Table S1: Report on XRF results of the main elements (wt%) that act as glass former, stabilizer and flux in some K2, Mapungubwe, Zimbawe and Khami series from van Riet Lowe Collection

Bead type/N	Elements	Min.	Max.	Mean
K2/2	Mg	0	0	0
	Ca	0.7	1.2	0.9
	K	3.6	3.9	3.8
	Al	5.4	6.2	5.8
	Fe	1.2	1.6	1.4
	Si	40.4	45.1	42.8
	Others/Na, O	39.8	44.2	42.0
Map oblate/4	Mg	1.9	2.3	2.1
	Ca	2.4	2.8	2.7
	K	2.7	3.5	3.2
	Al	3.6	6.5	4.8
	Fe	1.0	1.3	1.2
	Si	35.4	48.2	39.9
	Others/Na, O	30.2	44.8	36.4
Zimbabwe/6	Mg	1.3	3.1	2.3
	Ca	3.4	3.8	3.6
	K	2.9	3.8	3.4
	Al	4.2	7.1	5.5
	Fe	0.9	1.2	1.1
	Si	36.2	43.3	40.0
	Others/Na, O	34.2	46.3	38.9
Khami/8	Mg	0	1.4	0.4
	Ca	1.9	6.3	2.9
	K	2	2.7	2.3
	Al	4.3	6.6	5.4
	Fe	1.7	5.4	2.6
	Si	34.4	48.3	40.3
	Others/Na, O	40.8	49.6	43.7

Table S2: Average composition of some glass bead series from southern Africa (oxides wt%) [23]

Bead series	Na_2O	MgO	Al_2O_3	SiO_2	K_2O	CaO	Fe_2O_3
Zhizo	10.17-16.38	2.5-7.17	2.29-4.01	65.56-75.94	1.69-1.49	3.39-9.3	0.42-2.79
K2-IP	10.91-22.37	0.16-0.83	6.40-17.66	57.89-73.58	1.98-5.11	1.53-3.37	0.55-3.46
EC-IP	11.26-20.23	0.24-1.78	4.21-21.09	55.26-71.96	1.90-5.5	1.73-4.84	0.64-5.84
Map Oblate	10.38-19.51	2.68-10.16	5.01-11.93	51.34-70.06	2.02-5.31	3.35-12.41	0.52-2.54
Zimbabwe	10.31-20.89	2.97-6.02	2.98-9.77	51.21-67.26	2.21-5.13	4.27-11.30	0.64-3.26
K-IP	10.42-31.76	0.47-2.73	5.39-16.22	48.65-74.95	1.45-9.2	1.71-6.61	0.76-7.30

Table S3: Reclassification of the beads from Table 2

SAMPLE	XRF data	New series allocated	Remark
East Coast-Indo Pacific series (EC-IP)			
Mag-ecip-b1	✓	Khami	XRF data and morphology
Mag-ecip-b2	✓	-	XRF data and morphology
Mag-ecip-b3	×	European	Jacobsite (R)
K2-Indo Pacific series (K2-IP)			
Mag-k2-lb1	✓	-	Soda glass (R), Al high (XRF), U (XRF)
Mag-k2-lb2	✓	European	Soda/lime (R), calcium antimoniate (R), Ca High (XRF), Al low (XRF), Sb (XRF), Absence U (XRF)
Mag-k2-lb3	×	European	Soda/lime (R) , calcium antimoniate (R)
Mag-k2-lb4	×	European	Soda/lime (R)
Mag-k2-lb5	×	European	Soda/lime, calcium antimoniate (R)
Mag-k2-lb6	✓	European	Soda/lime, calcium antimoniate (R), Ca High (XRF), Al low (XRF), Sb (XRF), Absence U (XRF)
Khami-Indo Pacific series (K-IP)			
Mag-k-w1	✓	European	calcium antimoniate (R), Absence U (XRF)
Mag-k-w2	✓	-	Soda glass (R), Al high (XRF), U (XRF)
Mag-k-y1	✓	-	Lead tin yellow type (II) (R), Al high (XRF), U (XRF)
Mag-k-y2	✓	-	Lead tin yellow type (II) (R) , Al high (XRF), U (XRF)
Mag-k-y3	×	?	Lead tin yellow type (II) (R)
Mag-k-y4	×	?	Lead tin yellow type (II) (R)
Mag-k-y5	EDS	Recycled	Inhomogeneous glass
Mag-k-db6	×	-	Soda/lime (R), morphology
Mag-k-db7	✓	Unknown	Calcium antimoniate (R), Al high (XRF), Sb low (XRF), U (XRF), Co/As~2 (XRF),
Mag-k-db8	✓	-	Al high (XRF), U (XRF), absence of Co, Cu(XRF)
Mag-k-lb9	×	-	Soda/lime (R), morphology
Mag-k-lb10	×	-	Soda/lime (R), morphology
Mag-k-lb11	✓	-	Soda/lime (R), Al high (XRF), U (XRF)
Mag-k-g12	✓	Map or Zim	Soda/lime (R), Al high (XRF), Mg high (XRF), Absence U (XRF)
Mag-k-g13	✓	-	Soda/lime (R), Al high (XRF), U (XRF)
Mag-k-g14	✓	European	Lead arsenate (R), high Pb (XRF), As (XRF),
Mag-k-lb15	×	-	Soda/lime (R), morphology
Mag-k-r16	✓	European	Low Al (XRF), Sb (XRF), Absence U (XRF)

Table S4: Re-classification of the beads from Table 3			
SAMPLE	**XRF data**	**New series allocated**	**Rationale**
Zhizo series			
Mag-z-db1	✓	European	Absence Mg (XRF), Co/As (XRF), low Al (XRF), Co/As~0.4
Mag-z-db2	✓	European	High Pb (XRF), Co/As <0.1 (XRF),
Mag-z-db3	×	European	Soda/lime (R)
Mag-z-db4	✓	IP (Far East Asia)	Absence Mg and U(XRF), High Al (XRF), high Mn (XRF), Malayite (R)
Mag-z-lb1	✓	European	Absence Mg (XRF), low Al (XRF)
Mag-z-lb2	×	European	Soda/lime (R)
Mag-z-lb3	✓	European	Absence Mg (XRF), low Al (XRF), high Ca (XRF)
Mag-z-lb4	✓	IP	High Al (XRF), low Ca (XRF), U (XRF), Mg>1%
Mag-z-lb5	×	European	Soda/lime (R)
Mapungubwe Oblates			
Mag-map-b1	✓	European	Absence Mg (XRF), Jacobsite (XRF R)
Mag-map-b2	✓	European	Absence Mg (XRF), Jacobsite (XRF, R)
Mag-map-b3	✓	Khami	Absence Mg (XRF), U (XRF), FeS chromophore (R)
Mag-map-db1	×	Khami	Soda/lime (R), the same spectrum as db2
Mag-map-db2	✓	Khami	High Al (XRF), low Ca (XRF), Absence Mg (XRF), U (XRF), Co/As~2 (XRF)
Mag-map-db3	×	Khami	Soda/lime (R), the same spectrum as db2
Mag-map-lb4	✓	Khami	High Al (XRF), low Ca (XRF), Absence Mg (XRF), U (XRF)
Mag-map-lb5	✓	Khami	Soda glass(R), High Al (XRF), low Ca (XRF), Absence Mg (XRF), U (XRF)
Mag-map-lb6	×	Khami	Absence SnO_2 (R), morphology
Mag-map-lb7	×	Khami	Absence SnO_2 (R), morphology
Mag-map-bg8	✓	Unknown	Lead tin yellow (R), Cu (XRF), High Al (XRF), low Ca (XRF), Mg (XRF), Absence U (XRF), plant ash
Mag-map-bg9	✓	Unknown	Lead tin yellow (R), Cu (XRF), High Al (XRF), low Ca (XRF), Mg (XRF), Absence U (XRF), plant ash
Mag-map-bg10	×	Unknown	Soda/lime (R), the same spectrum and morphology as bg8 and 9
Mag-map-g11	✓	Khami	High Al (XRF), low Ca (XRF), U (XRF)
Mag-map-y4	✓	IP, South Asia Sri Lanka?	Soda glass (R), High Al (XRF), low Ca (XRF), high Ba (XRF), Absence Mg and U (XRF)
Mag-map-y5	✓	European	High Pb (XRF), high As (XRF), Pb-Sn-Sb triple oxide (R)
Zimbabwe series			
Mag-zim-y1	✓	European	High Pb (XRF), high As (XRF), Pb-Sn-Sb triple oxide (R)
Mag-zim-y2	✓	-	High Al (XRF), low Ca (XRF), Mg (XRF), Absence U (XRF), plant ash
Mag-zim-y3	×	IP	Soda glass (R), the same spectrum as Mag-map-y4
Mag-zim-db1	×	Khami	Soda/lime (R), the same spectrum as db2
Mag-zim-db2	✓	Khami	High Al (XRF), low Ca (XRF), Absence Mg (XRF), U (XRF), Co/As~2
Mag-zim-db3	✓	European	Low Al (XRF), high Ca (XRF), Absence Mg (XRF), Co/As~0.4
Mag-zim-g4	✓	European	Lead arsenate (R), High Pb (XRF), high As (XRF)
Mag-zim-db5	×	European	Soda/lime (R), the same spectrum as db3
Mag-zim-db6	×	European	Soda/lime (R), the same spectrum as db3
Mag-zim-db7	×	European	Soda/lime (R), the same spectrum as db3
Mag-zim-lb8	×	European	Soda/lime (R), the same spectrum as db3
Mag-zim-lb9	✓	Khami	High Al (XRF), low Ca (XRF), Absence Mg (XRF), U (XRF)

Mag-zim-lb10	×	European	Soda/lime (R), the same spectrum as db3
Mag-zim-lb11	✓	European	Calcium antimoniate (R), Sb (XRF), Absence Mg (XRF)
European			
Mag-Eu-g29	✓	Khami	High Al (XRF), low Ca (XRF), Absence Mg (XRF), U (XRF)