

1 Archaeological Artefact Database of Finland (AADA)

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20 Abstract

21

22

23 This paper presents the Archaeological Artefact Database of Finland (AADA) of all prehistoric
24 (covering period of almost 11,000 years) artefacts in Finland that are categorised by type and
25 are accompanied with photos of the artefacts. This database provides spatio-temporal context
26 for compare artefacts across different time periods and regions, as it includes approximately
27 38,000 single artefacts and approximately 10,000 pottery type identifications from the Early
28 Mesolithic to the end of the Iron Age in Finland (c. 8900 calBC - 1300/1500 calAD). In addition,
29 the artefacts are given period-based (subperiod) dating to allow their chronological affiliation. To
30 facilitate data usage, we also offer a geospatial framework to implement the visualisation and
31 analyses of the database.

32

33 Background & Summary

34 Archaeological collections in Finland have been accumulated during the centennia, first by the
35 private collectors, then - along with the national awakening - by the historical societies and
36 museums. Nowadays, the main keeper of the heritage collections is Finnish Heritage Agency,
37 which takes care that both the heritage sites and artefact discoveries are kept track, registered,
38 and protected by law. Until recently, the find catalogues were only in the paper format. The
39 digitalisation of the collections is under way, but the material is still too scanty for any statistical
40 analyses. Also, the search for artefacts from paper catalogues is tedious. The situation was felt
41 difficult and so in 2006, it was decided that the inspection of typologically classifiable artefacts
42 and building a database of them would benefit all. The first funding was received in 2008 and
43 the work in the collections began.

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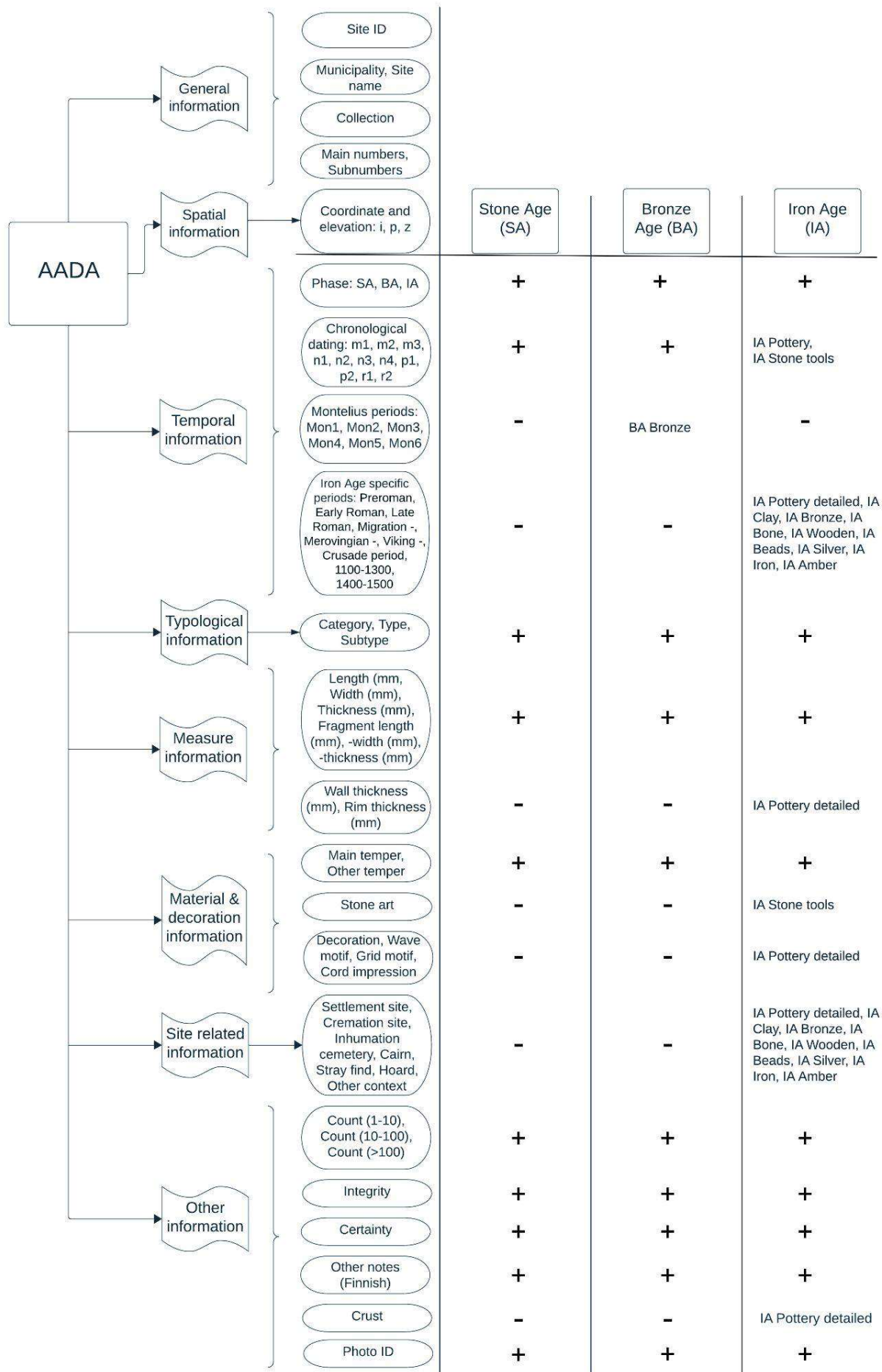
45 The creation of this archaeological database builds on a collaboration of many researchers,
46 started in 2008 and continued until 2023. We hope that bringing together various resources into
47 a single open data resource accelerates new kinds of analysis and visualisations, enhances
48 reproducibility, and increases the longevity and sustainability of the data. The work has been
49 preliminarily introduced by Moilanen et al.,¹ along with the linguistic typological database.²

50

51 This paper presents the outcome of the endeavour, the Archaeological Artefact Database of
52 Finland (AADA). The database offers comprehensive information on over 49,000 collection
53 entries of Finnish archaeological materials. It covers the whole prehistory of Finland from the
54 beginning of the pioneer settlement after the Last Ice Age (c. 8900 calBC) until the beginning of
55 the medieval period (c. 1300 AD). Geographically, it covers the entire territory of present-day
56 Finland, including the Åland Islands, and as well as artefacts collected before the Second World
57 War from the territories ceded to Russia in 1945 (e.g., Karelia, Petsamo). Database enables
58 varied statistical and modelling analyses, and easy drawing of maps and site distributions.

59 Our approach involves gathering information on-site from existing catalogues of the museum
60 collections, as well as conducting visual inspections and taking measurements of the actual
61 artefacts in the collections. Other specific variable types collected were e.g., material and
62 decoration-related, and site-related attributes (Figure 1, Supplementary File p.11). Our
63 methodology also incorporated their geospatial information (e.g., geographical locations). The
64 project was supported by the Academy of Finland and was carried out in collaboration with the
65 Argeopop project at the University of Helsinki (2009–2012) and *Kipot ja kielet* (Beakers and
66 Speakers) project at the University of Turku (2019–2020) and Uralic triangulation project (2020-
67 2022) by the Academy of Finland Digital Humanities programme. The AADA database in its
68 current form is available in Zenodo <https://zenodo.org/records/10437704> (Excel- and csv-files)
69 and <https://zenodo.org/records/10417384> (images).

70



72 *Figure 1. Structural overview of the Archaeological Artefact Database of Finland (AADA) encompasses*
73 *two overarching categories of attributes applicable across all periods: general and spatial information.*
74 *Additionally, it incorporates six specific attribute types, namely temporal, typological, measure, material*
75 *and decoration-related, site-related, and other attributes. For practical reasons, the data is divided into*
76 *three distinct chronological periods: Stone Age (SA), Bronze Age (BA), and Iron Age (IA). + and -*
77 *symbols denote whether or not certain attributes are available for certain periods. Attributes unique to*
78 *specific artifact categories are identified accordingly. For instance, IA Pottery is elaborated with additional*
79 *attributes specific to this category alone. These attributes include decoration (varied motifs) and*
80 *measurement characteristics such as wall and rim thickness, as well as crust.*

81 Site data in Finland can be accessed through the *Kulttuuriympäristön palveluikkuna - Kyppi*
82 (Ancient Relics Register) maintained by the Finnish Heritage Agency. The database presented
83 in this study alleviates the burden of locating the actual depositories of relevant typologically
84 datable archaeological material for artefact-oriented archaeologists. The AADA database
85 covers a wide range of artefacts related to subsistence, social structures, cosmology, burial
86 customs, and conflicts. It is important to note, however, that not all artefacts are equally well-
87 represented in archaeological assemblages due to preservation issues, cultural practices, and
88 recycling. Additionally, taphonomic processes, excavation practices, and the handling of finds
89 have varied over time which affects the numbers and distributions of artefacts that have been
90 preserved in museums and collections. Despite these limitations, existing archaeological
91 collections provide an unparalleled source of geographically and chronologically attributable
92 evidence of changes and continuities in past human populations.

93 Archaeological data is increasingly managed, analysed, and shared through digital platforms
94 and utilised with computational tools/methods, such as GIS, digital recording systems, and
95 statistical methods. AADA includes columns for latitude and longitude, transforming the data
96 into a spatial point format that can be visualised and analysed using various software tools.
97 Maps simplify complex data and provide a contextual view of multiple attributes, aiding in the
98 interpretation and understanding of the data. To facilitate the creation of maps directly from the
99 AADA database without prior expertise in working with spatial data, we provide an R-script that
100 outlines the process used to create the maps presented in this publication.

101 The AADA database offers a valuable resource for studying Finland's prehistoric period and is
102 accessible in Zenodo. The data will be continuously updated in the GitHub repository that will
103 be managed by Finnish Heritage Agency (P. Pesonen) and University of Turku (M. Sanwal and
104 P. Onkamo). New versions of AADA will be launched to Zenodo in regular intervals. The AADA
105 database is a part of the trend towards more open and collaborative research, representing a
106 shift towards greater reliability and quality.

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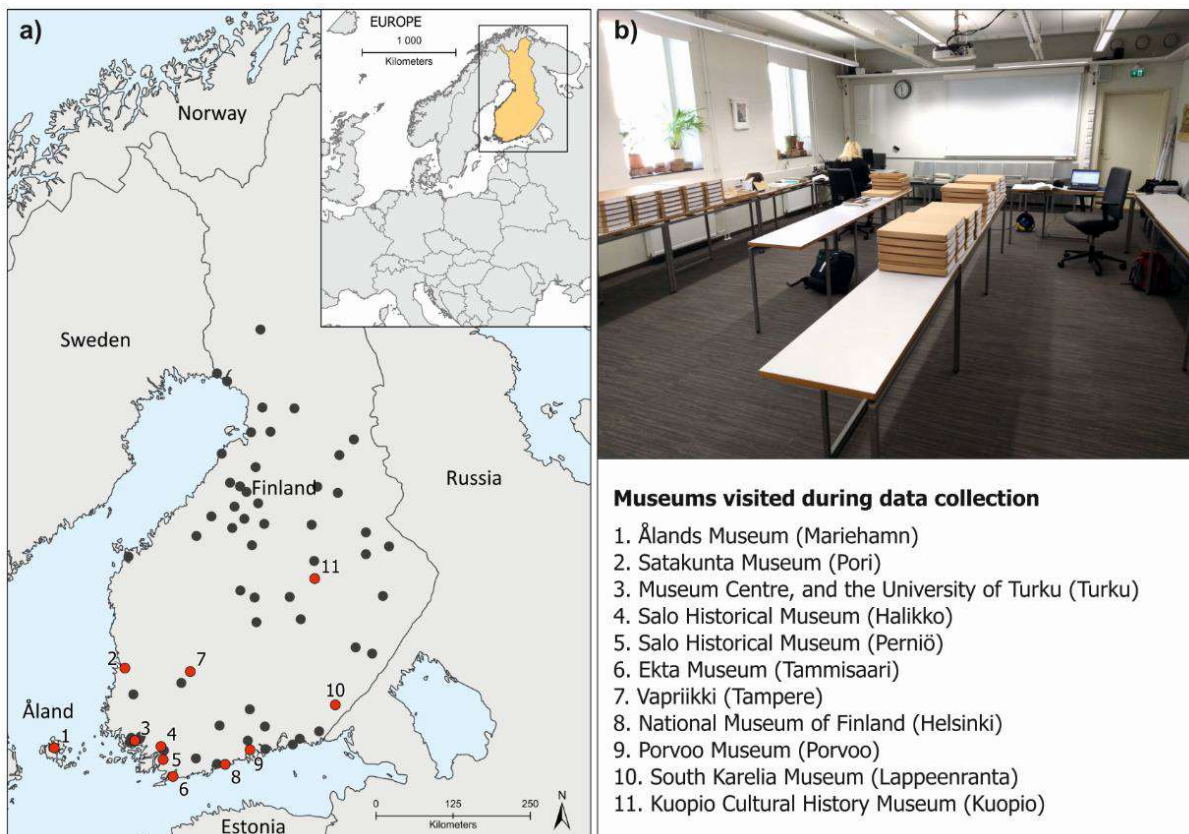
108 **Methods**

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110 **Collecting the database**

111

112 The National Museum of Finland in Helsinki (Kansallismuseo, NM/KM) houses the majority of
 113 Finnish archaeological collections, with approximately 90% of all archaeological material
 114 discovered in Finland. Other important collections are located in Mariehamn (Ålands Museum,
 115 ÅM), Pori (Satakunta Museum, SatM), Turku (Turku Museum Centre, TMM; University of Turku,
 116 TYA), Tampere (Häme Museum, HM, in Museum Centre Vapriikki), Kuopio (Kuopio Cultural
 117 History Museum, KHMESIE), and Oulu (Northern Ostrobothnia Museum). We studied all these
 118 major collections within our project, apart from the last-mentioned museum. In addition to these,
 119 some smaller county museums were also inspected (Figure 2).
 120



121
 122 *Figure 2. Overview of the data collection work in the museums. Image a) presents the distribution of the*
 123 *museums visited across 11 towns and image b) presents the database creation process of manually*
 124 *inspecting the catalogues and collections, e.g., photographing the artefacts in the museums. The black*
 125 *dots on the map represent minor museum collections that have not yet been included in the database.*
 126 *Background map: NaturalEarth.*
 127

128 Each entry in the catalogues of the original collections may contain 1–20,000 separate artefact
 129 entries, e.g., excavation of a site may include altogether 10,000 single items, which are
 130 organised in some hundreds of subnumbers. Majority of the single items are so-called mass-
 131 finds, e.g., stone debitage, bones, and pottery sherds, and only minority are typological
 132 artefacts. Still, the AADA database has records of over 36,000 single artefacts and c. 10,000
 133 pottery type definitions (Table 1).
 134

135 *Table 1. The count of items in the AADA database (version 1) by item category in three time periods:*
 136 *Stone Age (c. 8900–1900 calBC), Bronze Age (c. 1900–500 calBC), and Iron Age (c. 500 calBC–1300*
 137 *calAD). In the pottery category, the figures indicate the presence of certain pottery types, in other*
 138 *categories, the figures represent the actual number of items.*

Category	Stone Age	Bronze Age	Iron Age	AADA total
Pottery	7,343	861	1,668	9,872
Pottery (detailed)	0	0	822	822
Stone artefacts	29,126	329	334	29,789
Clay artefacts	1,159	15	195	1,369
Bone artefacts	567	72	98	737
Wooden artefacts	397	2	1	400
Amber artefacts	1,016	0	1	1,017
Birch bark tar	383	28	0	411
Silver and golden artefacts	0	0	83	83
Bronze artefacts	0	167	877	1,044
Iron artefacts	0	0	1,399	1,399
Beads	0	0	992	992
Total	39991	1474	6470	47935

139

140 Temporal information

141

142 For pragmatic reasons, the database has been divided into three main chronological periods:
143 Stone Age, Bronze Age, and Iron Age. AADA applies currently used periodization of prehistory
144 in Finland (Table 2). Each period contains both period-specific and general artefact categories
145 (Table 1) and accordingly also period-specific and general attributes (Figure 1). The general
146 item categories are pottery, stone tools, bone tools, clay artefacts, and wooden artefacts.
147 Period-specific categories include amber implements are specific to Stone Age, and birch bark
148 pitch occurrences to Stone and Bronze Age. Bronze objects are specific to Bronze and Iron
149 Age. The Iron Age includes separate tables for iron artefacts, beads made of different materials,
150 and silver and gold items (including a single Bronze Age gold item). Gold artefacts are
151 extremely rare in Finland in the Iron Age, but bronze objects may have been gilded. These
152 specific artefacts are included in the bronze category. Coins, which have occasionally been
153 used as pendants, are included in the silver find category. In all categories, the presence of
154 organic remains, such as textile, fur or wood fragments, was documented for future use in any
155 scientific analyses. There are no radiocarbon datings included in the AADA database.

156
157

Table 2. AADA database applies prehistorical periodisation of Finland, divided more specifically as periods, subperiods, calibrated years before Christ (calBC/AD), and calibrated years before present (BP).

Phase	Period	Subperiod	calBC/AD	calBP
Stone Age	Mesolithic	Early Mesolithic (m1)	8900–8200 BC	10900–10200
		Middle Mesolithic (m2)	8200–6200 BC	10200–8200
		Late Mesolithic (m3)	6200–5100 BC	8200–7100
	Neolithic	Early Neolithic (n1)	5100–3900 BC	7100–5900
		Middle Neolithic (n2)	3900–2900 BC	5900–4900
		Late Neolithic (n3)	2900–2400 BC	4900–4400
		Final Neolithic (n4)	2400–1700 BC	4400–3700
Bronze Age	Early Bronze Age (p1)	Montelian period I (Mon I)	1700–1500 BC	3700–3500
		Montelian period II (Mon II)	1500–1330 BC	3500–3330
		Montelian period III (Mon III)	1330–1100 BC	3330–3100
	Late Bronze Age (p2)	Montelian period IV (Mon IV)	1100–950 BC	3100–2950
		Montelian period V (Mon V)	950–800 BC	2950–2800
		Montelian period VI (Mon VI)	800–500 BC	2800–2500
Iron Age	Early Iron Age (r1)	Pre-Roman Iron Age	500–1 BC	2500–2000
		Early Roman Iron Age	1–200 AD	2000–1800
		Late Roman Iron Age	200–400 AD	1800–1600
		Migration Period	400–600 AD	1600–1400
	Late Iron Age (r2)	Merovingian Period	600–800 AD	1400–1200
		Viking Age	800–1050 AD	1200–950
		Crusade Period (Early Medieval Period)	1050–1250	950–750
		Medieval Period	1250–1530	750–470

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159

160 Typological information

161

162 The principles of recording the artefacts into the database were kept as constant as possible
163 throughout the project. The scope of the database was limited to typologically discernible tools
164 and artefacts. In the case of stone tools, particular emphasis was placed on polished items,
165 given their generally clearer recognition and classification attributes. Recording of chipped
166 stone tools primarily encompassed surface-retouched arrow/spear points, daggers, sickles, and
167 axes, all of which adhere to established typological criteria. A variety of informal small tools,
168 such as scrapers and knives, were thus left out of the database.

169

170 In terms of pottery finds, recognizable types and the relative quantities of sherds associated
171 with them were covered under each catalogue main number., i.e., single vessels were not
172 attempted to be separated from the material, except to limited excess in the case of Iron Age
173 pottery. Within the Iron Age material, certain bulk finds (clay daub) and objects that are difficult
174 to identify to a specific sub-period (knives, rings) were not recorded as they generally do not
175 contribute significantly to a database concentrating on chronologically and typologically
176 identifiable objects. It should be noted that many of the Iron Age finds in Finland originate from
177 sites that may have been used for centuries, and the find contexts do not always provide a clear
178 indication for exact dating of the material; some of the items, such as certain iron tools and
179 ceramic types, were used until the Middle Ages.

180

181 Apart from the measurable qualities of the artefacts, the information gathered is subjective to
182 some degree. Most notably, type definitions and in some cases also mineralogical
183 identifications of material are relatively intuitive and should not be treated as absolute verities.
184 Some consistency was tried to be kept on by limiting the number of persons filling in the
185 database: Stone Age entries were made only by P. Pesonen and J. Saipio, Bronze Age entries
186 solely by J. Saipio, and Iron Age by U. Moilanen and J. Tiilikkala. Relevant source books were,
187 of course, referenced periodically. The consistency of identifications will help future work if
188 categorizations have to be modified or corrected.

189

190 Certain aspects still require attention, particularly the completion of the Iron Age artefacts.
191 Approximately 45-50% of the Finnish Iron Age material needs to be added to the database (this
192 estimate excludes the metal detector finds made during the past two decades).¹ Additionally,
193 the documentation of Stone Age stone tools is not entirely complete. There are plenty of local
194 museums in Finland, and most of these have a few or a few dozen stone axes and chisels,
195 which were not possible to record during the current project. Within the collections of the
196 National Museum of Finland, recording of stone artefacts acquired in the 1910s and 1920s is
197 unfinished, and the same, to some extent, applies also to the collections of Ålands Museum and
198 Tampere Museum. The geographical focus of the database currently emphasises southern
199 Finland since it was not possible to study the collections of museums in northern and eastern
200 Finland because of the lockdown of museums during the coronavirus pandemic in 2020.

201

202 During the collection work, almost all the items were also photographed with an intention to
203 include them as an essential part to the database. This extensive collection of photographs is

204 also deposited in the Zenodo repository: <https://zenodo.org/records/10417384>. The usability of
205 this photo collection will be improved in the future within the URHIA user platform.
206

207 Spatial information

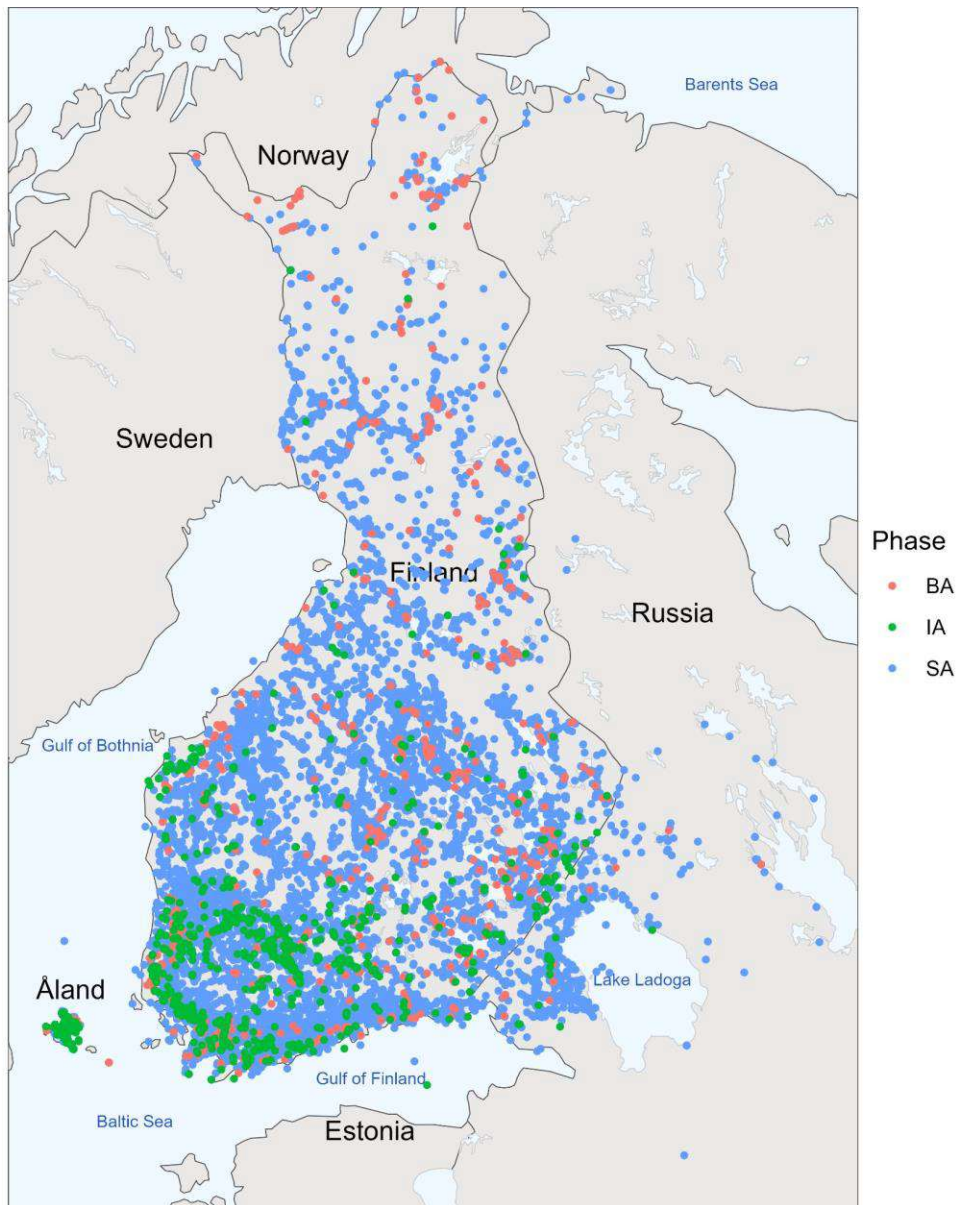
208 AADA captures the geographical context of artefacts, detailing where each item was
209 discovered. Unlike characteristics that are period-specific and vary based on the era being
210 studied, spatial information has a universal relevance across all time periods. It provides a
211 foundational framework for understanding the geographical distribution, relationships, and
212 contextual significance of the artefacts and archaeological findings. The potential of spatial
213 distributions and reproducibility is exemplified with the compatible R-script which highlights the
214 significance of visualisation opening novel insights into multidisciplinary research. Moreover, the
215 incorporation of geospatial information offers a valuable tool for digital humanities studies. This
216 involves exploring the interaction between spatiality and temporality, considering scalability and
217 representativeness. R, as a programming language and statistical software, offers significant
218 advantages for analyzing extensive spatial datasets such as the AADA database. Unlike
219 traditional desktop GIS software, which necessitates loading the entire dataset into memory
220 before querying or visualizing, R enables users to efficiently work with the data. Through
221 coding, users can selectively query relevant portions of the dataset, leading to accelerated data
222 exploration and visualization processes. The R-script provided in this article serves as a
223 valuable tool for researchers interested in delving into the spatial dimensions of archaeological
224 datasets.

225 The geographical focus of the database is currently mostly on Finland (Figure 3). The database
226 includes geographical find coordinates for each artefact, enabling the creation of maps that
227 present artefact distributions in a clear and accessible way. Importantly, maps also allow for
228 assessing spatiotemporal relationships and trends between artefact and material types.

229 As an example, spatial distributions of different stone tool typologies during the Stone Age
230 (Figure 4), variations of contemporaneous artefacts in the Bronze Age (Figure 5), Iron Age
231 (Figure 6) and the change of overall activity from Late Mesolithic to Middle Neolithic (Figure 7)
232 can be reproduced with accompanied R-script document (Supplementary file 1) tailored for the
233 AADA database.

234 AADA has already been utilised for showcasing this in earlier phases of the database project.³⁻⁷

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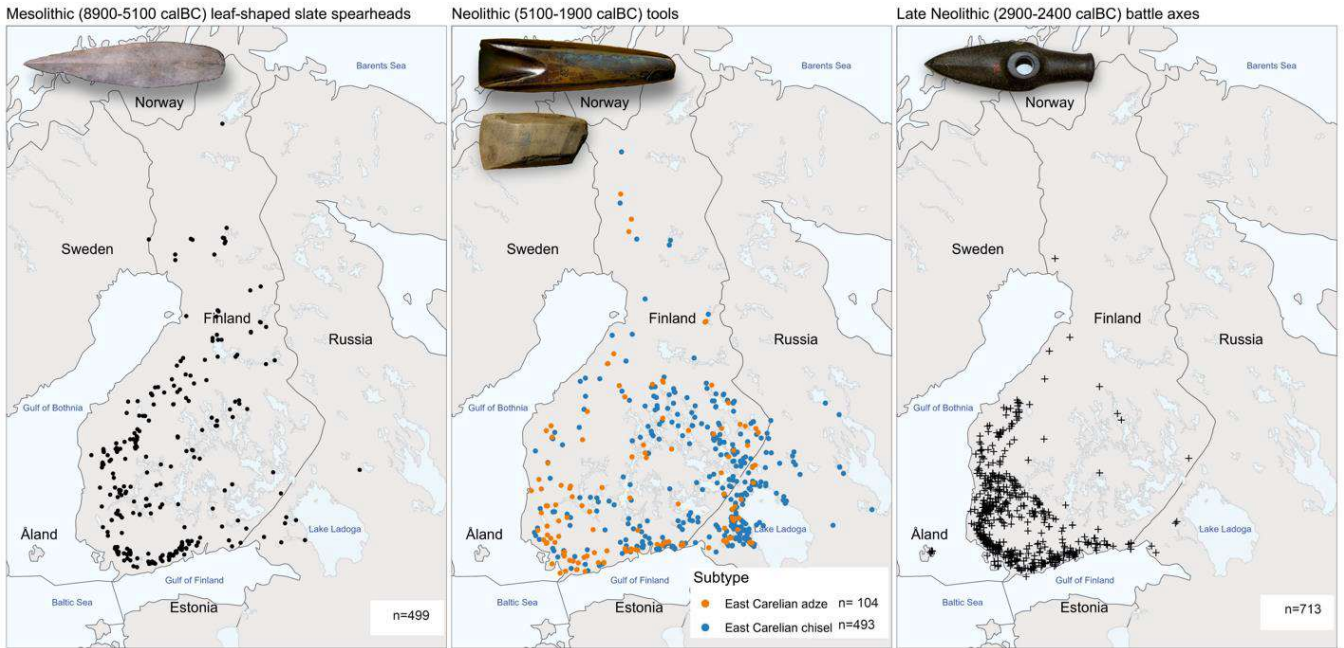
236

237 *Figure 3. The geographical representativeness of items (n= 47935) in the AADA database, divided into*
 238 *three chronological periods (phases): Stone Age (SA), Bronze Age (BA), Iron Age (IA).*

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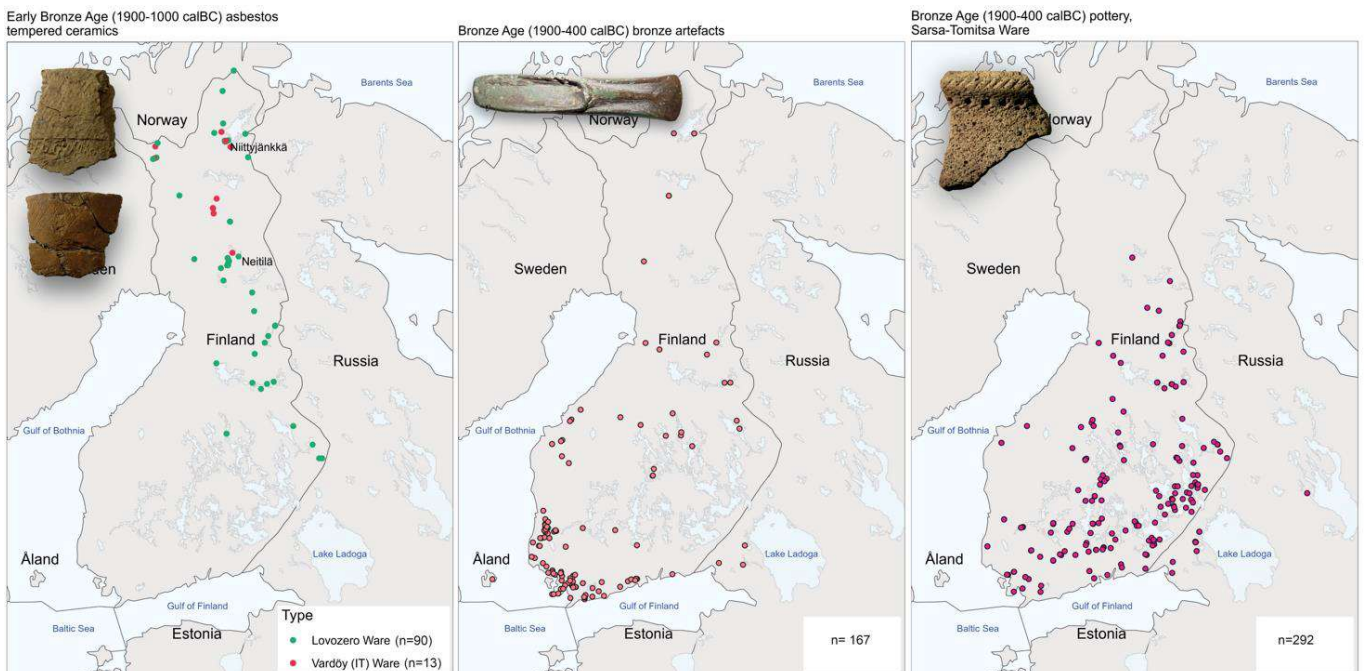
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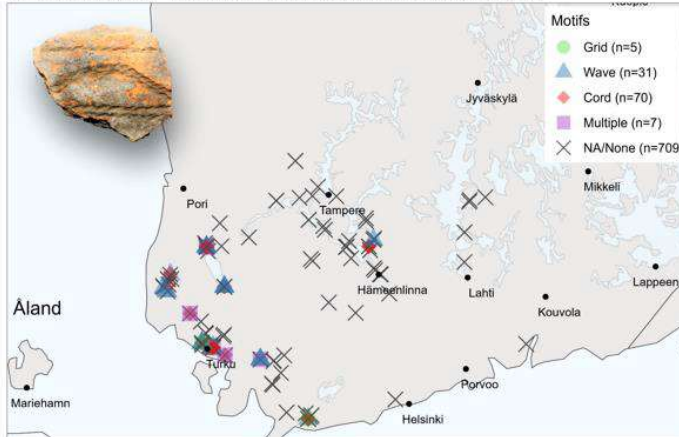
243 *Figure 4. Examples of Stone Age stone tool entries plotted on the map of Finland. a) Leaf-shaped slate*
 244 *spearheads from the Mesolithic period (spearhead from Jalasjärvi Laulaja, KM 20648:2, b) East Carelian*
 245 *adzes and chisels from Early and Middle Neolithic periods (adze from Parikkala, KM 253, chisel from*
 246 *Räisälä Kökkölä, KM 1922:232), and c) Battle axes from the Late Neolithic (battle axe from Sastamala*
 247 *Tyrvää, KM 452). Photos by Petro Pesonen.*



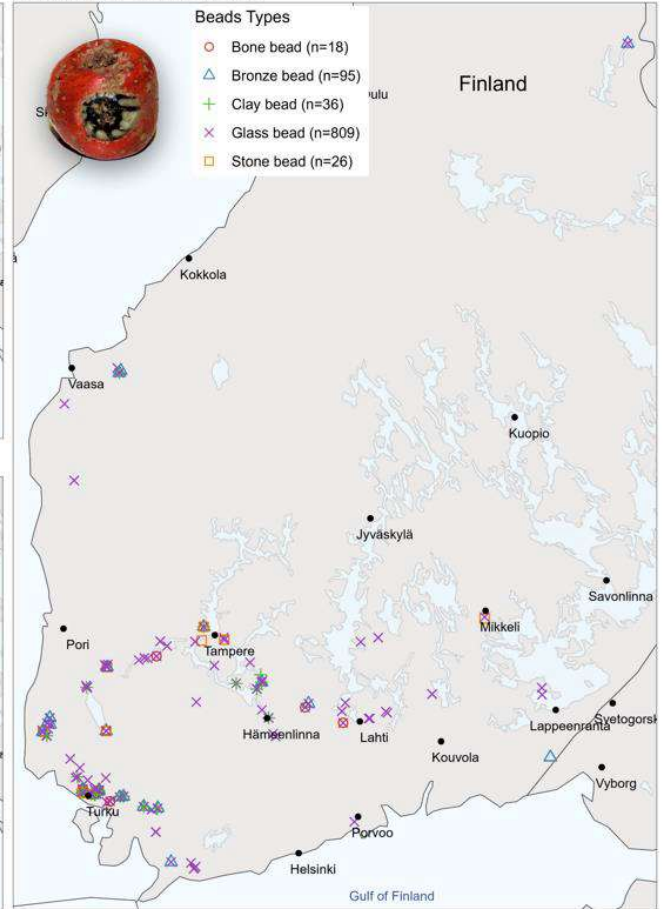
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249 *Figure 5. Examples of Bronze Age artefacts (c. 1900-500 calBC) plotted on the map of Finland, a) Early*
 250 *Bronze Age pottery of northern Finland: Lovozero Ware (green dots, the sherd in left from Kemijärvi*
 251 *Neitilä 4, KM 16145:2122, photo Petro Pesonen) and Vardöy Ware (also called Imitated Textile (IT)*
 252 *pottery, red dots, the sherd in right from Inari Niittyjäykkä, KM 26240:1, photo Petro Pesonen), b) Bronze*
 253 *Age bronze artefacts (palstave, KM 14532 from Raasepori Landsbroström, photo Jarkko Saipio), c)*
 254 *Sarsa-Tomitsa Ware (KM 22495:1 from Virolahti Mattila, photo Petro Pesonen).*

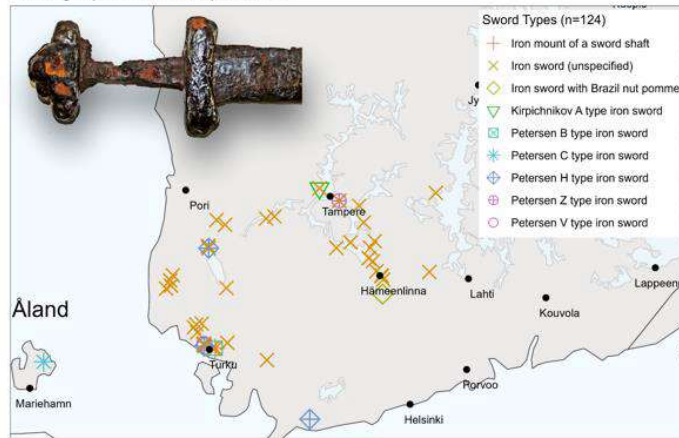
Iron Age (500 calBC - 1250 AD) pottery decoration types (separate sites)



Iron Age (500-1250 AD) beads



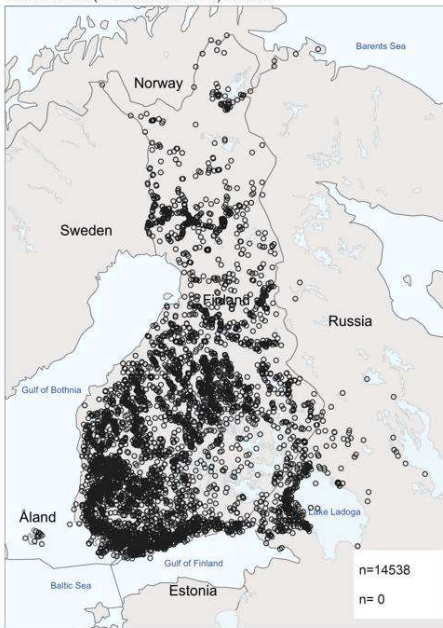
Iron Age (500-1250 AD) swords



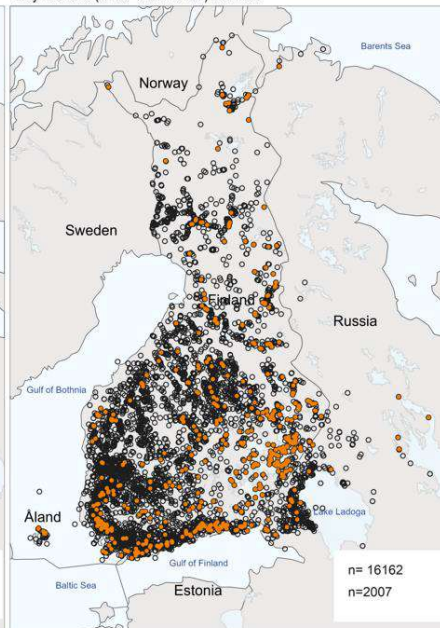
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256 *Figure 6. Examples of Iron Age artefacts plotted on the map of Finland, a) Iron Age pottery decoration*
 257 *types (wave decoration on a sherd from Raasepori Domargård, KM 21634:1648), b) Iron Age sword*
 258 *types (a sword from Eura Luistari, KM 17847:1), c) Iron Age bead types (a glass bead from Lahti*
 259 *Paakkolanmäki, KM 21967:1). All photos by Ulla Moilanen.*

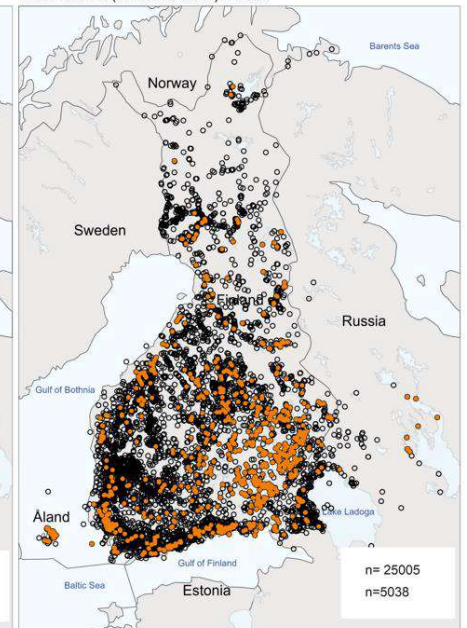
Late Mesolithic (6200-5100 calBC/AD) artefacts



Early Neolithic (5100 - 3900 calBC) artefacts



Middle Neolithic (3900-3400 calBC) artefacts



260
261

262 *Figure 7. Examples of period-wise plotted artefact distributions, a) Late Mesolithic artefacts (black dots, c.*
263 *6200-5100 calBC), b) Early Neolithic artefacts (c. 5100-3900 calBC, orange dots (n= 2007) denoting*
264 *Early Neolithic pottery and clay artefacts; black dots (n= 16162) all the other Early Neolithic artefacts),*
265 *and c) Middle Neolithic artefacts (c. 3900-3400 calBC, orange dots (n= 5038) denoting Middle Neolithic*
266 *pottery, clay, and amber artefacts; black dots (n= 25005) all the other Middle Neolithic artefacts).*
267 *Intensification of “Neolithic” type of artefacts (pottery, clay artefacts and amber) can be observed*
268 *throughout southern Finland and especially in the southeastern Lake Saimaa region, which was*
269 *transgressive until the beginning of the Middle Neolithic 3900 calBC.⁸*
270

271 Data Records

272
273 The original data was stored as interconnected tables in an Access database, where the SiteID
274 connected specific site locations to individual artefacts. The tables in the database contain
275 detailed information and typology for specific artefact categories. These tables were converted
276 into Excel workbooks, where each entry is linked to corresponding sites with coordinates.
277

278 The AADA database is thematically organised into three Excel workbooks according to the
279 chronological periods: Stone Age, Bronze Age, and Iron Age periods (Table 1). Each row in the
280 database represents a single artefact, while each column represents a specific attribute, such
281 as its type, period, site, and measurements. Moreover, each workbook contains spreadsheets
282 based on artefact type (Figure 1). For example, for the Stone Age period, there are separate
283 tables for pottery, stone tools, clay artefacts, bone artefacts, wooden artefacts, amber, and birch
284 bark tar. Similarly, for the Bronze Age period, there are separate tables for pottery, stone tools,
285 clay artefacts, bone artefacts, wooden artefacts, and bronze objects. For the Iron Age period,
286 there are separate tables for pottery, stone tools, clay artefacts, bone artefacts, wooden
287 artefacts, bronze artefacts, iron artefacts, silver and golden artefacts, beads, and organic
288 materials. In addition, due to chronological period dependent recording procedures, the Iron
289 Age table also contains a detailed table of pottery and stone tools (where e.g., the dating is
290 specified according to Iron Age subperiods).
291

292 Pottery tables differ from the rest of the tables, which are constructed an artefact per row.
293 Within the pottery table, each row denotes the presence of a certain pottery type in a certain
294 collection number, i.e., the presence does not record how many vessels etc. there are in the
295 collection number. Some measure of the quantity is expressed in “count” columns (see below).
296

297 The AADA data is stored and managed in GitHub. The Excel workbooks of the AADA database
298 are stored as a snapshot in Cern’s Data Centre’s Zenodo-repository including photographs
299 (<https://zenodo.org/records/10437704> and <https://zenodo.org/records/10417384>). The database
300 is freely and openly available to anyone with the condition of mentioning this publication as a
301 reference when using the data in publications.
302
303
304
305

306 General and spatial information

307 The AADA database contains primary information on archaeological artefacts from different
308 prominent institutions across Finland, such as the National Museum of Finland, Ålands
309 Museum, and Turku Museum Centre, among others. These artefacts are organised using a
310 main number and sub-number system. Additionally, the database includes information on the
311 municipality. Overall, the primary information contained in the AADA database serves as a
312 starting point while querying data.

313 **Collection** contains source information of 32 museums: KM = Kansallismuseo (National
314 Museum of Finland); ÅM = Ålands Museum; TYA = Turun Yliopisto Arkeologia (University of
315 Turku, Archaeology); TMM = Turun museokeskus (Turku Museum Centre; current signum is
316 TMK but database uses TMM); SatM = Satakunnan Museo (Museum of Satakunta); KHMESIE
317 = Kuopion kulttuurihistoriallinen museo (Kuopio Cultural History Museum ; EKM = Etelä-
318 Karjalan museo (Museum of South Karelia) ; BM = Porvoon Museo (Porvoo Museum,sw. Borgå
319 Museum); HM = Hämeen museo (Häme Museum, in Museum Centre Vapriikki, Tampere); Hal
320 = Halikon museo (Halikko Museum, part of Salo Historical Museum); Per = Perniön museo
321 (Perniö Museum, part of Salo Historical Museum); Linder = Linder collections in Turku Museum
322 Centre; Nyberg = Nyberg collections in EKTA Museum Raasepori; SII = Pöljän kotiseutumuseo
323 (curated by Kuopio Cultural History Museum); KARTT/VI = Karttulan kotiseutumuseo (curated
324 by Kuopio Cultural History Museum); KIUR = Kiuruveden museo (Kiuruvesi Museum, curated
325 by Kuopio Cultural History Museum); Lauri Nautela kok = Lauri Nautela Museum, Lieto; SHH =
326 Stockholm Historiska Museet, Sweden.

327 **Main numbers and Sub-numbers** organise collections, e.g., KM 12456:1–25, where KM
328 indicates the National Museum of Finland's collection with the main number 12456, which has
329 sub-numbers 1 to 25.

330 **Municipality, Site id and Site name.** The municipality categorises archaeological artefacts by
331 their place of origin municipality-wise. The database reflects the situation as of 2020, although
332 several municipalities have since merged. Old parish names are used for the ceded Karelia and
333 other areas (prior 1945). Site names and identification numbers are in accordance with the
334 Ancient Relics Register curated by the Finnish Heritage Agency.

335 **Coordinates (p/i/z).** AADA's coordinate reference system (CRS) is "KKJ / Finland Uniform
336 Coordinate System", with the EPSG identifier 2393 (<https://epsg.io/2393>). Z is for the elevation
337 of the site above sea level. "i" stands for easting ("itä" in Finnish), and "p" stands for northing
338 ("pohjoinen" in Finnish).

339

340 Temporal information

341 **Phase.** Information on the chronological period of the artefact, with SA denoting the Stone Age
342 (8900-1900 calBC), BA representing the Bronze Age (1900-500 calBC), and IA indicating the
343 Iron Age (500 calBC-1300 calAD).

344 **Period/dating.** The dating of the artefacts in the AADA database varies according to material.
345 In most tables (pottery, stone tools, clay, bronze, iron, beads) the dating is based on the
346 typology of the artefacts. In some tables, other datable finds from the same site are used as

347 dating criteria, i.e., thus providing a wider range of dating options for the object, including
348 materials such as amber, bone, birch bark, and wood. The periodization for Late Iron Age
349 differs in western, eastern, and northern Finland. Late Iron Age is generally extended to at least
350 c. 1300 AD in eastern Finland and Karelia, and occasionally even longer in northern Finland.

351 Typological information

352 **Typology (category, types, subtypes).** The artefacts in the database are organized
353 hierarchically by typology, which includes category, type, and subtype. For example, the
354 category of Stone Age bark floats is "wooden artefact," the type is "fishing implements," and the
355 subtype is "bark float." In some cases, such as Stone Age stone tools, there is also a lower
356 subtype hierarchy (subtype 2) . In addition, the Finnish terms for subtype (and subtype 2) are
357 presented as well.

358

359 Site context information

360 **Settlement, cremation cemetery, inhumation cemetery, cairn, stray find, hoard, other**
361 **context.** For Iron Age artefacts, the main type of find context is also recorded: inhumation
362 cemetery, cremation cemetery, cairn, settlement site, hoard, and stray find. This attribute gives
363 a contextual information of the find circumstances, which is crucial for understanding many of
364 the distributions of the Iron Age artefacts.

365

366 Other information

367 **Object attributes (certainty, integrity, measures, crust etc).** Object attributes, such as
368 integrity and measures, differ depending on the material. Certainty indicates the database
369 compiler's subjective identification of the artefact type, with 1 meaning certain, 2 meaning
370 probable, and 3 meaning possible. The integrity is indicated with a TRUE/FALSE statement in
371 the relevant column. The intact and fragmented artefacts' dimensions are recorded in separate
372 columns (length, width, thickness). For pottery, the main temper and other tempers are
373 explained in two columns, currently in Finnish. If present, the decorative motifs on Iron Age
374 pottery are recorded. However, the documentation of stone tool material is only available in
375 Finnish and is based on a quick and superficial visual inspection, making it very subjective.
376 Therefore, the recorded information on stone tools should only be considered suggestive. For
377 Iron Age pottery, a separate "crust"-column was used to record the presence of food crusts in
378 the surfaces of the pottery. In Stone and Bronze Age potteries this is written (in Finnish,
379 "karsta") in other notes -column.

380 **Count (only pottery).** The number of pottery sherds is recorded in three columns (count 1-10,
381 count 10-100, and count >100 sherds) to indicate their relative amount.

382 **Other notes.** This column has some additional information which is perhaps relevant for the
383 database users. The notes are in Finnish.

384 **Photos.** An individual photo identifier for the artefacts. Not used in pottery tables.

385

386 Technical Validation

387

388 The artefacts kept in the collections of the National Museum of Finland, regional museums and
389 various local museums form the backbone of the archaeological record in Finland. The ancient
390 sites and artefacts have been protected by law and they have been the property of the
391 government ever since the 1600s. There is no particular geographical or typological skew in
392 collections related to the market value of finds, and their availability to museums (but there
393 definitely are distortions, e.g., due to the patterns of modern land use which has defined where
394 archaeological rescue excavations have taken place). The geographical location of the find
395 spots are in most cases confirmed by professional archaeologists, nowadays with GPS-based
396 instruments. Many of the oldest finds' locations of discovery are not, however, accurate but may
397 only express the parish, village, or farm where the find was discovered. This should not,
398 however, be a major disadvantage. The database still enables performing spatial data analyses
399 which may well reveal hitherto unknown typological groups and traits and lead to better and
400 even more objective categories. This is perhaps one major future task to be carried out.

401 Usage Notes

402

403 The archaeological artefact database forms the baseline for any artefact-oriented study in
404 Finland. The database has relevance also to the prehistory of the neighbouring areas,
405 Northwest Russia, Estonia, and the Baltic area as well as Scandinavia and the whole Sapmi.
406 With the geographical location data, it is possible to make spatial enquiries into the database
407 and to retrieve local artefact histories. The major advantage of the database is, however, its
408 promise in boosting digital humanities. It provides an easy and costless entry to the
409 archaeological artefacts of Finland even at the times of lockdowns of museums. Further, the
410 collection of measurements and notes on the tools makes a powerful backbone for researchers
411 of other disciplines and lay audience to approach the archaeological data as well. Finally, an
412 easily accessible digital database opens new avenues for interdisciplinary innovative research
413 on the prehistory of Finland.

414

415 Code Availability

416

417 No custom code has been used in the collecting and creation of this data. In the database,
418 Scandinavian letters have been used in place names and in the descriptive parts of those data
419 entries that are in Finnish. In the future version we will extend the translations to also cover
420 some of the parts of the database that are now only in Finnish. In addition, Swedish terms for
421 artefact categories, types and subtypes will be added. R-script created to help others to reuse
422 the data is available in Supplement 1.

423

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435

436 Author contributions

437 The collaborative initiative engaged Petro Pesonen (PP) and Ulla Moilanen (UM) in database
438 conception and design, alongside with Jarkko Saipio (JS), and Jasse Tiilikkala (JT) in data
439 collection. PP and Meeli Roose (MR) curated datasets and constructed the database structure.
440 The first draft of the manuscript was written by PP, UM, and MR, with valuable input from all
441 authors during successive revisions. Figures and tables were crafted by PP and MR, reviewed by
442 UM, Outi Vesakoski (OV) and Päivi Onkamo (PO). MR wrote the database supplementary material
443 of geospatial framework. Usman Sanwal (US) played a crucial role in managing data versioning
444 and facilitating the data sharing process to repositories. OV and PO led intellectual content
445 development and critical review, culminating in final approval by OV, PO, and Visa Immonen
446 (VI). Because of the unique roles and inputs in collecting the database and preparing the
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448

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