The origins of pottery in East Asia: updated analysis (the 2015 state-of-the-art)

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ABSTRACT – *Recent developments related to the emergence of pottery in East Asia and neighbouring regions are presented. According to a critical evaluation of the existing evidence, the oldest centres with pottery in East Asia are situated in South China (dated to* c. *18 000 calBP), the Japanese Islands (*c. *16 700 calBP), and the Russian Far East (*c. *15 900 calBP). It is most likely that pottery-making appeared in these regions independently of each other. In Siberia, the earliest pottery now known is from the Transbaikal region (dated to* c. *14 000 calBP). However, it did not influence the more westerly parts of Siberia in terms of the origin and spread of pottery-making.*

IZVLEČEK – *Predstavljamo najnovejši razvoj študij pojava lončarstva v Vzhodni Aziji in sosedstvu. S pomočjo kritične presoje podatkov lahko sklepamo, da so najstarejši centri z lončenino v Vzhodni Aziji umeščeni v južno Kitajsko (ok. 18 000 calBP), Japonsko otočje (ok. 16 700 calBP) in Daljni Vzhod Rusije (ok. 15 900 calBP). Zelo verjetno se je izdelava lončenine v teh regijah pojavila neodvisno druga od druge. V Sibiriji je najstarejše lončarstvo poznano na področju Trans-bajkala (ok. 14 000 calBP). Vendar to ni vplivalo na razvoj in širjenje lončarske tehnologije v zahodne dele Sibirije.*

KEY WORDS – *pottery; East Asia; China; Japan; Russian Far East; Siberia; Transbaikal; radiocarbon dating; Late Glacial*

Introduction

The emergence of pottery is one of the most important phenomena in prehistory (*e.g., Jordan, Zvelebil 2009; Kuzmin 2013a*). Although it is now widely accepted that the oldest vessels made of fired clay appeared first in greater East Asia, encompassing modern China, Japan, and the Russian Far East (*e.g., Kuzmin 2006; Boaretto* et al. *2009*), debates about the exact location and timing of the earliest pottery-making cultural complexes have continued (*Wu* et al. *2012; Kuzmin 2013a; 2013b; Cohen 2013*). Recent attempts to model the spread of pottery technology in the Old World using the radiocarbon (^{14}C) dates of ceramic-bearing sites and the ambiguous results obtained (see *Kuzmin 2013b; 2014; Silva* et al. *2014*) highlight the necessity of a thorough evaluation of the existing records.

The aim of this paper is to give an updated analysis of the data on the earliest pottery from greater East Asia and neighbouring Siberia as of mid-2015 in order to introduce new information and its critical evaluation to the international scholarly community.

Material and methods

Recent overviews on the emergence of pottery among hunter-gatherers in East Asia and the neighbouring regions are used here as background (*Dikshit, Hazarika 2012; Cohen 2013; Kuzmin 2013a; Gibbs, Jordan 2013; Gibbs 2015*). The newly released data on the early pottery from the Transbaikal (southern part of Eastern Siberia) (*Razgildeeva* et al. *2013*) are incorporated into the existing dataset for this region (*Kuzmin 2013a; Kuzmin, Vetrov 2007; McKenzie 2009*) and interpreted. Information on the Gromatukha site in the Russian Far East, published previously by Japanese scholars (see *Kani 1992; Jomon 1996a; 1996a*), is discussed in the

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light of a new study conducted by Shevkomud and Yanshina (*2012*).

The evaluation of ^{14}C dates for the early pottery complexes is crucial for understanding the origins and spread of ceramics in the Old World, and it is provided here for all the earliest pottery complexes. The calibration of ^{14}C dates was conducted with the help of the Calib 7.0.2 computer programme (*Reimer* et al. *2013*) at ± 2-sigma, and all possible intervals are combined and rounded to the next ten years (see Tab. 1).

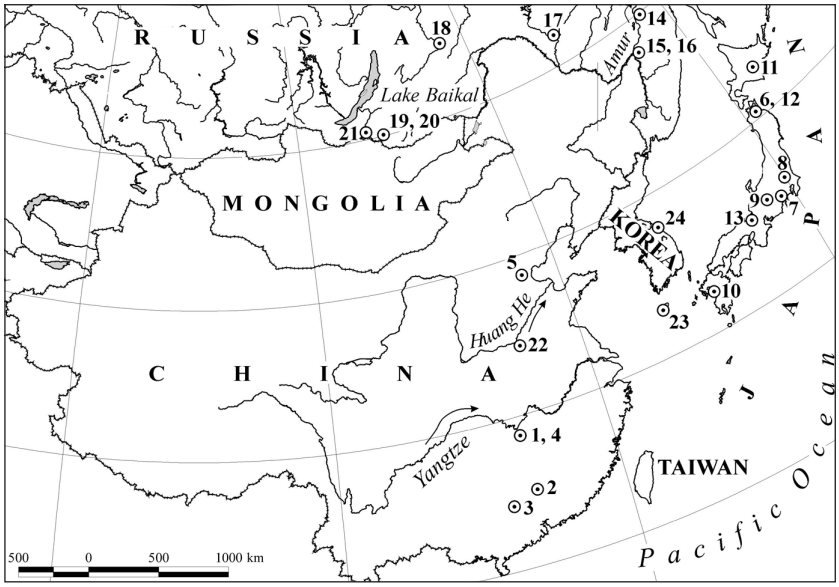

Fig. 1. Location of archaeological sites mentioned in the text. 1 Xianrendong Cave; 2 Yuchanyan Cave; 3 Miaoyan Cave; 4 Wang Dong Cave; 5 Nanzhuangtou; 6 Odai Yamamoto 1; 7 Kitahara; 8 Tokumaru Nakata; 9 Nakamachi; 10 Senpukuji Cave; 11 Taisho 3; 12 Omotedate; 13 Torihama; 14 Khummi; 15 Gasya; 16 Goncharka 1; 17 Gromatukha; 18 Ust-Karenga 12; 19 Studenoe 1; 20 Ust-Menza 1; 21 Ust-Kyakhta; 22 Lijiagou; 23 Kosanni; 24 Osanni.

Results and discussion

China

The results of additional studies at the Xianrendong Cave in southern China (Fig. 1) conducted in 2009 were recently published by Wu *et al.* (*2012*). According to these authors, the ^{14}C dates of the oldest site's component with pottery are *c.* 16915 BP (western section) and *c.* 17 105 BP (eastern section), correspond to the calibrated age ranges of 19 950–20 880 calBP and 20 440–20 850 calBP, respectively. If true, this would be the earliest pottery in the Old World.

However, several crucial issues allow me to cast doubt on these ^{14}C dates: (1) there is no direct association between the deer bone samples collected by Xiaohong Wu *et al.* (*2012*) and the potsherds: "*We did not recover any sherds from the reopened sections ... [in 2009]*" (*Wu* et al. *2012.1697*); (2) a ^{14}C date obtained previously from Stratum 3C1A, the second earliest site component with pottery – 12 530 ± 140 BP (BA95145) (*MacNeish 1999.238; Kuzmin 2013a.544*) – was ignored by Wu *et al.* (*2012*) despite the fact that it is much younger than the rest of the ^{14}C values from this layer at *c.* 13 885–16 340 BP (*Wu* et al. *2012.1698*); (3) some ^{14}C dates, which do not fit the age model suggested by Wu *et al.* (*2012*), were declared as 'outliers' without any reasonable explanation (see *Kuzmin 2013a.544*).

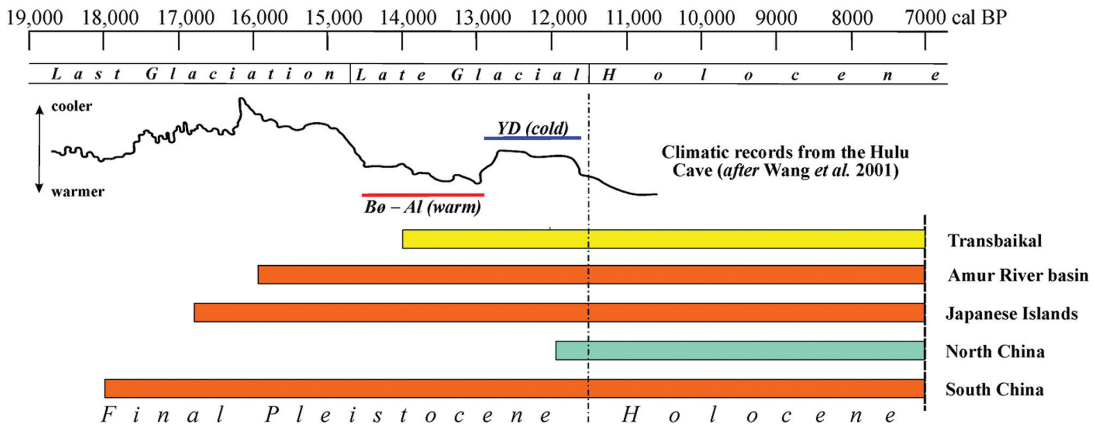

Fig. 2. Chronology of the earliest pottery complexes in greater East Asia and Siberia, on the background of climatic changes. Abbreviations: Bø-Al – Bølling-Allerød; YD – Younger Dryas.

Site	14C date, BP	Lab code and No.	Material dated	Calendar age, cal BP**	Reference
South China					
Yuchanyan Cave	14 800 ± 55	RTB 5464/BA06864	charcoal	17 830–18 190	*Boaretto* et al. *2009*
Miaoyan Cave	13 710 ± 270	BA92034-1	charcoal	15 820–17 380	*Yuan* et al. *1995*
Xianrendong Cave	12 430 ± 80	UCR-3561	charcoal	14 160–14 990	*MacNeish 1999*
Wang Dong Cave	11 500 ± 150	BK95138A	charcoal	13 060–13 700	*MacNeish 1999*
North China					
Nanzhuangtou	10 210 ± 110	BK-87075A	charcoal	11 400–12 390	*Yuan* et al. *1992*
Japanese Islands					
Odai Yamamoto 1	13 780 ± 170	NUTA-6510	adhesion	16 170–17 180	*Nakamura* et al. *2001*
Kitahara	13 060 ± 80	Beta-105398	ch. wood	15 320–15 920	*Keally* et al. *2003*
Tokumaru Nakata	12 770 ± 225	PAL-383	wood	14 240–15 860	*Keally* et al. *2003*
Nakamachi	12 740 ± 380	GaK-9624	charcoal	13 850–16 180	*Keally* et al. *2003*
Senpukuji Cave	12 220 ± 80	MTC-11296	adhesion	13 820–14 520	*Sato* et al. *2011*
Taisho 3	12 460 ± 40	Beta-194629	adhesion	14 270–14 960	*Yamahara 2006*
Russian Far East					
Khummi	13 260 ± 100	AA-13392	charcoal	15 640–16 240	*Kuzmin* et al. *1997*
Gasya	12 960 ± 120	LE-1781	charcoal	15 150–15 870	*Okladnikov, Medvedev 1983*
Goncharka 1	12 500 ± 60	LLNL-102169	charcoal	14 300–15 070	*Shevkomud 1997*
Gromatukha	12 380 ± 70	MTC-05937	charcoal	14 110–14 850	*Nesterov* et al. *2006*
Transbaikal (Eastern Siberia)					
Ust-Karenga 12	12 180 ± 60	AA-60210	charcoal	13 840–14 240	*Kuzmin, Vetrov 2007*
Ust-Karenga 12	11 240 ± 80	GIN-8066	charcoal	12 930–13 280	*Kuzmin, Vetrov 2007*
Studenoe 1	11 960 ± 80	TKa-15554	adhesion	13 580–14 020	*Razgildeeva* et al. *2013*
Studenoe 1	11 995 ± 150	AA-33040	charcoal	13 470–14 210	*Buvit* et al. *2003*
Studenoe 1	11 730 ± 60	MTC-16736	adhesion	13 450–13 720	*Razgildeeva* et al. *2013*
Ust-Menza 1	11 550 ± 50	MTC-16738	adhesion	13 280–13 470	*Razgildeeva* et al. *2013*

* Only the oldest ^{14}C dates for each site are listed here; for more complete information, see the relevant references.
** The IntCal13 dataset (*Reimer* et al. *2013*) is used.
a These dates are re-calculated (see *Kuzmin 2013a*).
b Only selected oldest sites (with ^{14}C dates older than *c.* 12 000 BP) are included; see the full list in Keally *et al.* (*2003*).
c Food remains on the surface of pottery (*e.g.*, *Nakamura* et al. *2001*).
d Charred wood.
e Bulk sample collected from Layer 7.
f Sample collected from a hearth in Layer 7.
g Sample collected from Layer 9G.
h Samples collected from Layer 8.

Tab. 1. The earliest East Asian and Siberian sites with pottery and their ^{14}C dates (from* Kuzmin 2013a*, with additions*).

The disturbed nature of the Xianrendong Cave profile can be easily demonstrated by information provided by Wu *et al.* (*2012*). For example, age-depth reversals are common at this site; here, there are ^{14}C dates which contradict the stratigraphic 'integrity' sensu David J. Cohen (*2013*) (layers are listed from top to bottom): (1) Layer 3B1: *c.* 14 610 BP (BA 093181), it is much older than the ^{14}C dates from both underlying and overlapping layers, *c.* 12 240–12 420 BP; (2) Layer 3B2: *c.* 12 420 BP (UCR3561), it is much younger than the ^{14}C date from overlapping Layer 3B1 at *c.* 14 610 BP (see above); and (3) Layer 3C2: *c.* 15 180 BP (UCR3300), it is much younger than the ^{14}C dates from both underlying and overlapping layers at *c.* 17 580–18 510 BP and *c.* 16 165–18 520 BP, respectively (see *Wu* et al. *2012.1698*). As a result, the chronological model created by Wu *et al.* (*2012*) is heavily biased toward the older ^{14}C dates and completely ignores the possibility of post-depositional mixing of the cultural layers and material for ^{14}C dating.

Cohen (*2013.62*) has stated that "*... these dates [by Wu* et al. *(*2012*)] are reliable due to the internal consistency across a large, systematic series of radiocarbon dates done on samples from stable, stratigraphic contexts ...*". Being aware of criticism by Yaroslav V. Kuzmin (*2013a*), Cohen (*2013*) neverthe-

less accepted the *c.* 20 000–20 900 calBP age for the Xianrendong Cave pottery without addressing the reliability of their 'stratigraphic contexts', which are not secure due to the lack of association between bone samples for ^{14}C dating collected in 2009 and the pottery (see above). Therefore, Cohen's (*2013.62–65*) arguments are not convincing.

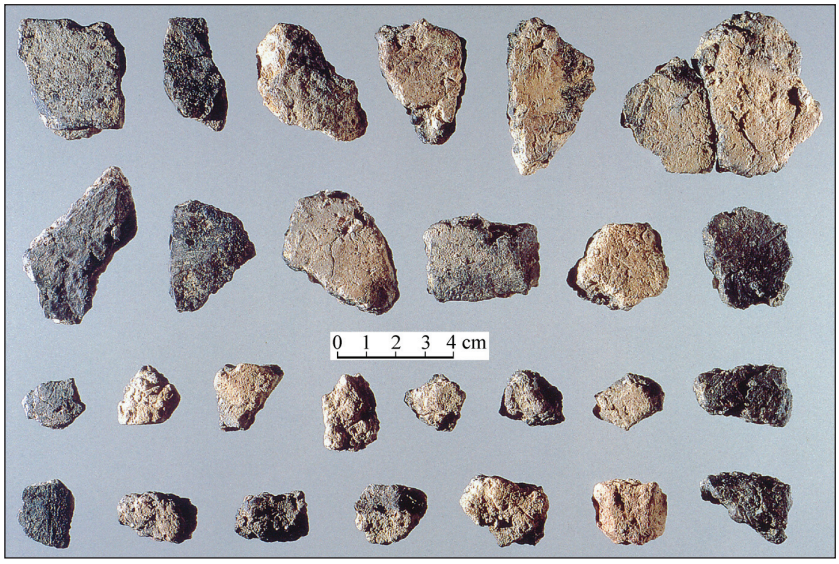

Fig. 3. Potsherds from the Odai Yamamoto 1 site, dated to* c. *13 500–13 800 BP (after* Odai Yamamato 1999*; modified).

Upon critical analysis of the ^{14}C records from the earliest Chinese sites with pottery (*e. g., Kuzmin 2006; 2013a*), it is secure to conclude that the Yuchanyan Cave with ceramics dated to 17 830–18 190 calBP (Tab. 1), centred at 18 010 calBP, represent the oldest case of pottery-making in greater East Asia (Fig. 2). The most reliable age for pottery from the Xianrendong Cave, in my opinion, is *c.* 14 600 calBP. For other sites in South China such as Miaoyan Cave and Wang Dong Cave [Diaotonghuan] (Fig. 1), the age of the earliest potsherd-containing strata is not older than *c.* 16 600 calBP (Tab. 1).

Japanese Islands

Since the publication of summary works in the early 2000s (*Ono* et al. *2002; Keally* et al. *2003; 2004*), supplemented by more recent overviews (*Omoto* et al. *2010; Kuzmin 2013a*), the situation with the earliest pottery corresponding to the Incipient Jomon of Japan has been consistent. The oldest ^{14}C dates, *c.* 13 500–13 800 BP (centred at *c.* 17 000 calBP), come from the northern part of Honshu Island at the Odai Yamamoto 1 site (Fig. 1, Tab. 1). Potsherds found at this site are quite fragmentary (Fig. 3), and it is not possible to reconstruct the vessel's shape. Pottery from other sites is represented mainly by pointed-bottomed vessels (Figs. 4–6), but round-bottomed pots (Fig. 7) and flat-bottomed ones

Fig. 4. Pottery from the Omotedate site, Incipient Jomon (after* Jomon 1996b*; modified).

Fig. 5. Pottery from the Senpukuji Cave (bean-relief design) dated to* c. *12 200 BP (after* Jomon 1996b*; modified).

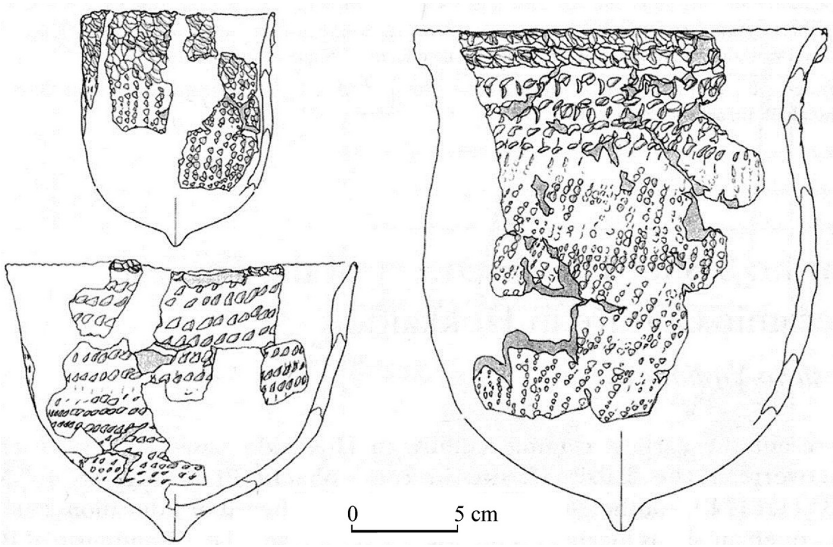

Fig. 6. Pottery from the Taisho 3 site dated to* c. *12 460 BP (after* Yamahara 2006*; modified).

(*e.g., Keally* et al. *2003.4*) are also known. The recent study of lipids in Incipient Jomon pottery indicated that it was used for cooking (*Craig* et al. *2013*); therefore, the function of the earliest ceramics in Japan was utilitarian.

Based on current knowledge, the existence of pottery on the Japanese Islands can be securely established from *c.* 17 000 calBP onwards (Fig. 2, Tab. 1).

The Russian Far East

Since analysis of the main results related to ^{14}C dating of the earliest sites in the Amur River basin (*Kuzmin 2006; 2013a*), the situation has not changed. It is now widely accepted that the first evidence of pottery-making in this region dates to *c.* 12 380–13 260 BP, corresponding to *c.* 14 110–16 240 calBP (Fig. 2, Tab. 1). Flat-bottomed vessels were reconstructed at the Gasya and Goncharka 1 sites (Figs. 8–9). The most probable function of this pottery was utilitarian (*e.g., Medvedev 1995; Kuzmin 2013a*).

The issue of the pottery from the Gromatukha site in the middle course of the Amur River can now be clarified in the light of new research conducted by Igor Y. Shewkomud and Oksana Yanshina (*2012*). Previously, Mikaeil Kani (*1992*) had reconstructed the vessel as round-bottomed (Figs. 10, 11). According to Shewkomud and Yanshina (*2012*), the most common shape of pottery at the lower level of the Gromatukha site, dated to *c.* 12 380 BP (or 14 110–14 850 calBP), is flat-bottomed (Fig. 12).

Why are these reconstructions so different? This question puzzled me for a long time, until I saw the conclusion by Shewkomud and Yanshina (*2012*). After that, I examined the circumstances related to the acquisition of Kani's (*1992*) material. The eyewitness for this is Kumi Kato (*1992*), who participated in the trip when these potsherds were obtained. During the field excursion in 1988 (not in 1991, as Shevkomud and Yanshina (*2012. 220*) assumed), Japanese archaeologists along with Russian colleagues conducted a very brief (four hours only) survey of the Gromatukha site (*Kato 1992.117*). Therefore, it seems less likely that the small Russian–Japanese team was able to dig a proper test pit, as suggested by Shevkomud and Yanshina (*2012.220*). More probably, the potsherds were collected from the talus where the cultural material from all components of the Gromatukha site has accumulated since the large-scale excavations in the 1960s (*Okladnikov, Derevianko 1977*). Because it is now clear that the Gromatukha site contains material of the later Neolithic along with the Initial Neolithic of the Gromatukha complex, it is quite possible that the reconstructed vessel belongs to the Belkachi complex dated to *c.* 3900–6300 BP (*e.g., Mochanov, Fedoseeva 1985; Alekseev, Dyakonov 2009*) with round-bottomed and cord-decorated pottery.

Fig. 7. Pottery from the Torihama site dated to* c. *11 800 BP (after* Jomon 1996b*; modified).

Shevkomud and Yanshina (*2012.221*) noted the single round-bottom fragment recovered from the entire collection of the 1960s excavations at the Gromatukha site, which consists of several hundred potsherds. It might be that this particular piece is not related to the Initial Neolithic complex, because the prevailing paradigm of Aleksei P. Okladnikov and Anatolii P. Derevianko (*1977*) was a gradual development of the Neolithic in the middle course of the Amur River basin, and all the potsherds were described as belonging to the single cultural complex. Therefore, the reconstruction of round-bottomed pottery of the Initial Neolithic at the Gromatukha site (*e.g., Kani 1992; Jomon 1996a; 1996b*) is most probably unreliable. Perhaps, the notion that pottery emerged on the Japanese Islands, which was common in the 1970s and 1980s (*e.g., Aikens 1995*), influenced the reconstruction of the Gromatukha vessel, because Kani (*1992*) assumed that its origin was directly related to the spread of pottery-making from Japan to the neighbouring regions.

Transbaikal

Since the early 2000s, new data on the earliest pottery in the Transbaikal region of Eastern Siberia have been obtained. The Ust-Karenga 12 site is located in the northern part of this territory, on the Vitim Plateau, which is covered by dense forest consisting mainly of Dahurian larch (*Suslov 1961.293–294*), on the border between the middle and southern taiga zones (*Tishkov 2002.219*). Another cluster of sites, Studenoe 1, Ust-Menza 1, and Ust-Kyakhta, is situated in the southern part of the Transbaikal, in the southern taiga zone (*Tishkov 2002.219*). The most important of these are Studenoe 1 and Ust-Menza 1 in the Khilok-Chikoy region (*Suslov 1961. 292–293*) or Dahuria (*Shahgedanova* et al. *2002. 335*), with mountain ranges and river valleys covered by conifer forests (spruce, fir, and Siberian pine) (*Suslov 1961.320*).

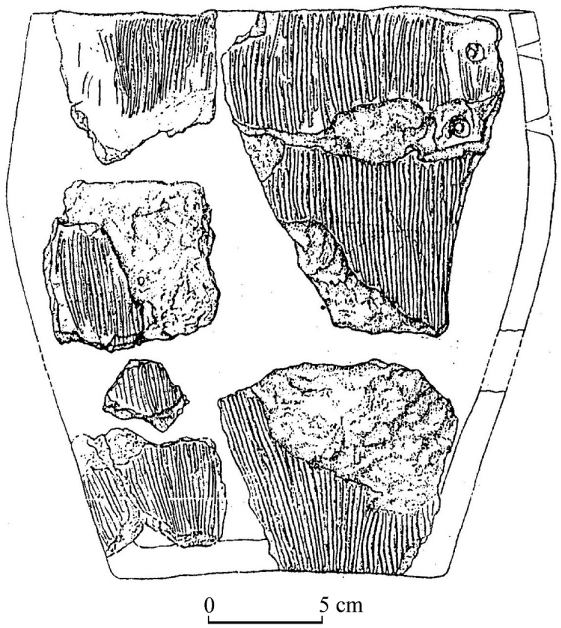

Fig. 8. Pottery from the Gasya site dated to* c. *12 960 BP (after* Derevianko, Medvedev 1995*; modified).

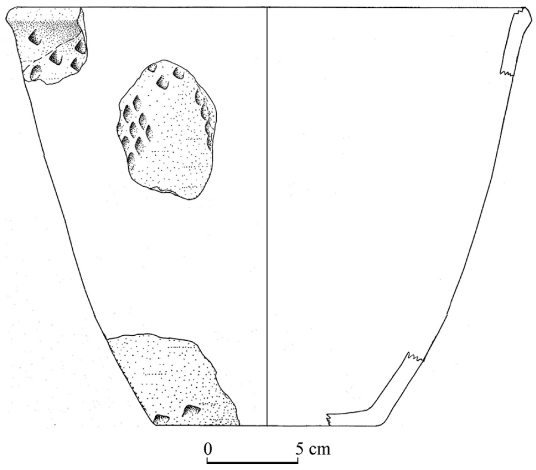

Fig. 9. Pottery from the Goncharka site dated to* c. *12 500 BP (after* Shewkomud, Yanshina 2012*; modified).

In the northern Transbaikal, the age of dispersed charcoal collected from Layer 7 with pottery at the Ust-Karenga 12 site is *c.* 12 180 BP (13 840–14 240 calBP (Tab. 1) (see *Kuzmin, Vetrov 2007*). It was proposed that the most secure estimate is the age of charcoal from a hearth in Layer 7, *c.* 11 240 BP (12 930–13 280 calBP) (see Tab. 1).

As for the southern region, I previously suggested that the earliest pottery from Layer 8 of Studenoe 1 (also known as Studenoe 1/1) site could be as old as *c.* 12 000 BP (13 470–14 210 calBP) (*Kuzmin 2013. 547–548*). Recently, new data were generated by Irina N. Razgildeeva *et al.* (*2013*). Food adhesions attached to the potsherds from Layer 9G (the lowermost stratum with pottery at this site) were ^{14}C dated to *c.* 11 600–11 960 BP; the oldest value corresponds to 13 580–14 020 calBP (see Tab. 1). Several ^{14}C dates of *c.* 11 570–11 730 BP were obtained from food residues on pottery in Layer 8, with the oldest calendar age being 13 450–13 720 calBP (Tab. 1). These new ^{14}C values are in accord with the charcoal date from Layer 8 at *c.* 11 995 BP (13 470–14 210 calBP; see Tab. 1).

Pottery from Layer 9G of the Studenoe 1 site is parabolic in shape (Fig. 13.A), with walls 0.6–0.7cm thick

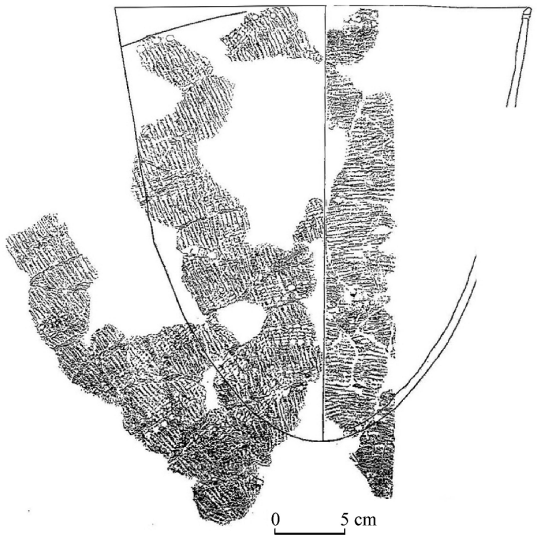

Fig. 10. Reconstruction of pottery from the Gromatukha site (after* Kani 1992*; modified).

Fig. 11. Reconstruction of pottery from the Gromatukha site (after* Jomon 1996a*; modified).

at the rim, and 1.0–1.1cm at the bottom. The clay paste contains plant material added at the time of manufacture. The diameter of the vessel at the rim is 23–32cm, and 17cm at the bottom. On the surface, grooves made by a tool with 8–10 protruding 'teeth' and vertical traces made by cord (perhaps, rope on a stick) are visible. The pottery from Layer 8 (Fig. 13.B) is similar to that from Layer 9G; however, no bottom parts were found (*Razgildeeva* et al. *2013.175*).

Razgildeeva *et al.* (*2013*) concluded that the ^{14}C age for food adhesions at the Studenoe 1 site is older than the ^{14}C values obtained on charcoal, and the former should be *c.* 12 000–13 000 calBP. Perhaps, they are not aware of the charcoal ^{14}C date of *c.* 11 995 BP (*Buvit* et al. *2003*) corresponding to 13 470–14 210 calBP. This value fits perfectly well with the age of the food remains, and in my opinion, the pottery from the Studenoe 1 site can now be securely dated to *c.* 12 000 BP (centred at *c.* 13 840 calBP).

The earliest pottery from the Ust-Menza 1 site was recently ^{14}C dated for the first time (*Razgildeeva* et al. *2013*). Previously, it was associated with the Early Holocene, *c.* 8715 BP (*e.g., Kuzmin, Orlova 2000*). The age of food adhesion on pottery from Layer 8 is *c.* 11 500 BP (13 280–13 470 calBP; Tab. 1). Potsherds are quite fragmentary, but their overall appearance is similar to the pottery from the Studenoe 1 site (*Razgildeeva* et al. *2013.176*). The ^{14}C date on food residue is considered older than its real age judging from the ^{14}C value of *c.* 10380 BP (11 350–12 710 calBP) in the underlying Layer 11 (see *Razgildeeva* et al. *2013.172*), and the 'true' age of the pottery from Ust-Menza 1 was suggested as *c.* 12 000–13 000 calBP (*Razgildeeva* et al. *2013*). In my opinion, the ^{14}C dating of adhesions is quite reliable, as in the case of the Studenoe 1 site (see above), and the age of pottery from Layer 8 at the Ust-Menza site can be accepted as *c.* 13 380 calBP.

Based on the general appearance of pottery from the entire Transbaikal region (including the Ust-Karenga 12, Studenoe 1, Ust-Menza 1, and Ust-Kyakhta

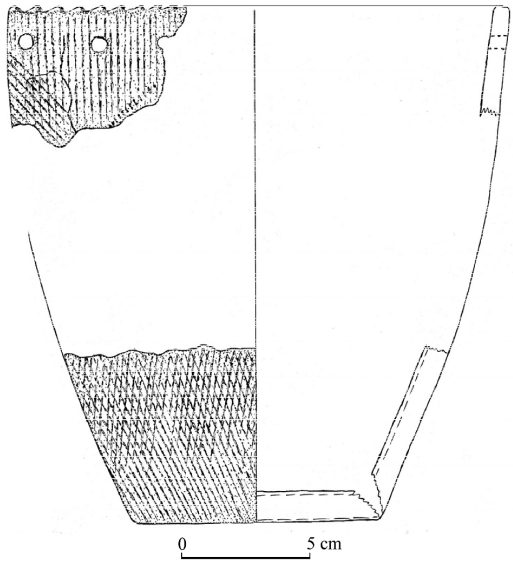

Fig. 12. Pottery from the Gromatukha site dated to* c. *12 380 BP (after* Shewkomud, Yanshina 2012*; modified).

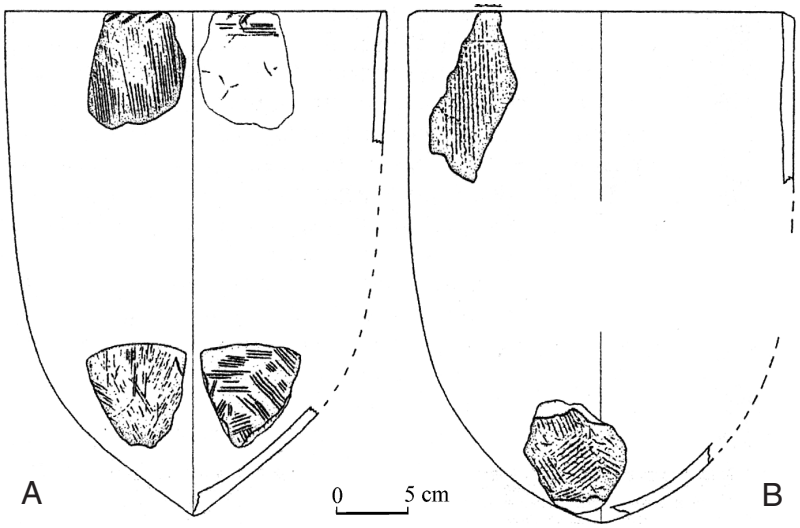

Fig. 13. Pottery from the Studenoe 1 site: A – from Layer 9G (dated to* c. *11 960–11 600 BP); B – from Layer 8 (dated to* c. *11 730–11 570 BP) (after* Razgildeeva *et al.* 2013*; modified).

sites, see Fig. 1), it was concluded that it represents a single cultural tradition of the earliest pottery-making in Eastern Siberia (*Razgildeeva* et al. *2013.177*). Its age can now be established as *c.* 12 000 BP (*c.* 14 000 calBP) (Fig. 2).

Centre(s) of pottery origin(s) in East Asia and neighbouring regions – how many?

Based on previous data, three primary centres of pottery origin in greater East Asia have been suggested: (1) South China; (2) the Japanese Islands; and (3) the Russian Far East (Amur River basin) (*e.g., Kuzmin 2010; 2013a*). This model is still valid, especially in the light of updated information on the age of the earliest pottery complexes outside of these centres (Fig. 14). For example, the oldest pottery in Korea (between the far eastern Russian and Japanese centres) is dated to *c.* 11 780 calBP at the Kosanni site, and *c.* 7960 calBP at the Osanni site (*Bae, Kim 2003; Choe, Bale 2002*). The earliest pottery complexes situated between the southern Chinese centre and the Japanese Islands, the Russian Far East, and the Transbaikal date to *c.* 11 900 calBP in North China at the Nanzhuangtou site (see Tab. 1), *c.* 10 360 BP in Central China at the Lijiagou site (*Wang* et al. *2015*), and *c.* 8480 calBP in Mongolia (*e.g., Kuzmin 2014.720*). Therefore, to the best of my knowledge, no reliable evidence about the diffusion/dispersal of pottery-making from any of these three centres to the neighbouring regions in greater East Asia (including Siberia) is known, contrary to the conclusion that "*Evidence for the dispersal of hunter-gatherer pottery from East Asia and via Siberia, across the continent to Europe suggests that it played an important role in the wider development of Eurasian pottery*" (*Gibbs, Jordan 2013.28*).

As for the Transbaikal, today we have much stronger evidence in favour of a very early appearance of pottery in this region – at *c.* 14 000 calBP, most probably independent of the primary East Asian centres (Fig. 14). However, it did not influence the more western parts of Siberia in terms of the spread of pottery-making. This issue was recently analysed by Kuzmin (*2014*), and no solid evidence was found concerning the diffusion/dispersal of pottery-making from East Asia toward Eastern Europe via Siberia sensu Dolukhanov and Shukurov (*2004*) and Davison *et al.* (*2006*).

Kevin Gibbs (*2015.340*) stated: "*It is possible that in some regions the invention of pottery correspond-*

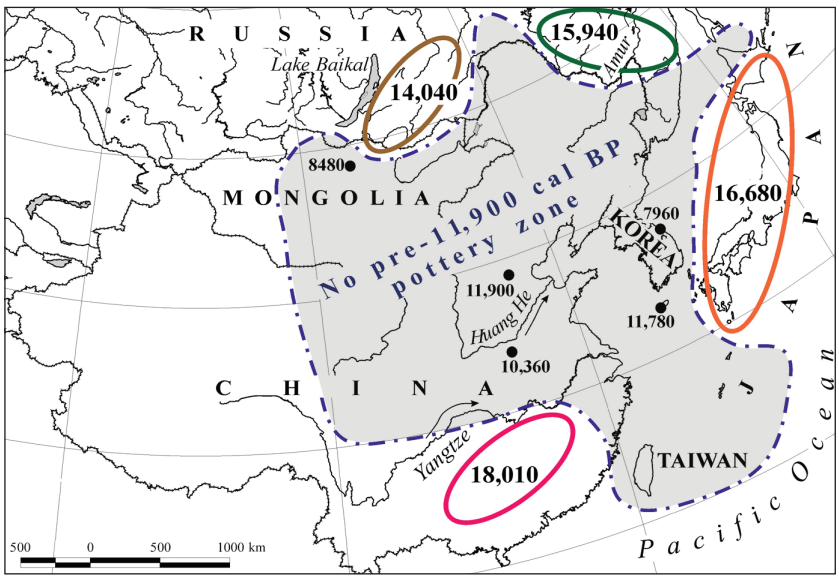

Fig. 14. Primary centres of pottery origin in greater East Asia and neighbouring regions with their calibrated ages (the mid-2015 state-of-the-art).

ed with a newly developed need, perhaps the introduction of a new potential food source that could be better exploited using durable, water-tight containers." I drew the following conclusion some time ago: "*The appearance of pottery was most probably facilitated by the necessity for East Asian populations in the Late Glacial (after* c. *16,000 BP, or* c. *19,000 cal. BP) to have light, easily made containers for the processing and storing of such types of food as wild plants and their nuts and fruit, which are otherwise hard to utilize without vessels for boiling and leaching*" (*Kuzmin 2013a. 551*). A similar view was expressed in the 1970s (*e.g., Ikawa-Smith 1976.515*).

Conclusions

Three regions in greater East Asia, namely South China, the Japanese Islands, and the Russian Far East, are the primary centres of pottery origin in the Old World. It is most likely that pottery-making emerged in these independently of each other, as recent archaeological and chronological data have suggested. It is worthwhile to emphasise that the earliest evidence of pottery preceded the climatic amelioration in the Late Glacial period, the Bølling – Allerød warm interval (*c.* 14 700–12 900 calBP) (Fig. 2).

In Siberia, the oldest pottery is now known from the Transbaikal, with a secure age of *c.* 14 000 calBP. It is, however, very unlikely that it is related to the later pottery complexes in both the eastern and western parts of Siberia. It seems that pottery-making in Siberia, as in East Asia in general, emerged in several regions independently and almost simultaneously.

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