | - | 1629 CD 4 | - | - | - | - | - | 29 | - | Whole | Swan 2007 |
| Not Sampled | - | Zimbabwe | - | 1629 DA 3 | - | - | - | - | - | 30 | - | Whole | Swan 2007 |
| Not Sampled | - | Zimbabwe | - | 1629 DA 3 | - | - | - | - | - | 32 | - | Whole | Swan 2007 |
| Not Sampled | - | Zimbabwe | - | 1629 DA 4 | - | - | - | - | - | 30 | - | Whole | Swan 2007 |
| Not Sampled | - | Zimbabwe | - | 1629 DA 5 | - | - | - | - | - | 25 | - | Whole | Swan 2007 |
| Not Sampled | - | Zimbabwe | - | 1629 DA 5 | - | - | - | - | - | 27 | - | Whole | Swan 2007 |
| Not Sampled | - | Zimbabwe | - | 1629 DB 3 | - | - | - | - | - | 30 | - | Whole | Swan 2007 |
| Not Sampled | - | Zimbabwe | - | 1730 AB 21 | - | - | - | - | - | 28 | - | Whole | Swan 2007 |
| Not Sampled | - | Zimbabwe | - | 1731 AC 7 | - | - | - | - | - | 32.5 | - | Whole | Swan 2007 |
| Not Sampled | - | Zambia | Ingombe Ilede | - | Burial 1 | Ingombe Ilede | - | 2 | 4480 | 31.75 | 3 | Whole | Fagan *et al.* 1969 |
| Not Sampled | - | Zambia | Ingombe Ilede | - | Burial 1 | Ingombe Ilede | - | 2 | 4480 | 30.5 | 3 | Whole | Fagan et al. 1969 |
| Not Sampled | - | Zambia | Ingombe Ilede | - | Burial 6 | Ingombe Ilede | - | - | 2608 | 27.2 | 1 | Whole | Fagan *et al.* 1969 |
| Not Sampled | - | Zambia | Ingombe Ilede | - | Burial 8 | Ingombe Ilede | - | 1 | 4082 | 31.5 | 3 | Whole | Fagan *et al.* 1969 |
| Not Sampled | - | Zambia | Ingombe Ilede | - | Burial 8 | Ingombe Ilede | - | 2 | 4167 | 31.5 | 3 | Whole | Fagan *et al.* 1969 |
| Not Sampled | - | Zambia | Chishi Island | - | - | - | - | 1 | - | - | - | Whole | Derricourt 1980 |

**SOM Table 3:**Catalogue of HXR ingots displayed in Figures 1, 3 and 11. Data were assembled from the authors and the references given in the reference column. HXR maker’s marks assigned based on Figure 8. HXR size pattern explained in Figure 11.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Site** | **Unit, layer** | **Context** | **Ceramic association** | **14C age (BP)** | **Cal. AD (2σ)** | **Laboratory number** | ***Croisette t*ype** | **Reference** |
| Kumadzulo | Charred hut pole | Hut 3 | EIA | 1529 ± 110 | 258–773 | N-409 | Ia\* | Vogel 1971: 15 |
| Kumadzulo | Charred hut pole | Hut 5 | EIA | 1390 ± 110 | 439–967 | N-410 | Ia\* | Vogel 1971: 15 |
| Kumadzulo | Charred hut pole | Hut 6 | EIA | 1400 ± 110 | 435–959 | N-411 | Ia\* | Vogel 1971: 15 |
| Kumadzulo | Charred hut pole | Hut 8 | EIA | 1330 ± 110 | 577–992 | N-412 | Ia\* | Vogel 1971: 15 |
| Kumadzulo | Charred hut pole | Hut 12 | EIA | 1320 ± 110 | 581–993 | N-413 | Ia\* | Vogel 1971: 15 |
| Kumadzulo | Charred hut pole | Hut 1 | EIA | 1260 ± 105 | 644–1020 | N-414 | Ia\* | Vogel 1971: 15 |
| Kamusongolwa | 3-6 in | Locality B | EIA | 800 ± 100 | 1041–1401 | SR-28 | Ia\*\* | Daniels 1967: 145 |
| Luano Main Site | 20 cm | Unit F12 | EIA-LIA | 855 ± 75 | 1039–1379 | I-12,606 | Ia\* | Bisson 1987: 50 |
| Luano Main Site | 30 cm | Unit H12 | EIA-LIA | 765 ± 75 | 1162–1400 | I-12,603 | Ia\* | Bisson 1987: 50 |
| Luano Main Site | 20 cm | Unit E5 Refuse pit | EIA-LIA | 875 ± 80 | 1026–1297 | I-12,643 | Ia\* | Bisson 1987: 50 |
| Luano Main Site | 40 cm | Unit F12 Refuse pit | EIA-LIA | 955 ± 75 | 933–1270 | I-12,605 | Ia\* | Bisson 1987: 50 |
| Luano Main Site | 80 cm | Unit G10 | EIA-LIA | 960 ± 90 | 908–1280 | I-12,641 | Ia\* | Bisson 1987: 50 |
| Luano Main Site | 40 cm | Unit G11 Refuse pit | EIA-LIA | 935 ± 75 | 1021–1274 | I-12,604 | Ia\* | Bisson 1987: 50 |
| Luano Main Site | 60 cm | Unit C8 | EIA-LIA | 1055 ± 75 | 887–1208 | I-12,601 | Ia\* | Bisson 1987: 50 |
| Luano Main Site | 50 cm | Unit E9 | EIA-LIA | 1250 ± 90 | 662–1012 | I-12,642 | Ia\* | Bisson 1987: 50 |
| Luano Main Site | 50 cm | Unit Pit with buried whole pot | EIA-LIA | 1670 ± 140 | 80–666 | I-12,602 | Ia\* | Bisson 1987: 50 |
| Kipushi | Sm. A, Sq. 2, 15–22 cm | Smelting area | Luangwa | 1110 ± 90 | 771–1180 | N-1604 | HIH (moulds) | Bisson 1976: 222 |
| Kansanshi | S.E.5, Sq. 5; -45 cm | Blacksmith shelter | - | 900 ± 60 | 1044–1275 | N-1439 | HIH | Bisson 1976: 205 |
| Kipushi | Sm. A, Sq. 4, Pit 1, 22–SOM 37 cm | Smelting area | Luangwa | 850 ± 85 | 1035–1382 | N-1603 | HIH (moulds) | Bisson 1976: 222 |
| Kipushi | Sm., Sq 8, 7 cm | Smelting area | Luangwa | 780 ± 85 | 1054–1404 | N-1605 | HIH (moulds) | Bisson 1976: 222 |
| Kikulu | Burial 20 | Funerary deposits | Kabambian A | 795 ± 65 | 1157–1391 | Hv-7505 | HIH | de Maret 1992: 79 |
| Kikulu | Burial 15 | Funerary deposits | Kabambian A | 665 ± 30 | 1296–1399 | Poz-108342 | HIH | de Maret 1992: 73 |
| Kikulu | Burial 20 | Funerary deposits | Kabambian A | 530 ± 50 | 1323–1496 | Hv-8269 | HIH | de Maret 1992: 79 |
| Malemba-Nkulu | Burial 26 | Funerary deposits | Kabambian A | 520 ± 50 | 1326–1612 | Hv-7495 | HIH, HX, HH (medium) | de Maret 1992: 130 |
| Malemba-Nkulu | Burial 27 | Funerary deposits | Kabambian A | 505 ± 30 | 1407–1461 | Poz-108344 | HIH, HX, HH (large, medium) | de Maret 1992: 130 |
| Ingombe Ilede | Burial 8 | Funerary deposits | Luangwa (Ingombe Ilede) | 370 ± 30 | 1463–1636 | Beta-415034 | HXR | Fagan et al. 1969: 102; McIntosh and Fagan 2017: 1073 |
| Kipushi | Sm., Sq. 18, 22 cm, feature 2 | Smelting area | - | 590 ± 65 | 1296–1454 | N-1602 | HXR (moulds) | Bisson 1976: 222 |
| Chedzurgwe | 0–7 inches | NW Edge of Village | Luangwa (Ingombe Ilede) | 510 ± 95 | 1302–1636 | SR-180 | HXR | Garlake 1970: 26 |
| Chedzurgwe | 0–7 inches | NW Edge of Village | Luangwa (Ingombe Ilede) | 415 ± 120 | 1317–1940 | SR-177 | HXR | Garlake 1970: 26 |
| Chedzurgwe | 0–7 inches | NW Edge of Village | Luangwa (Ingombe Ilede) | 350 ± 120 | 1415–1950 | SR-179 | HXR | Garlake 1970: 26 |

**SOM Table 4:**Table of radiocarbon dates associated with *croisette* ingot finds (adopted from supplementary materials of Rademakers *et al.* (2019: 65)). \* = Ingot from unknown context at site. \*\* = Radiocarbon date is associated with a context 4–7 inches (10–17.5 cm) above ingot find.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **LIA number** | **Site** | **Unit, layer** | **Context** | **Component** | **Housing museum** | **Reference** |
| Zam-Kan-13 | Kansanshi | Pit 1 | 350S450E, #427 | EIA1 | Livingstone Museum | Bisson 1976 |
| Zam-Kan-15 | Kansanshi | 75–90cm | 350S350E, #624 | Disturbed fill | Livingstone Museum | Bisson 1976 |
| Zam-Kan-17 | Kansanshi | Pit 1 | 350S450E, #427 | EIA1 | Livingstone Museum | Bisson 1976 |
| Zam-Kip-2 | Kipushi | - | - | - | Livingstone Museum | Bisson 1976 |
| Zam-Kip-3 | Kipushi | 0–7 cm | Sq. 17 | LIA2 | Livingstone Museum | Bisson 1976 |
| Zam-Kip-4 | Kipushi | - | - | - | Livingstone Museum | Bisson 1976 |

**SOM Table 5:**Context information for casting spills at precolonial mines in the Copperbelt

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample ID** | **Site** | **Lead (μg g-1)** | **208Pb/206Pb** | **2σ** | **207Pb/206Pb** | **2σ** | **206Pb/204Pb** | **2σ** | **207Pb/204Pb** | **2σ** | **208Pb/204Pb** | **2σ** | **Provenance** |
| Zam-Kan-13 | Kansanshi | 1 | 0.628 | 0.0002 | 0.274 | 0.0001 | 67.940 | 0.0027 | 18.585 | 0.0029 | 42.659 | 0.0071 | Copperbelt |
| Zam-Kan-15 | Kansanshi | <1 | 0.465 | 0.0002 | 0.227 | 0.0001 | 86.527 | 0.0027 | 19.649 | 0.0029 | 40.251 | 0.0071 | Copperbelt |
| Zam-Kan-17 | Kansanshi | 1 | 0.623 | 0.0002 | 0.280 | 0.0001 | 65.937 | 0.0027 | 18.475 | 0.0029 | 41.059 | 0.0071 | Copperbelt |
| Zam-Kip-2 | Kipushi | <1 | 0.484 | 0.0002 | 0.240 | 0.0000 | 80.056 | 0.0041 | 19.243 | 0.0040 | 38.717 | 0.0101 | Copperbelt |
| Zam-Kip-3 | Kipushi | 29 | 2.086 | 0.0001 | 0.866 | 0.0001 | 18.055 | 0.0030 | 15.635 | 0.0027 | 37.663 | 0.0062 | Kipushi |
| Zam-Kip-4 | Kipushi | 1 | 0.652 | 0.0001 | 0.303 | 0.0001 | 59.565 | 0.0030 | 18.061 | 0.0027 | 38.815 | 0.0062 | Copperbelt |

**SOM Table 6:** LIA data for casting spills at precolonial mines in the Copperbelt

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample ID** | **Site** | **Provenance** | **Cr** | **Fe** | **Co** | **Ni** | **Zn** | **As** | **Se** | **Mo** | **Ag** | **Cd** | **Sn** | **Sb** | **Pb** |
| Method detection limit  in μg L-1 |  |  | 0.043 | 0.011 | 0.619 | 0.006 | 0.032 | 0.014 | 0.025 | 0.542 | 0.010 | 0.003 | 0.002 | 0.019 | 0.005 |
| Zam-Kan-13 | Kansanshi | Copperbelt | <1 | 854 | 15 | 27 | 1 | 2 | 32 | <1 | 1 | <1 | 25 | <1 | 1 |
| Zam-Kan-15 | Kansanshi | Copperbelt | <1 | 69 | 1 | 39 | 2 | <1 | 28 | <1 | 1 | <1 | 4 | <1 | <1 |
| Zam-Kan-17 | Kansanshi | Copperbelt | <D.L | 219 | 2 | 4 | 2 | 6 | 111 | <1 | 1 | <1 | 22 | <1 | 1 |
| Zam-Kip-2 | Kipushi | Copperbelt | <1 | 917 | 26 | 229 | 5 | 23 | 38 | <1 | 2 | <1 | 56 | <1 | 7 |
| Zam-Kip-3 | Kipushi | Kipushi | <1 | 561 | <1 | 18 | 2 | 15 | <D.L | <1 | <1 | <1 | <1 | <D.L | <1 |
| Zam-Kip-4 | Kipushi | Copperbelt | <1 | 33 | <D.L | **1** | 14 | 561 | <D.L | <1 | 3906 | 1 | <D.L | 8 | 29 |

**SOM Table 7:**Chemistry data for copper casting spills at precolonial mines in the Copperbelt. All values are reported in μg g-1. Detection limits are included in the second row, however these values are reported in μg L-1 of dissolved sample in solution. Thus, all values below detection limits were culled prior to converting the sample data to μg kg-1 (ppb), μg g-1 (ppm), and wt% in the solid sample. <D.L = less than detection limits.

## References

Bisson, M.S. 1987. “The radiocarbon chronology of Luano, Zambia.” *Nyame Akuma* 28: 49–51.

Bisson, M.S. 2000. “Precolonial copper metallurgy: sociopolitical context.” In *Ancient African Metallurgy: The Sociocultural Context*, edited by J.O. Vogel, 83–146. AltaMira Press, Walnut Creek.

Cole-King, P. 1973. *Kukumba Mbiri mu Malawi: A Summary of Archaeological Research to 1973*. Zomba: Malawi Government Printer.

Daniels, S. 1967. “A note on the Iron Age material from Kamusongolwa Kopje, Zambia.” *South African Archaeological Bulletin* 22: 142–150.

de Maret, P. 1992. *Fouilles archéologiques dans la vallée du Haut-Lualaba, Zaïre. III: Kamilamba, Kikulu, et Malemba Nkulu, 1975*. Tervuren: Musée Royal de l’Afrique Centrale.

de Maret, P., 1995. “Croisette histories.” In *Objects-Signs of Africa*, edited by L. de Heusch, 133–145. Snoeck Ducaju & Zoon, Ghent.

Derricourt, R.M. 1980. *People of the Lakes: Archaeological Studies in Northern Zambia*. Manchester: Manchester University Press.

Fagan, B.M., Phillipson, D.W. and Daniels, S.G.H. 1969. *Iron Age Cultures in Zambia, Volume II: Dambwa, Ingombe Ilede, and the Tonga*. London: Chatto & Windus.

Garlake, P.S. 1970. “Iron Age sites in the Urungwe District of Rhodesia.” *South African Archaeological Bulletin* 25: 25–44.

Hall, R.N. and Neal, W.G. 1902. *The Ancient Ruins of Rhodesia: (Monomotapæ Imperium).* London: Methuen & Company.

Inskeep, R.R. 1962. “Some Iron Age sites in Northern Rhodesia.” *South African Archaeological Bulletin* 17: 136–180.

McIntosh, S.K. and Fagan, B.M. 2017. “Re-dating the Ingombe Ilede burials.” *Antiquity* 91: 1069–1077.

Rademakers, F.W., Nikis, N., De Putter, T. and Degryse, P. 2019. “Provenancing Central African copper croisettes: a first chemical and lead isotope characterisation of currencies in Central and southern Africa.” *Journal of Archaeological Science* 111: 105010.

Swan, L.M. 2007. “Economic and ideological roles of copper ingots in prehistoric Zimbabwe.” *Antiquity* 81: 999–1012.

Vogel, J.O. 1971. *Kamadzulo: An Early Iron Age Village Site in Southern Zambia.* Lusaka: National Museums of Zambia.