

Pikunda-Munda and Batalimo-Maluba

Archaeological Investigations of the Iron Age Settlement History of the western and northern Congo Basin

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6 **Abstract** The spread of pottery-producing communities into the Congo rainforest is
7 commonly linked to demic diffusion, driven by the so-called ‘Bantu Expansion’. It is
8 considered the primary linguistic, cultural, and demographic process in Holocene sub-
9 Saharan Africa. A key region in reconstructions of this process is the western Congo
10 Basin. This paper presents, for the first time, a coherent picture of the archaeological
11 settlement history in the western and northern Congo Basin, uncovered by fieldwork of
12 the late 1980s along the rivers Ngoko, Sangha, Likwala-aux-Herbes, Ubangi, andLua.
13 Archaeological research of the *River Reconnaissance Project*, directed by Manfred
14 K. H. Eggert from 1977 to 1987, produced a pottery sequence for the Congo Basin.
15 Archaeological features and findings uncovered during the project’s field campaigns
16 in the northern and western Congo Basin have only recently been studied in detail.
17 The present analysis provides the only reliable source for the a reconstruction of
18 the cultural dynamics within the region due to lack of subsequent archaeological
19 fieldwork. Archaeological data and the sequence of pottery styles within the western
20 Congo Basin, along the Sangha river, cannot support the claim that this region, due to
21 a climate-induced extension of savannas, played a unique role as a ‘corridor’ within
22 the expansion of putatively ‘Bantu’ speaking groups during the latter half of the 1st
23 millennium BCE.

24 **Résumé** La propagation des communautés productrices de poterie dans la forêt trop-
25 icaire du Congo est généralement liée à une diffusion démique, entraînée par ce qu’on
26 appelle « l’expansion Bantoue ». Il est considéré comme le principal processus lin-
27 guistique, culturel et démographique de l’Afrique subsaharienne de l’Holocène. Une
28 région clé dans les reconstructions de ce processus est l’ouest du bassin du Congo. Cet
29 article présente, pour la première fois, une image cohérente de l’histoire des peuple-
30 ments archéologiques dans l’ouest et le nord du bassin du Congo, découverte par des
31 travaux de terrain menés à la fin des années 1980 le long des rivières Ngoko, Sangha,
32 Likwala-aux-Herbes, Oubangi etLua. Les recherches archéologiques du *River Recon-*
33 *naissance Project*, dirigées par Manfred K. H. Eggert de 1977 à 1987, ont produit une

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34 séquence de poterie pour le bassin du Congo. Les caractéristiques archéologiques et les
 35 découvertes découvertes lors des campagnes de terrain du projet dans le nord et l'ouest
 36 du bassin du Congo n'ont été étudiées en détail que récemment. La présente analyse
 37 constitue la seule source fiable pour la reconstruction de la dynamique culturelle au
 38 sein de la région en raison du manque de travaux archéologiques ultérieurs sur le
 39 terrain. Les données archéologiques et la séquence des styles de poterie dans l'ouest
 40 du bassin du Congo, le long de la rivière Sangha, ne peuvent pas étayer l'affirmation
 41 selon laquelle cette région, en raison d'une extension des savanes induite par le cli-
 42 mat, a joué un rôle unique de « couloir » dans l'expansion du pays. groupes de langue
 43 putativement « bantou » au cours de la seconde moitié du 1er millénaire avant notre
 44 ère.

45 **Keywords** Congo Basin · Pottery · Iron Age · Settlement History

46 Introduction

47 The archaeological sequence in the Inner Congo Basin or *Cuvette central* has been
 48 studied in detail (Wotzka 1995), while finds from the adjacent western and northern
 49 fringes of the Congo Basin were analyzed only recently (Seidensticker 2021). This re-
 50 gion is critical as prevailing models of the spread of sedentary lifestyle in sub-Saharan
 51 Africa, regularly derived from linguistic reconstructions of modern languages, pro-
 52 pose it as the route for substantial migrations (Bostoen 2018, 2020). Relying on
 53 phylogenetic modeling and coupling their results with evolutionary genetic research,
 54 historical linguists favor rapid expansion, driven by demic diffusion, into and through
 55 the equatorial rainforests (Currie et al. 2013; Bostoen et al. 2015; Grollemund et al.
 56 2015; Koile et al. 2022; Grollemund et al. 2023). Regularly, these findings are coupled
 57 with an intensification of archaeological remains yielding ceramics in the second half
 58 of the 1st millennium BCE (de Saulieu et al. 2021; Seidensticker et al. 2021).

59 While the key objective of the research summarized here, was to reconstruct
 60 the settlement history of the northern and western Congo Basin, by establishing
 61 a chrono-typological framework of pottery development (Seidensticker 2021), this
 62 paper addresses three additional research questions: it gives a critical review of the
 63 "Sangha River Interval" (SRI) Hypothesis including the archaeological ground-truths,
 64 i.e. the missing signature of hypothesized migrations along the Sangha river valley
 65 during the 1st millennium BCE (Currie et al. 2013; Bostoen et al. 2015; Grollemund
 66 et al. 2015; Koile et al. 2022; Grollemund et al. 2023). Furthermore, this paper
 67 addresses the decline in archaeological finds between the end of the Early Iron Age in
 68 the 5th to 6th century CE and the onset of the Late Iron Age in the 10th century CE,
 69 specifically a so far overlooked potential recess in human activity in the Congo Basin.
 70 At last, this study examines regional differences in pottery finds along the Ubangi
 71 river, hinting at a prolonged 'fuzzy border'.

72 History of Research

73 Among the first archaeological finds from the northern Congo Basin are partially
74 polished lithic artifacts, found during colonial times between Libenge, Dongo and
75 Gemena (Bequaert 1937, 1938, 1940, 1946). A first excavation was conducted at
76 Batalimo on the Lobaye river, a tributary of the Ubangi river, by Roger de Bayle des
77 Hermens (1969, 1971, 1975). The site was first discovered in 1966 during construction
78 works, and a 2 × 3 m big trench was excavated in 1968. The site was revisited in 1981
79 by Pierre Vidal and most notably between 1987 and 1990 by Lassina Koté (1992).
80 More recent excavations directed by Alfred Jean-Paul Ndanga et al. (2010) focused
81 on re-evaluating the cultural layer discovered by de Bayle des Hermens (1975), and
82 the debated co-occurrence of partially polished lithic artifacts and ceramics (Eggert
83 1987, 137). In the early 1970s, Francis van Noten (1977) conducted fieldwork in the
84 Ubangi region. Two notable sites were excavated, the rock-shelter of Hau, to the west
85 of Gemena, and Motenge-Boma on the middle Ubangi river (Fig. 1). The excavation
86 at Hau revealed three distinct layers, each characterized by a specific inventory. The
87 lowest layer contained lithic artifacts in Levallois technique and was thus dated into the
88 Middle Stone Age (van Noten 1982c, 27,30). Above that was a layer with microliths,
89 associated with the Late Stone Age, while the uppermost layer was characterized
90 by potentially Iron Age pottery (Bahuchet 1992, 31). Unfortunately, three charcoal
91 samples, one from each layer, were unsuccessfully radiocarbon dated, ending all
92 studies of the material as the site was deemed disturbed (van Noten 1982c, 27,30).
93 Motenge-Boma, the second site excavated by van Noten (1977) yielded a few remains
94 of pottery, all showing carved roulette (van Noten 1982a, Fig. 40) and dating into the
95 Late Iron age.

96 Between 1977 and 1987, extensive boat surveys along the tributaries of the Congo
97 river were performed in the context of the *River Reconnaissance Project*, directed
98 by Manfred K. H. Eggert (1983, 1984, 1993, 1996). A detailed analysis of this
99 project's discoveries in the Inner Congo Basin, south of the Congo river, has been
100 published by Hans-Peter Wotzka (1993). Wotzka's reconstruction of the settlement
101 history of the *Cuvette central* relies on a sequence of 35 pottery styles that span the
102 last two-and-a-half millennia and pertain to six stylistic traditions. Four more local
103 stylistic traditions, named after their main region of distribution "Luilaka", "Tshuapa",
104 "Busira", and "Maringa" show interconnections that were indicative of them sharing a
105 common ancestry within the "West tradition" (Wotzka 1995, 219–225 Fig. 4). Wotzka
106 (1995) condensed this evolutionary development into the "Equator-Co style tradition",
107 applying the concept similar to Rouse (1957), Huffman (1970), Schmidt (1975), Vogel
108 (1978), and Hall (1983). The initial phase of pottery in the Congo Basin dates from
109 400 to 200 BCE and is represented by the Imbonga style (Wotzka 1995, 59–68). The
110 expansion continued into the 16th century CE, and the first settlers did not penetrate
111 the entire region at once. Instead, the settling of the Inner Congo Basin occurred in
112 multiple successive waves of upriver expansions (Wotzka 1995, 226–241). Wotzka
113 (1995, 290) concludes that "the explored parts of the Inner Congo Basin constitute a
114 remarkably self-containing ceramic sphere in the course of the last 2 400 years" and
115 that "all [encountered] pottery styles could be traced back to the Imbonga group".

116 Aiming at uncovering the northern extent of the Imbonga style, fieldwork of the
 117 *River Reconnaissance Project* was extended along the Ubangi river and its tributary,
 118 the Lua river, in 1985 (Eggert 1987). The survey traversed the equatorial rainforest
 119 up to the tropical savanna (Fig. 1). The roughly 850 km long exploration of the
 120 Ubangi yielded 44 sites, of which only the site of Motenge-Boma had been published
 121 prior (van Noten 1977, 1982b, 75). Four additional sites were discovered along an
 122 approximately 100 km long stretch of the lower Lua river, most notably Maluba, where
 123 multiple pit features were excavated. The only other site with an equally distinct record
 124 like that uncovered at Maluba is Batalimo on the Lobaye river (de Bayle des Hermens
 125 1969, 1971, 1975).

126 After the surveys along the Ubangi and Lua, which did not yield pottery associated
 127 with the earliest styles from the Inner Congo Basin, the campaign of 1987 focused
 128 on the western parts of the Congo Basin (Fig. 1; Eggert 1992). The nearly 600 km
 129 long survey of the Sangha river, from its mouth at Mossaka – around 220 km south
 130 of Mbandaka – up to Bomasa at the border triangle of the Republic of the Congo,
 131 Cameroon, and the Central African Republic, yielded 38 new sites. A survey along a
 132 roughly 80 km long stretch of the Ngoko river, which joins the Sangha north of Ouezzo,
 133 added another eight sites. The last survey, the *River Reconnaissance Project* conducted
 134 in 1987, covered the Likwala-aux-Herbes river, which runs in-between the Ubangi
 135 and Sangha and is characterised by a very distinct ecology (Philippon et al. 2019).
 136 The Likwala-aux-Herbes, not to be confused with the Likwala-Mossaka running
 137 further west, is characterised by a swampy bush- and grassland. Higher vegetation
 138 only appears multiple kilometres away from the river. Thus, a vast floodplain can
 139 be found at each river bank, unlike along the Sangha river, where the rainforest
 140 vegetation reaches directly to the river bank. The 530 km long survey yielded another
 141 23 sites. The entire region surveyed was archaeological *terra incognita* before 1987.
 142 The project's discoveries, including preliminary results from the western and northern
 143 Congo Basin, were outlined in a well-known paper concerning the archaeology of the
 144 equatorial rainforest (Eggert 1993). The survey and excavation finds were partially
 145 summarized (Seidensticker 2016) until the detailed analysis was published recently
 146 (Seidensticker 2021).

147 Fieldwork in the region re-commenced during the past decade. Contrasting earlier
 148 endeavours is the prevalent integration of paleo-ecological research. Focal points of
 149 research have been the Ngoto forest reserve in the south-western parts of the Central
 150 Africa Republic (Kiahtipes et al. 2011; Lupo et al. 2015; Kiahtipes 2016; Lupo et al.
 151 2021), the northern parts of the Republic of the Congo (Gillet 2013; Morin-Rivat et al.
 152 2014; Morin-Rivat 2017), the north-eastern parts of the Congo Basin (Cornelissen
 153 et al. 2013; Livingstone Smith et al. 2011, 2017), as well as the Inner Congo Basin
 154 (Neumann et al. 2022).

155 Material culture and language

156 A defining paradigm when working with pottery finds from Central Africa concerns
 157 the imposed link between this category of material culture and languages. The prevailing
 158 model of the spread of sedentary lifestyle proposes a 'migration' of Bantu-speech

communities through the rainforest, often identified by the presence of pottery finds (Currie et al. 2013; Bostoen et al. 2015; Grollemund et al. 2015; Koile et al. 2022; Grollemund et al. 2023). At the core of an intense academic debate surrounding the term 'Bantu' (cf. Oliver 1966; Vansina 1979, 1980; Robertson and Bradley 2000; Eggert 2005, 2016) lies a profound conceptual trend in which a "purely technical [term] without any non-linguistic connotations [that] was transformed into a designation referring indiscriminately to language, culture, society, and race" (Eggert 2005, 302). Research of the modern, about 300-600 languages spoken in sub-Saharan Africa summed up within the Bantu language family (Nurse and Philippson 2003; Bostoen 2018), resulted in two main models aimed at explaining their dispersion: an 'early split' of languages with predicted migrations on the northern fringes of the rainforest and a 'late split' model with migrations through the rainforest and subsequent diversification (Bostoen 2018, 2020). Pakendorf et al. (2011) claim that evolutionary genetic research on modern communities points towards demic diffusion as the driving force behind the expansion of Bantu languages in favor of the distribution of languages and technologies (Bostoen and Gunnink 2022). While migrations are incorporated into such models for the initial spread of speech-communities, their more recent dynamic histories (cf. Vennetier 1963, 83) are equally omitted as setbacks in human activity (Oslisly 1998; Oslisly et al. 2013; de Saulieu et al. 2017, 2021; Seidensticker et al. 2021). Lipson et al. (2022, 1) point out that "the structure of ancient populations cannot be robustly reconstructed based solely on genetic data from present-day people" due to disruptions by "demographic transformations", including "colonialism, imperialism, enslavement, and modern sociopolitical reorganization".

An unfortunate but common practice in order to 'date' nodes in linguistic reconstructions of modern Bantu languages is 'calibrating' them using archaeological data: for example, Grollemund et al. (2015, SI p. 2) equates an initial off-branching in the Cameroon-Nigeria homeland with the archaeological inventories of the lower horizon of the Gray Ash layer from the site of Shum Laka, representing the second phase of the "Stone to Metal Age" (SMA) or "Ceramic Late Stone Age" and dating into the 3rd to 2nd millennium BCE (Lavachery 2001, 226–231,243). During that phase the microlithic quartz industry, dominating the late Pleistocene deposits (Cornelissen 2003, 2017, 172 Fig. 4), is slowly declining, while a macrolithic flake and blade industry on basalt, which occurs in smaller numbers in older deposits as well, becomes more prevailing (Cornelissen 2003, 2017, 169 Fig. 1). Pottery, while already present in the older deposits of the upper horizon of the Ochre Ash layer and dating into the 5th to 4th millennium BCE (Lavachery 2001, 224-225 Fig. 4.2–3), is now more prominent and decorated with grooves and impressions, including rocker zig-zag (Lavachery 2001, 231–232 Fig. 8). It must be stressed that Shum Laka represents the only site in the wider region of the putative homeland of the Bantu languages, in the border area of Nigeria and Cameroon, that has been studied in detail. Thus the deciding factors of Grollemund et al. (2015) for 'selecting' the specific deposits at Shum Laka as an archaeological 'calibration point' for their phylogenetic language tree is neither quantitative nor qualitative. And while Grollemund et al. (2015, SI p. 2) allege that "small immigrant communities from further north" introduced pottery and Benue-Congo languages, more recent genetic analyses from four burials at Shum Laka showed that the genetic profiles of the occupants of the site "are very different from those of most

205 speakers of Niger–Congo languages today, which implies that these individuals are not
 206 representative of the primary source population(s) that were ancestral to present-day
 207 Bantu-speakers" (Lipson et al. 2020, 5).

208 Grollemund et al. (2015, SI p. 2) date the subsequent node of Bantu languages
 209 in the younger half of the 2nd millennium BCE based on the earliest occurrence of
 210 markers for 'sedentism' at Obobogo in southern-central Cameroon (de Maret 1982;
 211 de Maret et al. 1983; de Maret 1992). It must be noted that final analyses from the
 212 site of Obobogo are still pending. Claes (1985) provided some initial results, but not
 213 a consecutive analysis of all available data. Grollemund et al. (2015, SI p. 2) associate
 214 the third major branching-off point with the emergence for Urewe ceramics in the
 215 Great Lakes region of East Africa. All these choices together perpetuated the trope
 216 that early Bantu-speakers can be equated with the earliest pottery production in a
 217 given region (Bostoen et al. 2015, 355,362,364). This generalization further suffers
 218 from disregarding the (dis-)continuities of a single facet of material culture in a given
 219 region and their relations to any historically identifiable human society. In a nutshell,
 220 the procedure of adopting opportune archaeological results for underpinning linguistic
 221 reconstructions by Grollemund et al. (2015) and Bostoen et al. (2015), which was
 222 subsequently adopted by Koile et al. (2022, SI) without any critical review, represents
 223 another facet of a long-standing tradition in circular reasoning (Ehret 1973; Phillipson
 224 1976a,b, 1977; Heine et al. 1977) that has been reviewed by Eggert (2005, 2016, 82).
 225 Such approaches induce 'procedural puzzles' and fail at linking linguistics with "the
 226 authentic material evidence of archaeology" (Eggert 2016, 88). In consequence it can
 227 only be reiterated that "non-written languages do not leave material traces" (Eggert
 228 2016, 85).

229 Landscape and Geography

230 The study area is a north-south transect through the rainforest, as most surveyed rivers
 231 run north to south. It covers the tropical savanna climate ('Aw'-climate according to
 232 the Köppen-Geiger systematic) in the north, followed by the tropical monsoon climate
 233 ('Am'), while the bulk of sites is located in tropical rainforest climate ('Af'; Peel et al.
 234 2007). At the heart of the study area lies the Congo Basin, which is dominated by the
 235 Congo river and its many tributaries. The catchment area of the Congo river covers
 236 the entire area of the Democratic Republic of the Congo (DRC) as well as large parts
 237 of the Republic of the Congo, south-eastern Cameroon, the southern Central African
 238 Republic and adjacent areas further east, south-east and south of the DRC (Eggert
 239 2017, 60 Fig. 1). The Congo Basin is generally limited to a topography below 450 m
 240 ASL (Runge 2001, 11) and characterized by quaternary geological deposits (Persits
 241 et al. 1997).

242 For this review of the settlement processes, the study area is represented best when
 243 subdivided into the "western Congo Basin" (rivers Ngoko, Sangha and Likwala-aux-
 244 Herbes) and the "northern Congo Basin" (region of the Ubangi and Lualaba river) (Fig. 1).

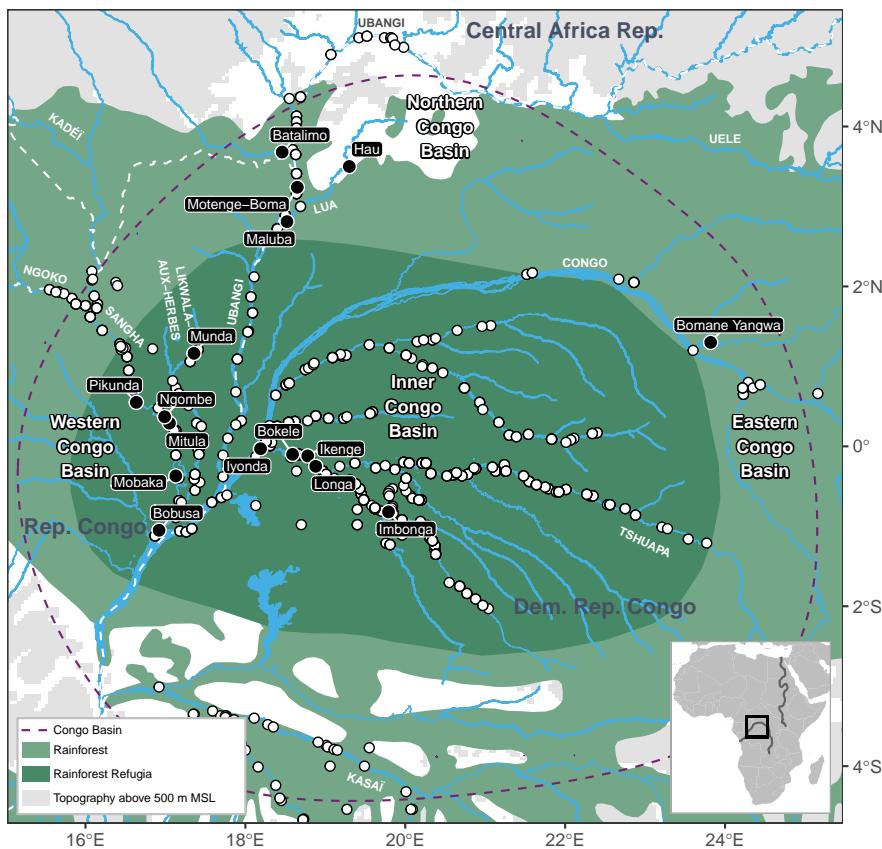


Fig. 1 Map of the Congo Basin. White dots are known sites with pottery finds (dark dots representing sites mentioned in the text). Green shading shows the modern extent of the equatorial rainforest (White 1983). Dark green shading represents the putative extent (refugia) of the rainforest during the 1st millennium BCE rainforest crisis (Bremond et al. 2017; Maley et al. 2017). The purple dotted line shows the extent of the Congo Basin (Runge 2001, 11). Grey shading shows topography above 500 m ASL.

245 Materials and Methods

246 The research is based on inventories of 122 sites along the rivers Ubangi, Lualaba,
 247 Sangha, Ngoko, and Likwala-aux-Herbes (Fig. 1). The study area covers an area of
 248 about 500 × 700 km. In total, the studied collection is comprised of around 10.500
 249 individual objects, including roughly 4.200 vessel units and a similar amount of highly
 250 fragmented ceramic sherds (Seidensticker 2021, 23–43). At five sites, 14 features
 251 were excavated. Most of the excavated features were pits. Additional pit features were
 252 sampled at four sites. Only about a third of the studied ceramics was discovered during
 253 excavations or deliberate sampling of clearly identifiable features.

254 Morphologically and ornamentally similar vessel units are summarized as pottery
 255 styles, following the established conceptualizations of Wotzka (1995, 52–57). The
 256 styles describe a specific and recognizable way ceramics are produced and decorated.

257 Throughout the text, the term 'group' is used synonymous for 'style'. Additionally,
 258 early investigations into clay sourcing, conceptualized as macroscopic pottery fab-
 259 rics (Seidensticker 2021, 60–69), were included in the morphological description of
 260 ceramic styles.

261 The study's main objective was to develop a spatio-temporal reference frame-
 262 work for the area based on pottery groups derived from the ceramics' technological,
 263 morphological, and ornamental characteristics. Twenty-four new ceramic style were
 264 described for the northern and western Congo Basin combined. Furthermore, five
 265 styles found mainly within the Inner Congo Basin and described by Wotzka (1995)
 266 could be identified.

267 Established concepts were adopted (Eggert 1983, 295; 1984, 250, 257; 1988, 28–
 268 31; Wotzka 1995, 217–225) to describe the change and development of pottery in the
 269 study area. A sequence of subsequent pottery styles that share clear indications that
 270 one was derived of the other are regarded as 'pottery traditions' or 'style traditions'
 271 (Rouse 1957; Willey 1945), while contemporaneous sets of closely related pottery
 272 styles are summarized as 'style horizons' (Kroeber 1944, 108–111).

273 All data and computer code produced are available here: [https://github.com/
 274 dirkseidensticker/PikundaMunda_BatalimoMaluba_AAR](https://github.com/dirkseidensticker/PikundaMunda_BatalimoMaluba_AAR)

275 Radiocarbon Dating

276 In total, 21 conventional radiocarbon samples were dated in the 1980s (Tab. 1). All
 277 dates were obtained from charcoals found within the respective feature. Two additional
 278 samples from bone material were AMS dated in 2014 (Seidensticker 2021, 355–
 279 356 Appendix 2). All dates are available via the aDRAC online repository (<https://github.com/dirkseidensticker/aDRAC>; Seidensticker and Hubau 2021) and
 280 thus not listed individually here. Four samples obtained off food crusts from the
 281 interior of ceramics were AMS dated, providing for the first time direct and precise
 282 dates associated with the usage of the pottery (Tab. 2). Stable carbon and nitrogen
 283 isotopes were also measured to compensate for fresh-water reservoir effects.

285 Bayesian Phase Modeling

286 The previously determined chronological ranges of the pottery groups (Seidensticker
 287 2021; Seidensticker et al. 2021) were further examined using Bayesian phase mod-
 288 eling. While Crema and Kobayashi (2020) relied on the OxCal software to run
 289 their model, an implementation that is available via the nimbleCarbon R-package
 290 was used (Crema and Di Napoli 2021; Crema and Shoda 2021). The code used
 291 to define the model was derived of the vignette provided with the nimbleCarbon
 292 software. A simple Bayesian chronological model was fitted to all radiocarbon
 293 dates of a given pottery style that showed sufficient archaeological contextualiza-
 294 tion and have not been discarded as potential lab errors in prior studies (Seiden-
 295 sticker et al. 2021, 9) and posterior probabilities for its onset and end were recovered
 296 (Fig. S1). To compare these with the conventional estimations provided in earlier

Lab-No	C14	STD	Site	Feature	Potterystyle	calBCE/CE (2-Sigma)	Source
KI-2444	1930	120	Maluba	MLB 85/1-3-1	Batalimo-Maluba	340-324 BCE (0.7%) 200 BCE-384 CE (94.6%) 397-410 CE (0.1%)	Eggert 1987: 141 Tab. 2
GrN-13584	1670	110	Maluba	MLB 85/1-3-1	Batalimo-Maluba	130-144 CE (0.8%) 155-603 CE (94.7%)	Eggert 1987: 141 Tab. 2
KI-2445	2140	200	Maluba	MLB 85/1-3-2	Batalimo-Maluba	761 BCE-248 CE (95.2%) 298-306 CE (0.2 %)	Eggert 1987: 141 Tab. 2
GrN-13585	1990	60	Maluba	MLB 85/1-3-2	Batalimo-Maluba	149-135 BCE (1.3%) 115 BCE-205 CE (94.1%)	Eggert 1987: 141 Tab. 2
Poz-62102	580	30	Maluba	MLB 85/1-4-3	-	1305-1365 CE (64.6%) 1383-1419 CE (30.9%)	Seidensticker 2021: Appendix 2
Poz-62103	810	80	Maluba	MLB 85/1-4-3	-	1036-1302 CE (94.5%) 1370-1378 CE (1.0%)	Seidensticker 2021: Appendix 2
KI-2891	600	75	Pikunda	PIK 87/1	Mandombe	1278-1438 CE (95.4%)	Seidensticker 2021: Appendix 2
KI-2877	1980	100	Pikunda	PIK 87/1	Pikunda-Munda	347-315 BCE (1.7%) 205 BCE-251 CE (92.9%) 293-315 CE (0.9%)	Eggert 1992: 16 Tab. 3
KI-2892	840	41	Pikunda	PIK 87/1	Ebambe	1051-1080 CE (5.3%) 1153-1276 CE (90.2%)	Seidensticker 2021: Appendix 2
KI-2895	2230	100	Mitula	MIT 87/103	Imbonga	720-708 BCE (0.4%) 662-653 BCE (0.3%) 544-31 BCE (93.9%) 18 BCE-8 CE (0.9%)	Eggert 1992: 20 Tab. 4
KI-2894	2270	160	Mobaka	MKA 87/102	Imbonga	781 BCE-26 CE (95.2%) 49-56 CE (0.2%)	Eggert 1992: 20 Tab. 4
KI-2882	1110	110	Munda	MUN 87/1-0-1	-	675-1158 CE (95.4%)	Seidensticker 2021: Appendix 2
KI-2883	870	180	Munda	MUN 87/1-0-1	-	774-793 CE (1.0%) 798-1412 CE (94.4%)	Seidensticker 2021: Appendix 2
KI-2884	250	40	Munda	MUN 87/1-0-2	Ebambe	1508-1594 CE (24.4%) 1618-1686 CE (41.1%) 1732-1806 CE (26.1%) 1927-1955 CE (3.5%)	Seidensticker 2021: Appendix 2
KI-2885	1800	80	Munda	MUN 87/2-1-1	Pikunda-Munda	31-40 CE (0.5%) 60-420 CE (94.0%)	Eggert 1992: 16 Tab. 3
KI-2887	2020	180	Munda	MUN 87/2-1-1	Pikunda-Munda	469-435 BCE (0.6%) 423 BCE-418 CE (94.8%)	Eggert 1992: 16 Tab. 3
KI-2881	1990	45	Munda	MUN 87/2-1-1	Pikunda-Munda	102-66 BCE (3.4%) 61 BCE-131 CE (90.7%) 141-158 CE (1.0%) 192-200 CE (0.4%)	Eggert 1992: 16 Tab. 3
KI-2886	1910	80	Munda	MUN 87/2-1-1	Pikunda-Munda	93-76 BCE (0.9%) 55 BCE-259 CE (90.0%) 279-335 CE (4.6%)	Eggert 1992: 16 Tab. 3
KI-2888	1990	65	Munda	MUN 87/2-1-3	Pikunda-Munda	151-130 BCE (2.2%) 121 BCE-207 CE (93.3%)	Eggert 1992: 16 Tab. 3
KI-2876	1980	41	Munda	MUN 87/2-1-3	Pikunda-Munda	89-81 BCE (0.5%) 54 BCE-131 CE (93.5%) 142-157 CE (1.0%) 193-199 CE (0.4%)	Eggert 1992: 16 Tab. 3
KI-2890	1680	90	Munda	MUN 87/3	Pikunda-Munda	204-590 CE (95.4%)	Eggert 1992: 16 Tab. 3
KI-2889	1650	80	Munda	MUN 87/3	Pikunda-Munda	241-575 CE (95.4%)	Eggert 1992: 16 Tab. 3
KI-2893	1960	90	Likwala-aux-Herbes Km 186	LKW 87/186	-	176 BCE-251 CE (94.5%) 294-314 CE (0.9%)	Eggert 1992: 20 Tab. 4

Tab. 1 Calibrated ages (Reimer et al. 2020) of previously published radiocarbon dates from the fieldwork of the *River Reconnaissance Project* in the western and northern Congo Basin (Seidensticker 2021, Appendix 2).

Lab-No	C14	STD	Site	Feature	Potterystyle	calBCE/CE (2-Sigma)	%C	%N	$\Delta^{13}\text{C}$	$\Delta^{15}\text{N}$	at C.N
RICH-30864	1850	24	Pikunda	PIK 87/1	Pikunda-Munda	126-240 CE (95.4%)	44,9	3,1	-26,6	7,7	16,9
RICH-30865	192	22	Munda	MUN 87/1-0-2	Ebambe	1657-1688 CE (22.2%) 1730-1807 CE (58.4%) <1925 CE (14.8%)	55,7	6,4	-26,2	9,3	10,2
RICH-30866	328	22	Munda	MUN 87/1-0-2	Ebambe	1490-1639 CE (95.4%)	54,4	4,5	-26,1	8,8	14,2
RICH-30867	841	24	Ngombe	NGO 87/102	Ngombe	1167-1262 CE (95.4%)	16,5	1,0	-25,7	6,8	19,6

Tab. 2 Calibrated ages (Reimer et al. 2020) of newly obtained AMS dates of foodcrusts from the interior of ceramic vessels and stable isotope values. Legacy radiocarbon dates can be found in Tab. 1, the online aDRAC repository (Seidensticker and Hubau 2021) and as a supplementary data table (Data S1).

297 studies (<https://github.com/dirkseidensticker/aSCAC>; Seidensticker et al.
 298 2021, Data S2), the median age value of the posterior distribution was extracted
 299 (Tab. S1).

300 **Results**

301 Early Iron Age (200 BCE – 500 CE) in the Western Congo Basin

302 *Imbonga style*

303 Remnants of the oldest ceramics in the western Congo Basin are found at two sites
 304 along the lower Sangha river, at Mitula and Mobaka (Fig. 1; Seidensticker 2021, 169–
 305 172, 306–307). At both villages, fragments of diagnostic vessels were found partially
 306 embedded in the soil, indicating eroded remains of pit features. During the pottery's
 307 extraction, charcoal was found and subsequently radiocarbon dated. Charcoal from
 308 inside the vessel at Mobaka dates to the 8th to 1st centuries BCE (KI-2894; Tab. 1),
 309 while the sample from underneath the vessel at Mitula dates to the 6th to 1st centuries
 310 BCE (KI-2895; Tab. 1; Fig. 2). Both conventional radiocarbon dates show substantial
 311 standard errors and thus cover long timespans after calibration. These dates correspond
 312 to the age of the Imbonga style from the Inner Congo Basin, dated to the 4th to 1st
 313 centuries BCE and constituting the initial phase of settlement history in the Congo
 314 Basin (Fig. 2; S1; Tab. S1; Wotzka 1995, 59–68). The Imbonga style is characterized
 315 by vessels with flat bases that either show round bellies, pronounced shoulders, and
 316 profiled rims or are wide-mouthed bowls. Its decoration patterns comprise of rocker-
 317 stamping on the lower half, often combined with horizontal grooves and incised
 318 or plastic ornamentation on the vessels' shoulder regions (Seidensticker 2021, 196
 319 Fig. 93.1–4). The two mentioned vessels found on the lower Sangha river do not
 320 represent classic Imbonga characteristics but show striking similarities to vessels
 321 associated with the Imbonga style (Seidensticker 2021, 170 Fig. 84): the vessel found
 322 at Mitula resembles another from Iyonda (Wotzka 1995, 441 Pl. 7.7) while the vessel
 323 from Mobaka matches one found at Bokele (Wotzka 1995, 453 Pl. 19.10). These
 324 relatively isolated finds indicate an area of influence the Imbonga group had west of
 325 its previously known boundary.

326 *Pikunda-Munda style*

327 The Pikunda-Munda group represents the earliest pottery style in the western parts of
 328 the Congo Basin (Seidensticker 2021, 114–120). It shows substantial similarities to the
 329 contemporaneous groups in the Inner Congo Basin regarding pottery technology and
 330 decorations. However, concerning vessel shapes, there are considerable differences
 331 (Wotzka 1995, 107 Ftn. 4). The Pikunda-Munda style is represented best through the
 332 inventories of pit features excavated in 1987 at the two eponymous sites: Pikunda on the
 333 middle Sangha river and Munda on the upper Likwala-aux-Herbes river (Fig. 1). The
 334 excavation at Pikunda detected two features: one about 3.4 m deep pit dating from the
 335 4th century BCE to the 3rd century CE (KI-2877; RICH-30864; Tab. 1; 2) that's been

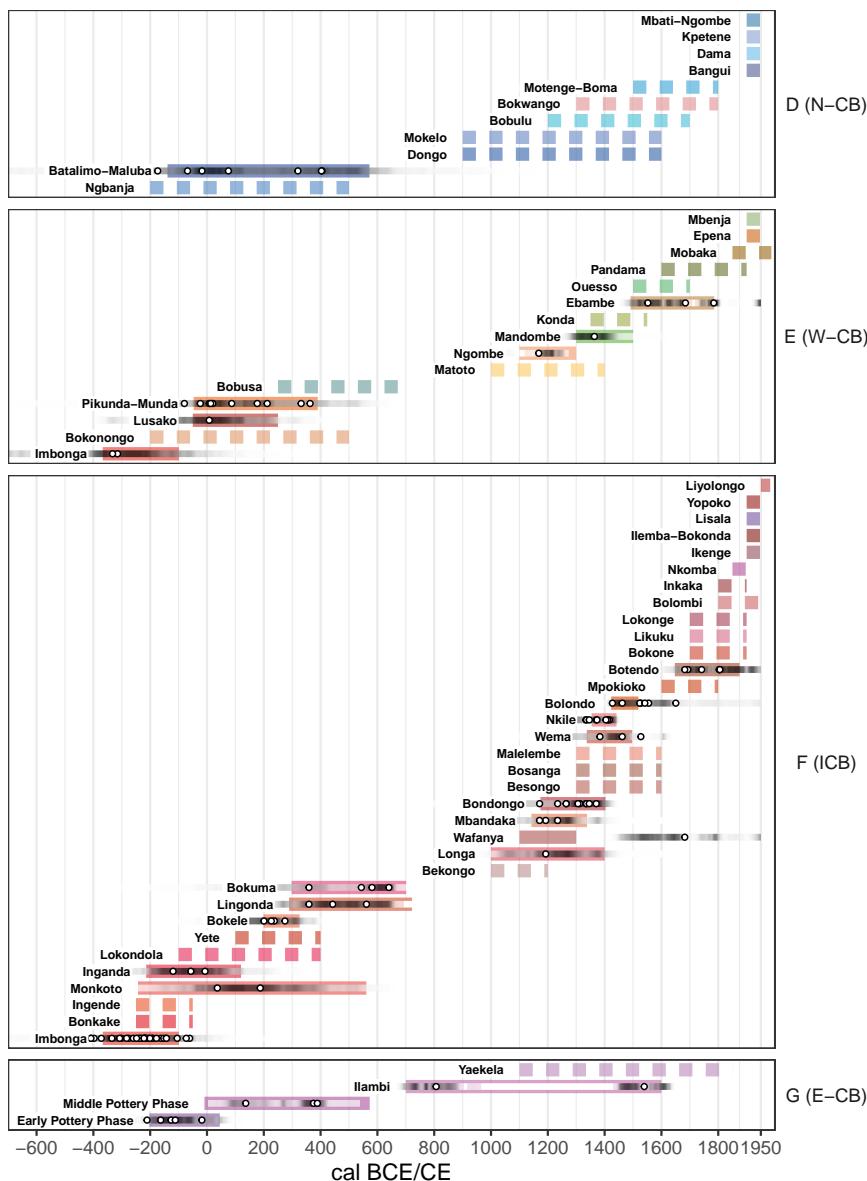


Fig. 2 Temporal distribution of known pottery styles in the Congo Basin over the past 2600 years separated by regions (Seidensticker et al. 2021, Fig. 1; D) Northern Congo Basin, E) Western Congo Basin, F) Inner Congo Basin, G) North-Eastern Congo Basin). Circles represent the highest probability of calibrated calendar age of each pottery-linked 14C date. The intensity of grey-shading is proportional to the summed probability of the calendar-age windows of all pottery occurrences by type. Colored bars represent the phase duration of radiocarbon dated pottery styles. For groups with more than two associated radiocarbon dates, the median start and end dates of the phases were calculated using a Bayesian phase model (Fig. S1; Tab. S1). Dashed colored bars indicate estimated 100-year bins derived from stylistic resemblance (Seidensticker et al. 2021, Data S2).

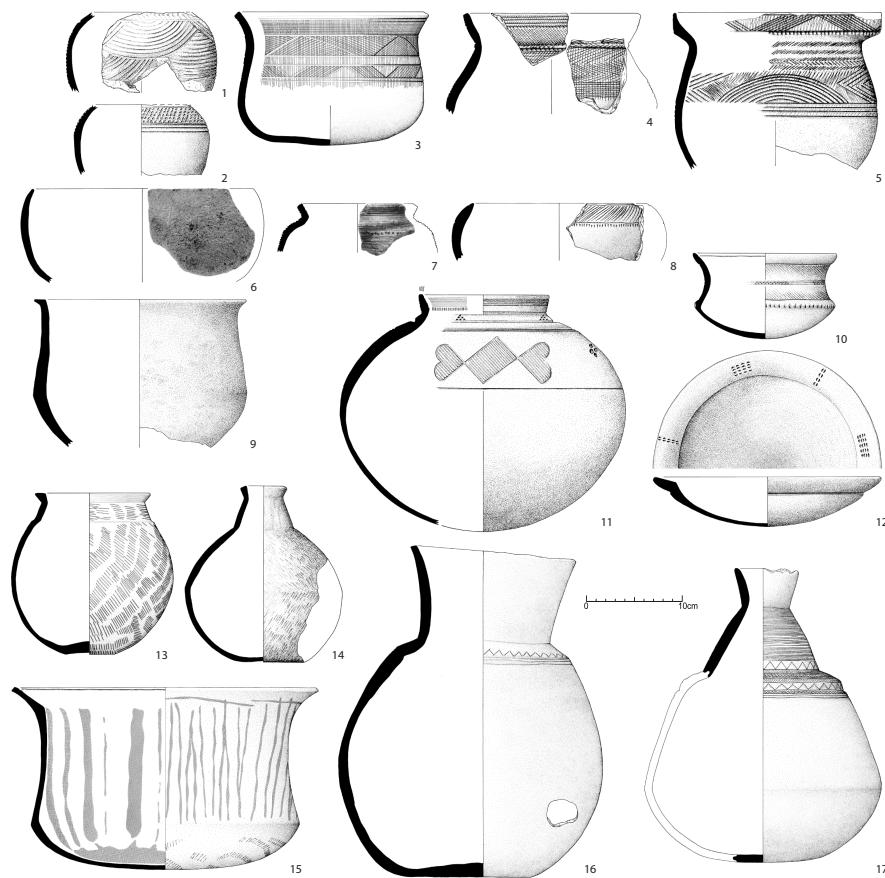


Fig. 3 Ceramic vessels from the western Congo Basin – along the rivers Ngoko, Sangha and Likwala-aux-Herbes – that are representative for the following pottery styles: 1–2) Imbonga; 3–4) Pikunda-Munda; 5) Bokonongo; 6–8) Bobusa; 9) Matoto; 10–12) Ngombe; 13–14) Ebambe; 15) Mobaka; 16–17) Epena (Seidensticker 2021, 114–144, 162–172).

336 intersected by a considerably younger pit (Seidensticker 2021, 288–300). The older
 337 pit contained two nearly complete vessels and around 160 sherds that can be attributed
 338 to the Pikunda-Munda style, as well as one rim sherd of the Lusako style known from
 339 the Inner Congo Basin (Eggert 1992, 18 Fig. 4.1; Wotzka 1995, 104–107). Four
 340 sherds show a considerably different fabric, shape, and decoration similar to that of
 341 the Ngbanja pottery known from the middle Ubangi river (Seidensticker 2021, 296
 342 Tab. 34). At Munda, two pits and a metallurgy-related feature yielded inventories of
 343 the Pikunda-Munda style (Seidensticker 2021, 321–339). All features dated between
 344 the 1st century BCE and 4th century CE (Fig. 2; S1; Tab. S1). The inventories from
 345 these pits are quite different compared to the one excavated at Pikunda, whose pottery
 346 is heavily fragmented. The pits at Munda contained complete vessels intentionally
 347 deposited either upside-down or lying on their side; a practice reminiscent of the
 348 depositions in pits in the Inner Congo Basin (Wotzka 1993). Overall nearly 550 vessel

349 units are attributed to the Pikunda-Munda style, with two-thirds of the assemblage
350 originating from the excavations mentioned above at the two eponymous sites.

351 Pikunda-Munda pottery was found along the Sangha river from its mouth into
352 the Congo river in the south up to the village of Ikelemba, around 65 km south-east
353 of Ouedo, and along the entire stretch of the Likwala-aux-Herbes river (Fig. 4B–D;
354 Seidensticker 2021, 119 Fig. 49). A vessel from Ingonda Bosopela along the lower
355 Lulonga river (Wotzka 1995, 119 Ftn. 4, 531 Pl. 97.5) and a few isolated sherds found
356 south-east and north-east of Ouedo (Gillet 2013, 114 Fig. 42) can be attributed to the
357 Pikunda-Munda style as well.

358 The main characteristic of the Pikunda-Munda pottery are wide, open-mouthed
359 bowls with approximately cylindrical walls, flared rims and rounded bases (Fig. 3.3;
360 Eggert 1993, 311–314). Ornamental motives are based on linear elements produced
361 through incisions or grooves, as well as occasional rocker-stamp decoration (Seiden-
362 sticker 2021, 362 Appendix 4.12). Utilizing of these decoration techniques and
363 motives corresponds to contemporaneous practices in the Inner Congo Basin. Especially
364 concerning their decoration, there are considerable similarities between the Pikunda-
365 Munda style and the styles Lokondola, Lusako, Lingonda, and Bokuma (Wotzka
366 1995, 107). The main difference to the contemporaneous ceramics of the Inner Congo
367 Basin is that among Pikunda-Munda pottery, only round bases are observed, while
368 the ceramics further east unanimously show flat bases.

369 Irrespective of these morphological differences, in terms of macroscopic fabrics,
370 Pikunda-Munda sherds and pottery from the Inner Congo Basin are practically in-
371 distinguishable. Pikunda-Munda pottery is made from fine river clays that were not
372 tempered (Seidensticker 2021, 66–67 Fig. 21). The used clays proved to be rich in
373 sponge spicules (Seidensticker 2020). A small-scale pilot study on their shaping tech-
374 niques showed that Pikunda-Munda vessels are roughed out by a version of drawing
375 of a ring technique (Seidensticker 2021, 47–51 Fig. 13; 72–73 Tab. 13), and thus in
376 a very similar fashion to the pottery production observed in the late 1970s and early
377 1980s at Ikenge in the Inner Congo Basin (Eggert and Kanimba-Misago 1980).

378 The oldest feature in the Congo Basin associated with iron metallurgy thus far
379 pertains to the Pikunda-Munda group: the upper part of a pit at Munda on the upper
380 Likwala-aux-Herbes river contained 7.5 kg of iron slag partially embedded in a hard-
381 fired clay lining (Seidensticker 2021, 321–330). The feature also contained five nearly
382 complete Pikunda-Munda bowls deposited laying on their sides (Seidensticker 2021,
383 323 Fig. 157.A–E; Pl. 91.1–5). Two radiocarbon dates from that part of the feature
384 date into the 1st to 4th centuries CE (Tab. 1: KI-2885, KI-2887).

385 Neither the precursor nor a potential successor of the Pikunda-Munda pottery is
386 known. The precise association between the Pikunda-Munda style and contemporane-
387 ous styles of the Equator-Co style tradition remains a subject for subsequent research.
388 The present state of knowledge points to the Pikunda-Munda group being a remote
389 sub-stream of the *Equator-Co* style tradition and no completely independent entity.

390 *Other Finds*

391 Several vessels from a partially eroded pit on the banks of the Likwala-aux-Herbes
392 river at kilometer 186 have no comparison in the region in terms of vessel shapes

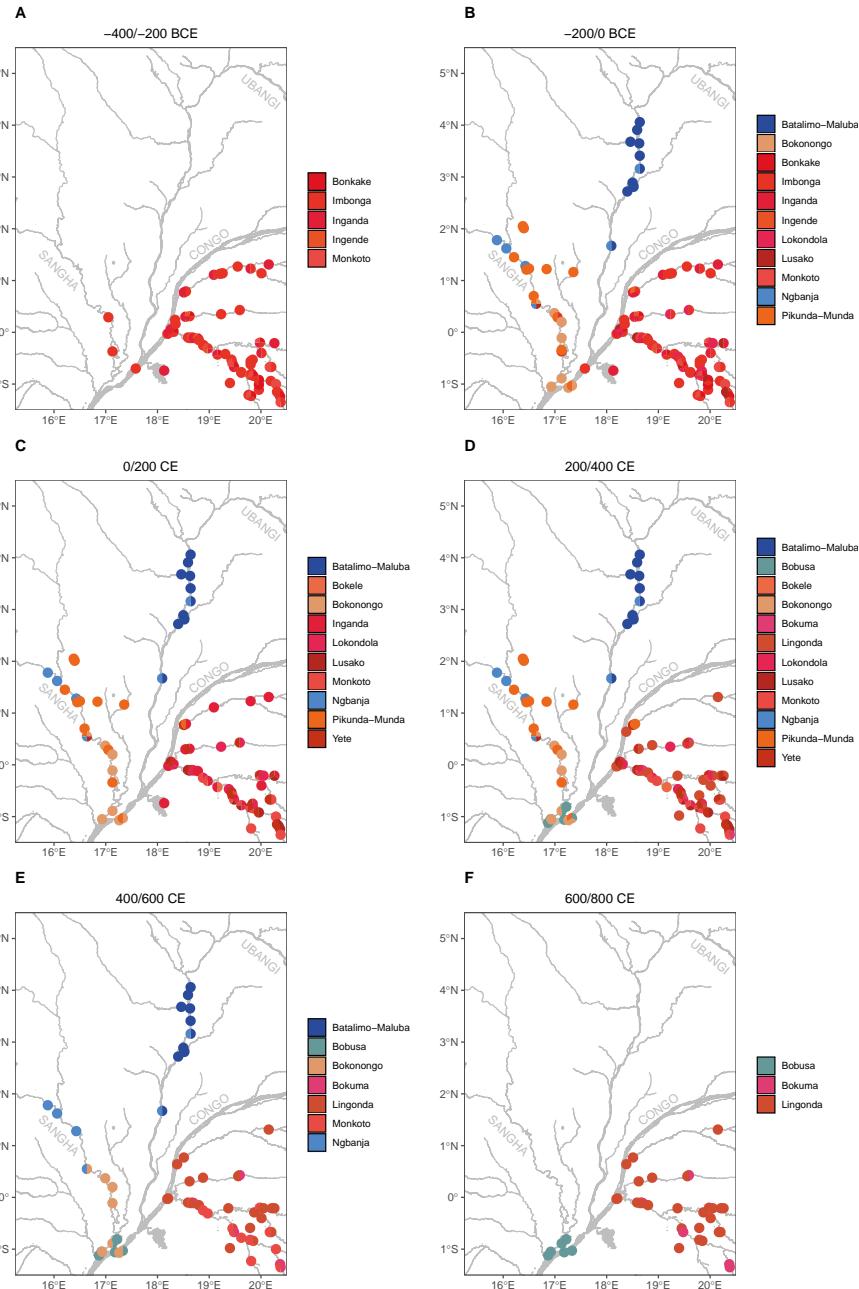


Fig. 4 Time-sliced maps of occurrences of pottery styles in the northern and western Congo Basin dating between the 4th century BCE to 8th century CE. If multiple contemporaneous pottery styles were recorded at a site, the colored icon is divided following Seidensticker (2021, 218–244 Fig. 100–107). Colors correspond to Fig. 2.

and decorations (Seidensticker 2021, 165–168, 339–340). Time constraints during fieldwork only allowed a quick sampling of the pit, obtaining a nearly complete vessel, four larger fragments and 13 smaller sherds (Eggert 1993, 320 Fig. 16.15; Seidensticker 2021, Pl. 76.1–11). A charcoal sample dates this features between the 2nd century BCE to the 3rd century CE (Tab. 1: KI-2893). The vessel has a flat base, convex belly, and a slightly elaborated shoulder leading to a concave neck and a flared rim. Its decoration consists of crudely made crossing grooves made with a comb on the shoulder and impressions beneath the rim. Further fragments show similar decorations. Overall, the vessel's shape is substantially different from those of the contemporaneous Pikunda-Munda style. Some aspects of the ceramics superficially resemble a vessel found at Gbadolite on the upper Ubangi river (Eggert 1984, 277–278 Fig. 7). Loosely similar in terms of vessel shapes, decoration technique and motives is the pottery of the Ngovo group of the lower Congo region (de Maret 1986; Seidensticker 2021, 167 Fig. 81).

The Bokonogo style is an interim term for an inventory of 19 vessel units from seven sites, including Pikunda on the middle Sangha river, that show very distinct characteristics: all vessels are either rather tall with convex bellies and concave necks ending in cylindrical rims or bowls with inverted rims (Fig. 3.4; Seidensticker 2021, 120–123). Decorations consist of grooves beneath the rim and on the neck and shoulders, mainly forming horizontal, chevron or crossing motives. About half of the inventory showed a fabric similar to that of the Pikunda-Munda group, while a quarter showed grog tempering. At the same time, the remainder contained a heterogenous mix of quartz and grog. All finds are surface finds and not associated with any indications of their dating. The only loose comparison in terms of morphological characteristics and decorations can be made towards the Oveng pottery found in north-western Gabon (Clist 2004, 615–618) and on the island of Corisco (Equatorial Guinea) dating into the 1st to 7th century CE (Clist 2004, 555 Fig. 7–14; González-Ruibal et al. 2011; 2012; Sánchez-Elipe 2015, 217–221; Sánchez-Elipe et al. 2016, 351–355).

Close to the mouth of the Sangha river, in the very south of the study area, a unique kind of pottery was found that is characterized by predominant grog tempering and small globular pots with short everted rims or convex bowls with slightly inverted rims (Fig. 3.6–8; Seidensticker 2021, 162–165). This group is named after the site of Bobusa, located near the mouth of the Sangha river. While there are no radiocarbon dates available for this pottery group, some of its characteristics show similarities to pottery found on the Île des Mimosas in Kinshasa (Eggert 1984, 279–280).

428 Early Iron Age (200 BCE – 500 CE) in the Northern Congo Basin

429 The 1985 survey along the Ubangi river from its mouth into the Congo river south of
430 Mbandaka up to Kouango and along the Lualaba river (Fig. 1) yielded a first glimpse into
431 the variability of ceramics in the northern parts of the Congo Basin. The distribution
432 of pottery groups in the northern Congo Basin is separated into three distinct regional
433 lines of development (Seidensticker 2021, 183–185): only along the middle part of
434 the Ubangi river, from around 180 to 240 km upstream of its mouth into the Congo

⁴³⁵ river up to Bangui, pottery dating into the late 1st millennium BCE to 1st millennium
⁴³⁶ CE was uncovered.

⁴³⁷ *Batalimo-Maluba style*

⁴³⁸ In the region between Impfondo and Bangui, henceforth referred to as the middle
⁴³⁹ Ubangi river, the ceramic sequence starts with the Batalimo-Maluba style (Seiden-
⁴⁴⁰ sticker 2021, 75–82), named after the eponymous sites Batalimo on the lower Lobaye
⁴⁴¹ river and Maluba on the lower Lua river (Fig. 1). Excavations at Batalimo were con-
⁴⁴² ducted by de Bayle des Hermens (1975), Vidal, Koté (1992) and Ndanga et al. (2010).
⁴⁴³ The initial excavation indicated a coexistent of partially polished lithic artifacts and
⁴⁴⁴ ceramics (Aumassip 1975). This was not supported by later excavations at the site
⁴⁴⁵ (Ndanga et al. 2010), nor excavations at the other eponymous site Maluba (Eggert
⁴⁴⁶ 1987). The pottery of the Batalimo-Maluba style was found at 18 sites, with a core
⁴⁴⁷ distribution area between Dongo near the mouth of the Lua river and Mokelo, about
⁴⁴⁸ 30 km downstream of Bangui. The most southern find was uncovered at Ngbanja near
⁴⁴⁹ Impfondo (Fig. 4B–E; Seidensticker 2021, 81 Fig. 25). Only in Batalimo and Maluba
⁴⁵⁰ excavations yielded pottery of this style. The other sites associated with this group
⁴⁵¹ originate from surface finds. Available radiocarbon dates and one thermolumines-
⁴⁵² cence date (OxTL-154a-4), indicate that the Batalimo-Maluba pottery dates between
⁴⁵³ the 2nd century BCE and 6th century CE (Fig. 2; S1; Tab. S1; Seidensticker 2021, 80
⁴⁵⁴ Fig. 28).

⁴⁵⁵ Batalimo-Maluba pottery is characterized by well-structured, flat-based globular
⁴⁵⁶ pots and wide-mouthed bowls that are elaborately decorated using cross-hatching,
⁴⁵⁷ impression motifs and incised or grooved lines organized in alternating horizontal
⁴⁵⁸ and vertical zones (Fig. 5.1–3; Eggert 1993, 306–308; Seidensticker 2016, 118; 2021,
⁴⁵⁹ 75–82).

⁴⁶⁰ *Ngbanja style*

⁴⁶¹ Closely related to the Batalimo-Maluba style is the Ngbanja style, which shares similar
⁴⁶² general characteristics (Seidensticker 2021, 82–86). The primary vessel types are
⁴⁶³ globular or slightly ovaloid pots or beakers with everted rims (Fig. 5.4–5). Decorations
⁴⁶⁴ are based on grooves and impressions, and while they show similar motives as the
⁴⁶⁵ Batalimo-Maluba style, they are restricted to the neck or inside of the rim.

⁴⁶⁶ Ngbanja pottery is strongly related to the Batalimo-Maluba style, and Eggert
⁴⁶⁷ (1987, 141) suggested it as a predecessor of the Batalimo-Maluba group. Besides the
⁴⁶⁸ stylistic connections, the only chronological fixpoint for the Ngbanja style is a sherd
⁴⁶⁹ of this style found in the deep pit at Pikunda (Sangha river). Two radiocarbon dates
⁴⁷⁰ (Tab. 1: KI-2877; Tab. 2: RICH-30864) date the feature to the second half of the 1st
⁴⁷¹ century BCE to the late 3rd century CE. The sherd exhibits a coarse fabric instead of the
⁴⁷² delicate fabric common to the Pikunda-Munda style, and its decor consists of a ledge
⁴⁷³ with comb impressions on it. A nearly matching sherd was found during surveys at
⁴⁷⁴ Ngbanja on the middle Ubangi river (Seidensticker 2021, 83 Fig. 26.7–8). At Pikunda,
⁴⁷⁵ this sherd must be considered a foreign but contemporaneous type within the closed
⁴⁷⁶ Pikunda-Munda inventory. Three other sherds with coarse fabric and a decoration



Fig. 5 Ceramic vessels from the northern Congo Basin – along the rivers Ubangi and Luá – that are representative for the following pottery styles: 1–3) Batalimo-Maluba; 4–5) Ngbanja; 6–7) Bobulu; 8–9) Mokelo; 10–13) Motenge-Boma; 14–15) Bondongo; 16) Mbandaka; 17–18) Bokwango; 19–20) Dama; 21–22) Mbatis-Ngombe; 23) Bangui; 24) Kpetene; 25) Botendo (Seidensticker 2021, 75–114, 172–181).

477 different from the Pikunda-Munda style were also found. These associations allow for
 478 the possibility that Ngbanja pottery is contemporaneous not only to Batalimo-Maluba
 479 pottery but also to the Pikunda-Munda style and dates between the 2nd/1st century
 480 BCE and the 5th/6th century CE (Fig. 2; 4B–E).

481 Hiatus (500–1000 CE) in the Congo Basin

482 In both regions, inventories dating between the end of the 6th century to the early 10th
 483 century CE are currently unknown, leaving a gap within the regional sequences of at

⁴⁸⁴ least 300 years (Fig. 2; 4F–6A; S1). A detailed review of chronological indicators for
⁴⁸⁵ the 32 pottery styles described by Wotzka (1995, 59–212) revealed a similar pattern:
⁴⁸⁶ no pottery could be dated between the end of the Bokuma and Lingonda styles, which
⁴⁸⁷ end towards the end of the 7th centuries CE, and the onset of the widespread Bondongo
⁴⁸⁸ style at the beginning of 12th century CE (Fig. S1; Tab. S2).

⁴⁸⁹ In the north-eastern Congo Basin, around Kisangani (Fig. 1), a similar interruption
⁴⁹⁰ between ceramics designated to the Early and Middle Pottery Phase and styles
⁴⁹¹ pertaining to the Late Iron Age has been observed (Livingstone Smith et al. 2017,
⁴⁹² Fig. 2; S1). Technological analyses of the shaping techniques revealed a distinction as
⁴⁹³ well: the pottery of the Early and Middle phases is exclusively shaped via a drawing of
⁴⁹⁴ a ring technique, while all Late Iron Age pottery is shaped by pounding in a concave
⁴⁹⁵ mold. Only certain stages of the *chaînes opératoires* of the Late Iron Age ceramics
⁴⁹⁶ still adhere to principles followed during earlier times, indicating a certain continuity
⁴⁹⁷ (pers. comm. Livingstone-Smith 2021).

⁴⁹⁸ Two recent papers firmly established the supra-regional pattern of putative demo-
⁴⁹⁹ graphic changes in Central Africa during the past three millennia, both showing strong
⁵⁰⁰ empirical evidence for a setback in human activity between the 6th to 10th century
⁵⁰¹ CE (de Saulieu et al. 2021; Seidensticker et al. 2021). These independent results have
⁵⁰² been critically reviewed by Clist et al. (2023).

⁵⁰³ Late Iron Age (1000–1850 CE) in the Western Congo Basin

⁵⁰⁴ After the interruption of pottery sequences during the 6th to 10th century CE, ceramics
⁵⁰⁵ re-appear within the archaeological inventories of the region in the 10/11th century
⁵⁰⁶ CE (Fig. 2; 6A–B; S1). During the late Iron Age in the western Congo Basin, a clear
⁵⁰⁷ distinction appears between pottery styles associated with the adjacent Inner Congo
⁵⁰⁸ Basin and an independent stream summarized as Ngome style tradition.

⁵⁰⁹ Ngombe style

⁵¹⁰ The re-emergence of ceramics in the western Congo Basin at the onset of the Late
⁵¹¹ Iron Age is marked by the Ngombe style (Seidensticker 2021, 125–128), which is
⁵¹² rooted in the Equator-Co tradition of the Inner Congo Basin (Wotzka 1995, 222 Fig.
⁵¹³ 4). The ceramics of this type are found mainly on the lower Sangha river, with the
⁵¹⁴ eponymous site of Ngombe constituting the northernmost extension of its distribution
⁵¹⁵ area (Seidensticker 2021, 127 Fig. 54). In total, 56 vessel units from 15 sites are
⁵¹⁶ associated with the Ngombe style. They are similar to the Longa and Mbandaka styles
⁵¹⁷ (Wotzka 1995, 121–128, 139–143) of the Inner Congo Basin but show equally inde-
⁵¹⁸ pendent characteristics. The defining inventory of the Ngombe style was discovered in
⁵¹⁹ a partially eroded pit at the eponymous site on the middle Sangha river (Seidensticker
⁵²⁰ 2021, 305–306). It yielded an inventory of two plates, a big bowl, and a carinated
⁵²¹ bowl, all surrounded by fragments of a large vessel with a convex belly, a tapered
⁵²² shoulder and a short, flared rim (Fig. 3.10–12; Seidensticker 2021, Pl. 42.15–44.2).
⁵²³ The Ngombe style shows only rounded bases. Decorations consist of grooves and
⁵²⁴ impressions on the upper parts of the vessels. A new radiocarbon date obtained off

525 a food crust from the bottom of the main vessel found at Ngombe dates into the late
526 12th to mid 13th century CE (RICH-30867; Tab. 2). This corroborates the previously
527 proposed age of this pottery in relation to the Mbandaka and Longa styles of the Inner
528 Congo Basin (Fig. 2; 6B–C; S1; Tab. S1; Seidensticker 2021, 126–128).

529 *Ebambe and Epena styles*

530 Modern pottery production in the western Congo Basin shows two styles being present
531 along the Likwala-aux-Herbes river: upstream dominates the Epena style, while down-
532 stream, the Ebambe style is more present, but with vessels of both styles being found
533 along the entire length of the river (Seidensticker 2021, 131–141). Only the Ebambe
534 style has been found along the lower Sangha river. A potter in Boleko, on the lower
535 Likwala-aux-Herbes river, was still producing pottery of the Ebambe style in 1987
536 using a drawing of a lump technique combined with additional coiling for the neck
537 (Eggert in prep.). Diagnostic shapes include tall vessels with tapered necks, bottles
538 with think necks and bowls with parallel rims (Fig. 3.13–14; Seidensticker 2021, 132
539 Fig. 57). All vessels of the Ebambe style show flat bases. A diagnostic feature of the
540 Ebambe style is the consistent use of *banfwa-nfwa* decor on nearly all parts of the
541 vessel, including occasionally the inside of the rims. *Banfwa-nfwa* is the characteris-
542 tic decoration technique employed by potters at Ikenge (Eggert and Kanimba-Misago
543 1980, 399) and can be found on most of the pottery of the Inner Congo Basin after
544 the onset of the Late Iron Age (Wotzka 1995, 109–111). It is created by whipping the
545 leather hardened clay with the narrow side of a chip made from the rib of a palm leaf,
546 leaving short, mostly lancet-shaped impressions (Fig. 3.13–14; 5.16,25; Eggert 1980,
547 386 Ftn. 5).

548 A rich inventory of Ebambe style vessels was excavated in Munda on the upper
549 Likwala-aux-Herbes river (Seidensticker 2021, 311–321). New radiocarbon dates on
550 food crusts from two vessels found within the pit (Tab. 2: RICH-30865–RICH-30866)
551 corroborate the existing convention date (Tab. 1: KI-2884). All three dates cover the
552 16th century CE onwards.

553 The pottery produced at Epena on the upper Likwala-aux-Herbes river shares
554 similar morphological features with the Ebambe style, especially their flat bases
555 and tall vessels with tapered necks (Fig. 3.16–17; Seidensticker 2021, 137–141).
556 Production was documented in 1995 by Léopold Mpika Ngoma (1996, 25–33). Epena
557 ceramics – labeled ‘Jeke’ in Seidensticker (2016, 119 Fig. 6.3) – were shaped via
558 drawing of superimposed rings. Most vessel shapes show relatively straight walls
559 with slight tapering on the largest diameter and everted rims (Seidensticker 2021, 138
560 Fig. 60). Decorations are usually reserved for the shoulder and neck area. The rims
561 are regularly undecorated, and – unlike the Ebambe pottery – bellies are not decorated
562 with *banfwa-nfwa*. There are no chronological indicators for the onset of the Epena
563 style available.

564 *Ngoko style tradition*

565 Between the 13th to 15th centuries CE, a set of ceramics emerged that showed no
566 connection to the Equator-Co tradition and constituted an independent style tradition

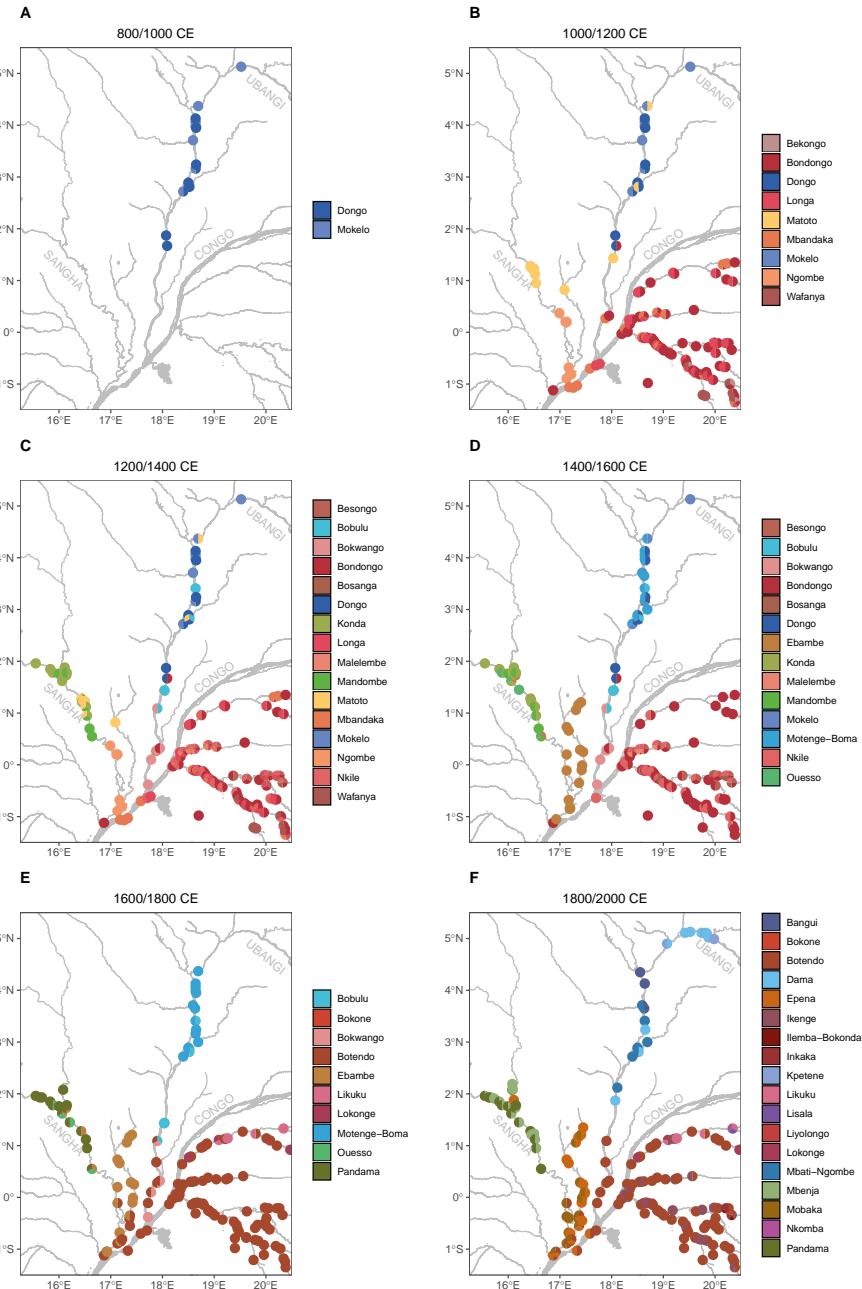


Fig. 6 Time-sliced maps of occurrences of pottery styles in the northern and western Congo Basin dating younger than the 9th century CE. If multiple contemporaneous pottery styles were recorded at a site, the colored icon is divided following Seidensticker (2021, 218–244 Fig. 100–107). Colors correspond to Fig. 2.

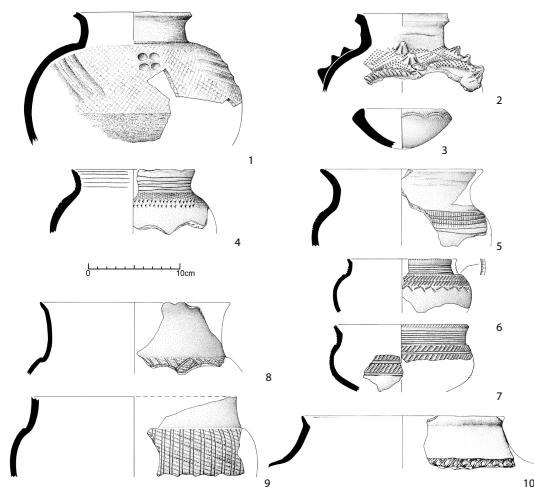


Fig. 7 Ceramic vessels of the Ngoko style tradition – along the rivers Ngoko and Sangha – that are representative for the following pottery styles: 1–3) Mandombe; 4–5) Konda; 6–7) Ouesso; 8–9) Pandama; 10) Mbenja (Seidensticker 2021, 145–162).

(Fig. 7). Two out of the five pottery styles forming the Ngoko style tradition are dated: the Mandombe style (Seidensticker 2021, 145–148), which was defined after the inventory excavated in the upper pit at Pikunda, dates into the 13th to 15th century CE (Tab. 1: KI-2891), and the Mbenja style (Seidensticker 2021, 158–162), which represents the modern pottery along the upper Sangha and the Ngoko. The other three styles that are part of the Ngoko style tradition can – thus far – only be dated relative to these two groups (Seidensticker 2016, 121–123 Fig. 6.5): the Pandama style (Seidensticker 2021, 155–158) shows considerable similarities with the modern Mbenja pottery, the Quesso style (Seidensticker 2021, 152–155) shows similarities to the Pandama style, and the Konda group (Seidensticker 2021, 148–152) shows similarities to the styles Mandombe and Pandama respectively. The proposed order of these pottery styles starts in the 13th to 15th century CE with the Mandombe style, followed by the Konda group and the Ouesso group, which in turn are surpassed by the Pandama style, which links to the modern Mbenja pottery.

All styles within the Ngoko style tradition share similar main vessel types: pots with convex bellies, concave necks, and short, everted rims. While decorations in the Mandombe style are based on grooves, often using a comb, and comb impressions, the lower halves of the vessels are consistently roughed up by a slurry or slip (Fig. 7.1–3). A diagnostic property are plastic decorations, such as knobs and ledges, that can only be found among vessels of the Mandombe style. While relying on grooves and impressions, the succeeding Konda style shows no elevated decoration (Fig. 7.4–5). The Ouesso pottery shows decorations made through grooving and comb impressions, similar to the Konda pottery (Fig. 7.6–7). At the same time, the shape of the rims is similar to the Pandama style. The decorations of Pandama pottery are based on knotted strip, twisted string, and alternate knotted strip roulettes, which are sometimes superimposed by grooves (Fig. 7.8–9). Roulette decoration was previously observed

only in some vessel units associated with the styles Mandombe and Konda. This indicates a slow and staged introduction of roulette within the developed system of the Ngoko style tradition (Seidensticker 2016, 120–123). Within the modern Mbenja style, vessel shapes become more heterogeneous, while the shape of the rims persist. Concerning decorations, Mbenja pottery shows carved roulette only and decor is restricted to a single band on the vessel's shoulder (Fig. 7.10). None of the ceramics associated with the Ngoko style tradition show fabrics indicative of the usage of fine riverine clays (Seidensticker 2020). Sherds contain substantial quantities of quartz and organic temper. Pottery of the Mandombe style excavated at Pikunda, and modern pottery produced in Pikunda in 1987, decorated with knotted strip roulette, was produced using coiling. All these styles show inherent commonalities and, at the same time, substantial differences to any pottery linked to the Equator-Co style tradition of the Inner Congo Basin (Wotzka 1995). The fieldwork of the *River Reconnaissance Project* in 1987 only uncovered the southern margins of the Ngoko tradition, which reached as far south as Pikunda on the middle Sangha river (Fig. 6C–F). Its upstream or northern extent can only be revealed during future fieldwork in the south-east of Cameroon and the south-west of the Central Africa Republic respectively.

610 Late Iron Age (1000–1850 CE) in the Northern Congo Basin

During the younger part of the pottery sequence in the northern Congo Basin the three-way split of regional ceramic development persists: on the lower part of the river, up to 180 to 240 km upstream, all observed ceramics are part of the Equator-Co tradition of the Inner Congo Basin. Inventories from sites in that region are dominated by the newly described Bokwango style and the already established styles Bondongo, Mbandaka, and Botendo (Seidensticker 2021, 96–98, 172–181). The area further upstream, up to Bangui, showed a complex set of pottery styles described below. Upstream of Bangui, only very young pottery has been identified as of yet. A key characteristic of the pottery styles pertaining to the Late Iron Age along the Ubangi river is the introduction of roulette decoration in an equally staged and slow process as in the Ngoko style tradition.

While excavations in this area are rare, only pits with Batalimo-Maluba pottery at Maluba were sufficiently excavated during the *River Reconnaissance Project*, there are no adequately documented inventories known thus far that yielded pottery dating into the Late Iron Age. Therefore, all lines of reasoning are based on stylistic developments within survey inventories. Modern pottery production documented at four sites on the middle and upper Ubangi river are the only points of reference.

At Mbati-Ngombe on the middle Ubangi river, the production of short-necked vessels and bowls with round bases (Fig. 5.21–22) shaped via coiling was observed (Seidensticker 2021, 109–121). Bowls show inverted rims, while the vessels usually have a short cylindrical neck and very short, everted rim. Most distinctive is the systematic decoration of vessels of the Mbati-Ngombe group using either knotted strip, twisted string, or alternated knotted strip roulettes (Livingstone Smith et al. 2010, 88–105) in a single band below the rim or occasionally on the inside of the rim.

635 Further upstream, ceramic vessels were produced at Dama 1, Sidi and Boduna by
636 pounding in a concave mold (Seidensticker 2021, 69 Ftn. 101). Dama style pottery
637 (Seidensticker 2021, 104–109) consists of either smaller pots with rounded bases and
638 short everted rims but without a defined neck area or substantially bigger vessels with
639 pronounced convex shoulders and everted rims (Fig. 5.19–20). The primary means of
640 decoration within the Dama style are carved roulettes, consistently applied in a single
641 band on the vessel's shoulder. Only rarely is the roulette accompanied by grooves or
642 impressions.

643 The Kpetene style summarizes a set of ethnographic vessels whose production was
644 not documented. This style is comprised of ovaloid vessels and bowls with round bases
645 that are extravagantly decorated with multiple bands of carved roulette (Seidensticker
646 2021, 103–105). Near Bangui, modern vessels with flat bases and a decoration not
647 relying on roulettes are observed (Seidensticker 2021, 112–114). This group, named
648 after the capital of the Central African Republic, shows systematic roughing up of the
649 lower parts of the vessels with *banfwa-nfwa*. In contrast, the upper parts are decorated
650 with multiple bands of impressions and grooves (Fig. 5.24).

651 The most distinctive style among the precursors of these modern productions is the
652 Motenge-Boma group (Seidensticker 2021, 99–103), first discovered by Van Noten
653 (1977, 75, 1982b, 69, Fig. 40). The vessels of the Motenge-Boma group show convex
654 bellies, no pronounced neck areas and, most importantly, a particular variety of rim
655 shapes (Fig. 5.10–13). Often, the usually straight or slightly inverted rims show thick
656 ledges. The spectrum of vessel shapes within the Motenge-Boma group also includes
657 convex bows with thickened rims. A clear marker of the Motenge-Boma pottery is
658 a decoration based on bands of carved or, in some cases, knotted strip roulette in
659 combination with grooves and impressions on the bellies and shoulders of vessels.
660 The rims are often also decorated similarly. No new pointers for the dating of the
661 Motengo-Boma pottery have been obtained as studied ceramics of this style were
662 found entirely as surface finds. Thus, until excavations uncover inventories pertaining
663 to this style as well as datable material, the age of the Motenge-Boma pottery can only
664 be estimated to be somewhere in the second half of 2nd millennium CE as suggested by
665 Van Note (1982b, 69). The detailed surveys of 1985 could demarcate the distribution
666 of this pottery along the Ubangi river quite well. Motenge-Boma ceramics are only
667 found from the mouth of the Lua river in the south to Bangui in the north (Fig. 6D–E;
668 Seidensticker 2021, 102 Fig. 37).

669 Evidence for pottery dating between the end of the Batalimo-Maluba style in
670 the 6th century CE (Fig. S1; Tab. S1) and the onset of the Motenge-Boma group is
671 scarce. The styles Dongo, Mokelo and Bobulu (Fig. 2; Seidensticker 2021, 86–95) are
672 noteworthy as they date potentially between the mid of the 1st millennium CE and the
673 middle of the 2nd millennium CE. The most diagnostic among these is the Mokelo
674 pottery, distributed between the mouth of the Lua river and the bend of the Ubangi
675 river further upstream. Its vessels often show tapered profiles (Fig. 5.8–9). While
676 carved roulette decoration is occasionally present, the bulk of its decors is achieved
677 utilizing incisions and bands of comb impressions.

678 Notably, no ceramics dating to before the 10th century CE were found along the
679 lower stretches of the Ubangi river, south of Impfondo. All finds from that region
680 pertain to pottery styles known from the Inner Congo Basin, such as Bondongo,

681 Mbandaka, and Botendo (Fig. 5.14–16,25; Seidensticker 2021, 172–181), with the
 682 only exception being the newly described Bokwango style (Fig. 5.17–18; Seidensticker
 683 2021, 96–99). The ceramics of this group are an off-shoot for the Equator-Co style
 684 tradition (Wotzka 1995). The lower halves of Bokwango vessels are decorated with
 685 *banfwa-nfwa*, as is typical for styles from the Inner Congo Basin dating into the Late
 686 Iron Age but showing slightly tapered profiles.

687 Discussion

688 Settlement History of the Congo Basin

689 The results from the northern and western parts of the Congo Basin presented here
 690 complement the available data on the settlement history of the Inner (Wotzka 1995)
 691 and north-eastern Congo Basin (Livingstone Smith et al. 2017), enabling a synopsis
 692 of the settlement history of the region as a whole (Seidensticker 2021, 218–244). The
 693 earliest pottery group known within the entire Congo Basin thus far is the Imbonga
 694 style, dating into the 4th to 2nd century BCE (Fig. 2; S1; Tab. S1) that is found within
 695 the western half of the *Cuvette central* (Fig. 4A; Wotzka 1995, 59–68) as well as at
 696 two sites along the lower Sangha river.

697 The Imbonga style differentiates into multiple groups that still inherit substantial
 698 morphological and decoration characteristics in the following phase, starting in the 3rd
 699 and 2nd century BCE (Seidensticker 2021, 219–224). Initially, the later individually
 700 described styles Bonkake, Ingende and Inganda (Fig. 2; S1; Tab. S1; Wotzka 1995,
 701 68–84) were conceptualized as part of a broader ‘Imbonga horizon’ (Eggert 1983).
 702 During this time, the settled area in the Inner Congo Basin slightly expanded upriver
 703 along the lower Tshuapa, up to the region of the modern town of Boende, and on
 704 the lower Luilaka (Fig. S2B). The development of ceramic styles in the Inner Congo
 705 Basin around the turn of time is characterized by differentiation and regionalization,
 706 with many of the successors of the Imbonga style being only distributed along certain
 707 tributaries of the Congo river.

708 Also within this time period, the initial phase of pottery-producing communities
 709 emerged in the north-eastern parts of the Basin, in the vicinity of Kisangani (Fig. S2A;
 710 Livingstone Smith et al. 2017). The pottery of the Early Phase dates between the 2nd
 711 century BCE and 1st century CE (Fig. 2; S1; Tab. S1). Livingstone Smith et al.
 712 (2017, 110,115) propose a relation of this pottery to the contemporaneous Imbonga
 713 style of the Inner Congo Basin, especially regarding the use of similar decorative
 714 techniques. In a critical review it must be noted that the pottery of the Early Phase
 715 (Livingstone Smith et al. 2017, 112 Fig. 24) lacks systematic rocker zig-zag on the
 716 bottom parts of vessels as well as raised decorations such as ledges or ridges, vessels
 717 shows no pronounced shoulders, all primary characteristics of the Imbonga style
 718 (Seidensticker 2021, 170 Fig. 84.1–20). Pottery of the Early Phase is still attested
 719 until the 1st century CE, while the Middle Phase pottery already commences (Fig. 2;
 720 S1; Tab. S1; Livingstone Smith et al. 2017).

721 In the 2nd to 1st century BCE pottery-producing communities emerge in the
 722 western and northern Congo Basin: along the Sangha and Likwala-aux-Herbes rivers,

723 the Pikunda-Munda style and along the middle Ubangi river, on the northern fringes
724 of the rainforest, the Batalimo-Maluba (Fig. 2; S1; Tab. S1) and the Ngbanja styles
725 can be found (Fig. 4B). It is essential to state that these groups share no fundamental
726 commonalities with the pottery of the Inner Congo Basin and must be regarded as
727 distinct and individual lines of development. Based on preliminary technological
728 analyses, a connection to the Inner Congo Basin's contemporaneous ceramics can
729 only be postulated for the Pikunda-Munda group. Ceramics within the western and
730 Inner Congo Basin appear to have been shaped in either a drawing of a lump or a
731 ring technique. These ceramics have yet to be differentiated, especially regarding used
732 clays and the lack of tempering of the clays (Seidensticker 2020).

733 The first half of the 1st millennium CE sees a continuation of the described
734 patterns. In the Inner Congo Basin, multiple interrelated styles with only regional
735 distribution areas emerge (Fig. S2C–D). It should be remarked that during this time,
736 a slight retreat of settlement activity is discernible, with substantially fewer sites
737 compared to the centuries BCE being known along the Lulonga and Lopori rivers
738 (Seidensticker 2021, 224). This plateauing of settlement activity led to the setback in
739 human activity visible throughout Central Africa that continued until the 10th century
740 CE (Seidensticker et al. 2021).

741 Within the entire Congo Basin, only very few dated sites point to the presence of
742 pottery-producing communities between the 7th to 10th centuries CE (Seidensticker
743 2021, 225–231; Seidensticker et al. 2021, Fig. S4). The two predominant styles in the
744 western and northern Congo Basin, the Pikunda-Munda and Batalimo-Maluba groups,
745 end between the 4th to 6th century CE at the latest (Fig. S1; Tab. S1). The available
746 dates for the Middle Phase pottery in the Kisangani region indicate that it ended
747 around the same time. The earliest evidence for the Ilambi style, clearly pertaining to
748 the younger Iron Age, dates to the 8th century CE. It must be stressed that this early
749 date is challenged by another date also associated with the Ilambi style, dating into
750 the 15th to 17th century CE, leaving a considerable discrepancy (Livingstone Smith
751 et al. 2017, 98 Tab. 1).

752 Substantial human activity is attested for again by significant increases in sites
753 yielding pottery dating to the 11th century CE and younger. Among these are the
754 widely distributed Bondongo and Longa styles (Fig. 2; S1; Tab. S1; Wotzka 1995,
755 121–139). While these groups are distributed across nearly all parts of the Inner
756 Congo Basin that was surveyed during the *River Reconnaissance Project*, and in the
757 case of the Bondongo group also along the lower Ubangi river, they are immediately
758 followed by a distinct development of regional traditions (Wotzka 1995 221–223;
759 Seidensticker 2021, 231–244; Seidensticker et al. 2021, 3–5). Along the lower Sangha
760 river, the newly dated Ngombe group (Tab. 2) reflects an uptick in human activity.
761 Starting in the 13th century CE, new components of pottery production commence
762 along the Ngoko river and upstream parts at the Sangha river. These new elements form
763 the foundation for the newly described Ngoko style tradition, whose onset is marked
764 by the emergence of the Mandombe style. This group is later followed by at least three
765 more pottery styles that lead directly into the modern potters' production in the area.
766 Along the Likwala-aux-Herbes river, re-settlement is only attested for starting in the
767 16th century CE, documented by newly obtained radiocarbon dates for ceramics of the
768 Ebambe style (Tab. 2: RICH-30866). Within a similar time falls the Motenge-Boma

769 style found along the middle Ubangi river. It is putatively preceded by the poorly
 770 attested Dongo, Mokelo, and Bobulu groups. The introduction of roulette decoration
 771 within the Ngoko style tradition, as well as among the groups on the middle Ubangi
 772 river, while being an easily observable marker, cannot be described as a watershed
 773 event but rather a process of slow adaption (Seidensticker 2016, 120–123). Similarly
 774 to these regions, roulette decoration becomes a prime marker of younger pottery styles
 775 in the Kisangani region (Livingstone Smith et al. 2017).

776 Refuting the "Sangha River Interval" (SRI) Hypothesis

777 The putative origin of ceramic-producing communities starting to settle in the Congo
 778 Basin in the 4th century BCE remains elusive. Linguistic studies propose rapid migra-
 779 tions through the rainforest (Currie et al. 2013; Whiteley et al. 2019; Koile et al. 2022)
 780 and suggest that the region of the Sangha river, in the western Congo Basin (Fig. 1),
 781 played a crucial role as a potential 'gateway' through the equatorial rainforest of the
 782 Congo Basin (Grollemund et al. 2015; Bostoen et al. 2015; Grollemund et al. 2023).
 783 In consequence, putative Bantu-speaking migrants are deemed to have followed a
 784 savannah-corridor, determined by the Sangha River Interval (SRI), in the latter half
 785 of the 1st millennium BCE (Grollemund et al. 2015; Bostoen et al. 2015). This hy-
 786 pothesis is brought forward based on statistical analyses of present-day languages and
 787 attempts to integrate archaeological data into the outcome of these statistical analyses
 788 against the background of an ecologically identified "forest perturbation" (Bostoen
 789 et al. 2015, 356) during the Late Holocene Rainforests Crisis (LHRC) (Vincens et al.
 790 1994; Elenga et al. 1996; Raynaud-Farrera et al. 1996; Maley and Brenac 1998; Vin-
 791 cens et al. 1998; Maley 2004; Ngomanda et al. 2009; Sangen 2009; Giresse et al.
 792 2020).

793 The unique composition of the region along the Sangha river (cf. "W&E margins"
 794 in Philippon et al. 2019, 7 Fig. 3A), linking plant and animal species from the
 795 Sudanian and Zambezian savannas, was first brought forward in René Letouzey (1968).
 796 This roughly 400 km wide region between 14 and 18°E "lacks some plant species
 797 typical of dense humid forests present in both the lower Guinean and the Congolian
 798 floristic domains in Cameroon-Gabon and the Democratic Republic of the Congo,
 799 respectively" (Bostoen et al. 2015, 356). Remote sensing data corroborate the specific
 800 ecology of the SRI (Gond et al. 2013; Philippon et al. 2019). Ground truths for
 801 a widespread opening of the forest are severely lacking, especially those for the
 802 1st millennium BCE during which such an opening is regarded as triggering for
 803 a southwards migrations of Bantu-speech communities (Grollemund et al. 2015;
 804 Bostoen et al. 2015). The existence of the SRI during the 1st millennium BCE was
 805 recently critically reviewed based on a multi-proxy analysis, combining phytolith
 806 assemblages with $\delta^{13}\text{C}$ rations of the soil organic carbon from soil profiles within the
 807 SRI (Bremond et al. 2017). Out of all 18 profiles, only four showed $\delta^{13}\text{C}$ values higher
 808 than -25‰ and can be related to past vegetation changes during the 1st millennium
 809 BCE. The phytolith assemblages further corroborate these findings of only occasional
 810 and rare forest openings (Bremond et al. 2017, 99). During the last millennium, the
 811 environment in the SRI shows considerable stability (Giresse et al. 2023).

812 The archaeological background established by Grollemund et al. (2015) and
813 Bostoen et al. (2015) for postulating large-scale migrations of putative Bantu-speaking
814 communities through the SRI is insufficient. The compilation of discussed sites in the
815 Congo Basin by Bostoen et al. (2015, 356 Fig. 1) depicts only the site of Imbonga
816 on the Momboyo river. The entire settlement history of the Inner Congo, which was
817 published in detail (Eggert 1984, 1987; Wotzka 1995), has been reduced to the pu-
818 tative and untested connection between the earliest pottery style (Imbonga) and the
819 earliest immigration of Bantu speakers (Bostoen et al. 2015, 366). The fundamentals
820 of the settlement history of the western Congo Basin Eggert (1992, 1993) were largely
821 omitted. Bostoen et al. (2015, 364) reduce these reports to a short note concerning
822 the association of evidence for iron metallurgy with the Pikunda-Munda pottery style.
823 A review of the radiocarbon dates, which were already published by Eggert (1992,
824 1993), shows an at least 200-year off-set between the oldest dates in the heart of the
825 rainforest (Imbonga) versus the oldest dates from within the SRI (Pikunda-Munda;
826 Fig. S1; Tab. S1). Thus, archaeological fieldwork in the western Congo Basin, and the
827 SRI in particular, have not revealed any precursors of the oldest pottery of the Congo
828 Basin, whose distribution is relegated to the western half of the Inner Congo Basin
829 (Seidensticker 2021, 220 Fig. 100A). Clist (2022, 66–67) re-evaluated his former con-
830 tribution to Bostoen et al. (2015), based on evidence brought forward by Morin-Rivat
831 et al. (2014), Seidensticker (2016), and Giresse et al. (2020).

832 In conclusion, the SRI has to be considered a patchy opening of the dens forest
833 rather than a 'savannah corridor', and the fact that pottery-producing communities
834 settled within it at least 200 years after the Inner Congo Basin was already settled
835 dismisses the argumentation brought forward by Grollemund et al. (2015) and Bostoen
836 et al. (2015).

837 (Dis-)Continuities of pottery traditions in the Congo Basin

838 Of equal importance to the onset of the settlement of the Congo Basin by pottery-
839 producing communities is the persistence of these over the past 2400 years. Of special
840 importance in that respect is the setback in human activity during the second half of
841 the 1st millennium CE (Seidensticker et al. 2021). Anecdotal evidence can be derived
842 from local and regional studies, such as the discontinuation of settlement activities
843 reported from Gabon by Oslisly (1998, 101–103 Fig. 9, 2001, 112–113 Fig. 7.9). At
844 the island of Corsico (Equatorial Guinea), research found that the late facies of the
845 Oveng pottery, dating into the 7th to 8th century CE, coincides with "a period of
846 social and demographic decline that lasts until the late first millennium CE", leading
847 to "several centuries of depopulation" (Sánchez-Elipe et al. 2016, 355–356). Also at
848 Dibamba in western Cameroon, with six hectares the biggest site in the region in terms
849 of examined surface, showed a hiatus between the 4th to 10th century CE (de Saulieu
850 et al. 2017). An empirical review of the putative setback in human activity throughout
851 Central Africa was recently derived from macro-level analyses of radiocarbon dates
852 (de Saulieu et al. 2021; Seidensticker et al. 2021).

853 The sequence of pottery styles in the Inner Congo Basin has been described as
854 uninterrupted by Wotzka (1995). A detailed review of chronological indicators for the

855 32 pottery styles described by Wotzka (1995, 59–212) revealed that no pottery could
 856 be securely dated between the end of the styles Bokuma and Lingonda, which come to
 857 an end in the 7th centuries CE at the latest, and the onset of the widespread Bondongo
 858 style at the beginning of 12th century CE (Fig. S1; Tab. S1; Seidensticker 2021,
 859 193–204). Wotzka (1995, 121–128) proposed for the Longa style to be potentially
 860 dated in-between the Early and Late Iron Age. Its characteristics show some links to
 861 the styles Bokuma and Bokele, both dating into first half of the 1st millennium CE,
 862 and strong links to the Bondongo style, dating between the 12th to 14th century CE
 863 (Wotzka 1995, 127). One feature discussed in that regard is the onset of *banfwa-nfwa*
 864 decoration during the times of the pottery styles Bokuma and Lingonda (Wotzka 1995,
 865 109–111, 117–118). *Banfwa-nfwa* is restricted to the inside of the rims within those
 866 styles. Vessels of the Longa style only rarely show *banfwa-nfwa* decoration, if so it is
 867 mostly on the inside of the vessels and only very rarely on the outside (Wotzka 1995,
 868 124). *Banfwa-nfwa* becomes the dominant decoration technique during the subsequent
 869 Bondongo style, extensively covering the outside of vessels (Wotzka 1995, 131–134).
 870 In consequence, the Longa style is regarded by Wotzka (1995, 125–128) as a 'bracket',
 871 connecting better dated pottery styles from the end of the Early Iron Age and the onset
 872 of the Late Iron Age.

873 None of the three radiocarbon dates associated with Longa pottery date into the
 874 time-span between the 6th to 10th century CE though. Two somewhat older dates
 875 (Hv-12611, Hv-12626) are discarded by Wotzka (1995, 127–128 Tab. 53) as not-
 876 representative. The third available date (Hv-11572) covers the 11th to 14th century
 877 CE. This last date goes very well with the close stylistic connections Longa pottery
 878 shows to the Bondongo style, which is firmly dated between the beginning of the 12th
 879 and the end of the 14th century CE (Fig. 2; S1; Tab. S1; Wotzka 1995, 138 Tab. 58).
 880 This younger date for the Longa pottery is further supported by a new radiocarbon
 881 date obtained from a food crust on the bottom of the enormous globular vessel found
 882 at Ngombe on the middle Sangha river (Tab. 2: RICH-30867). The ceramics found
 883 within this feature are the basis of the pottery style of the same name, which shows
 884 strong similarities with the Longa style. This gives enough reason to propose the age
 885 of the Longa style to be later than the 10th century CE, thus dating it firmly to the
 886 Late Iron Age. This reassessment of the chronology of the Longa pottery leaves the
 887 same 'gap' or 'hiatus' within the sequence of the Inner Congo Basin that has been
 888 observed throughout Central Africa (de Saulieu et al. 2021; Seidensticker et al. 2021).
 889 Consequently, the conceptualization of an uninterrupted sequence of pottery styles
 890 starting with the Imbonga style and leading, similar to a network of direct decedents,
 891 right to the local potters' producing ceramic today (Wotzka 1995, 65, 221, 274, 285)
 892 must be questioned.

893 Fuzzy Border at the Ubangi river

894 Another intriguing aspect concerns the importance of the surveyed river systems.
 895 Particular focus is always laid on whether rivers constitute exchange barriers or,
 896 instead, that they are preferred pathways for expansion and axes of contact (Russell
 897 et al. 2014). The observed distribution patterns of pottery styles along the Ubangi

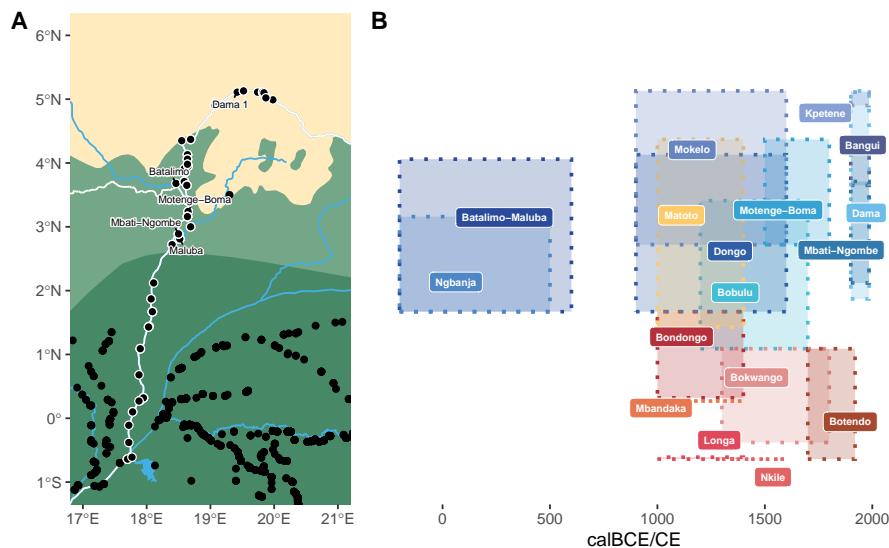


Fig. 8 Map of archaeological sites along the Ubangi river (left) and chronospatial distribution of pottery styles documented within the region (right). Sites along the Ubangi show a white border, while other archaeological sites are demarcated as simple black dots. The green shading denotes the putative rainforest distribution during the 1st millennium BCE (Bremond et al. 2017; Maley et al. 2017) (dark green) and today (White 1983) (light green).

888 river, a consecutive 850 km long north–south transect, show a seemingly impermeable
 889 border zone that existed for nearly two millennia (Fig. 8; Seidensticker 2021, 183–185,
 900 184 Tab. 17). These zones are persistent and long-lasting, with ceramics rarely found
 901 outside their specific region. This ‘fuzzy’ boundary is situated between 1° to 1.5° N,
 902 north of Impfondo. South of this region, all ceramics date into the Late Iron Age and
 903 are all associated with the Equator-Co style tradition of the Inner Congo Basin (Wotzka
 904 1995). Further upriver, near the mouth of the Lualaba river, the Batalimo-Maluba style
 905 is among the earlier potteries in the region. All pottery groups that follow afterwards
 906 ‘respect’ the southern border of the Batalimo-Maluba group (Fig. 8). This observation
 907 offers a unique view into a putative lack of social connectivity along one of the major
 908 rivers in Central Africa and needs more research.

909 Conclusions

910 While pottery styles identified in the northern parts of the study area follow indepen-
 911 dent trajectories, the styles of the western parts of the Congo Basin show substantial
 912 similarities to contemporaneous styles from the Inner Congo Basin. These similarities
 913 start with the clay sourcing, resulting in very similar macroscopic ceramic fabrics.
 914 Furthermore, while vessel shapes are sometimes different, decoration techniques and
 915 motives are nearly identical. Concerning the Pikunda-Munda style, the oldest pottery
 916 widely distributed in the western Congo Basin, strong technological similarities stand

917 in the way of several stylistic differences. So far, this style can only be loosely associated
 918 with contemporaneous ceramics of the Inner Congo Basin. Furthermore, the
 919 Pikunda-Munda style did not develop into an individual stylistic tradition, and after
 920 its end, there are no reliable links with any younger styles in the region. More critical
 921 for the settlement history of the Congo Basin is the fact that the emergence of the
 922 Pikunda-Munda group can only be dated as about 200–300 years younger than the
 923 emergence of the first pottery production further east, in the Inner Congo Basin. This
 924 fact, also considering that it is the earliest widely distributed pottery in the "Sangha
 925 River Interval" and shows legitimate stylistic differences to the ceramics from the
 926 Inner Congo Basin, refutes any hypotheses of migrations through the Congo Basin
 927 via the "Sangha River Interval" (Bostoen et al. 2015; Grollemund et al. 2015, 2023).

928 After the setback in human activity during the 7th to 10th centuries CE, pottery
 929 groups such as the Ngombe style appear that show close stylistic ties to pottery from
 930 the Equator Co-Tradition and can be regarded as part of them. The same general
 931 association as western offshoots of the Equator Co-Tradition goes for the younger
 932 styles Ebambe and Epena.

933 The introduction of roulette decorations, which often govern decoration practices
 934 of modern-day ceramics, is equally vital for the region's settlement history. A gradual
 935 adoption and intensive use of this ornamentation practice can be observed within the
 936 Ngoko tradition. In the extreme south of the study area, another distinct line of pottery
 937 development was observed within the grog-tempered Bobusa group.

938 The settlement sequence of the northern and western Congo Basin sketched out
 939 within this study must, at least in part, be taken cautiously due to the limited sources
 940 available. Only new fieldwork and excavations can remedy this situation. Thus far,
 941 the available data constitutes valid proof for the chrono-temporal position of the early
 942 parts of the sequence during the Early Iron Age. However, available data from the
 943 middle of the 1st millennium CE onwards must be considered incomplete. Despite
 944 the extensive body of material obtained by the *River Reconnaissance Project* in the
 945 1980s, the present work only provides a first insight into the ceramic variability of the
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