Transactions of the Philological Society

PhilSoc The Philological Society

Transactions of the Philological Society Volume 00 (2025) 1–24 doi: 10.1111/1467-968X.12321

LINGUISTIC EVIDENCE SUGGESTS THAT XIŌNG-NÚ AND HUNS SPOKE THE SAME PALEO-SIBERIAN LANGUAGE

By Svenja Bonmann and Simon Fries

Department of Linguistics, University of Cologne and Faculty of Linguistics, Philology, and Phonetics/Faculty of Classics, University of Oxford

(Submitted: 24 March, 2025; Accepted: 2 May, 2025)

Abstract

The Xiōng-nú were a tribal confederation who dominated Inner Asia from the third century BC to the second century AD. Xiōng-nú descendants later constituted the ethnic core of the European Huns. It has been argued that the Xiōng-nú spoke an Iranian, Turkic, Mongolic or Yeniseian language, but the linguistic affiliation of the Xiōng-nú and the Huns is still debated. Here, we show that linguistic evidence from four independent domains does indeed suggest that the Xiōng-nú and the Huns spoke the same Paleo-Siberian language and that this was an early form of Arin, a member of the Yeniseian language family. This identification augments and confirms genetic and archaeological studies and inspires new interdisciplinary research on Eurasian population history.

Zusammenfassung

Die Xiōng-nú waren eine Stammeskonföderation, die Innerasien vom 3. Jahrhundert v. Chr. bis zum 2. Jahrhundert n. Chr. dominierten. Xiōng-nú-Nachfahren bildeten später den ethnischen Kern der europäischen Hunnen. Die linguistische Affiliation der Xiōng-nú und der Hunnen ist bislang unklar; unter anderem ist vermutet worden, die Sprache der Xiōng-nú könnte zur iranischen, türkischen, mongolischen oder jenissejischen Sprachfamilie gehört haben. Wir präsentieren in diesem Aufsatz linguistische Evidenz vierfacher Natur, die nahelegt, dass die Xiōng-nú und die Hunnen tatsächlich die gleiche paläosibirische Sprache sprachen und dass es sich dabei um eine frühe Form des Arinischen handelte, einer jenissejischen Sprache. Diese Identifizierung ergänzt und bestätigt genetische und archäologische Studien und regt zu neuer interdisziplinärer Forschung zur Populationsgeschichte Eurasiens an.

Summarium

Xiongnu erant confoederatio nomadum populorum quae magnis regionibus in tesquis Asiae mediae et in Sinis septentrionalibus a saeculo tertio a.C.n. fere usque ad saeculum secundum p.C.n. imperabant. Gens Hunnorum quae saeculo quarto p.C.n. Europam invasit origine sua connecta est cum gentibus Xiongnuum. Lingua Xiongnuum incerta est, fortasse inter Iranicas aut Turcicas aut Mongolicas aut Ieniseenses linguas numeretur, sed de hac re inter glottologos controversia magna est. In hoc tractatu demonstremus quattuor indicia minime inter se connecta quae indicant Xiongnus Hunnosque eadem lingua

Svenja Bonmann and Simon Fries contributed equally to this work.

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Palaeosiberiaca locutos esse, videlicet lingua Arinica antiqua, quae erat lingua Ieniseensis. Haec cognitio investigationes archaeologicas geneticasque supplet atque confirmat variarumque scientiarum nova studia ad Eurasiae historiam pertinentia ciet.

ΣΥΝΟΨΙΣ

οἱ Σιόνγκνου ὑπῆρξαν πολύφυλός τις συμμαχία ἣ ἀπὸ τρίτου αἰῶνος π.Χ. ἐς δεύτερον αἰῶνα μ.Χ. ἐκράτησε τῆς μεσογαίου Ἀσίας. χρόνωι ὑστέρῳ τῶν Σιόνγκνου ἀπογόνοι πυθμὴν ἐθνικὸς τῶν Οὔννων τῶν εἰς τὴν Εὐρώπην εἰσβεβληκότων ἐγίγνοντο. λέγονται μὲν εἴτε Ἰρανικῇ εἴτε Τουρκικῇ εἴτε Μογγολικῇ εἴτε Ἰενισσείᾳ γλώττῃ συγγενεῖ τινι διαλέκτῳ κεχρῆσθαι οἱ Σιόνγκνου, ἡ δὲ συγγένεια γλωττικὴ τῶν Σιόνγκνου καὶ τῶν Οὔννων ἀμφισβητήσιμός ἐστι. διὰ μὲν οὖν τῆς ἡμετέρας μελέτης μέλλομεν ἀποδεικνύναι τέτταρα σημεῖα τῆς γλώττης, οὐδενὶ τρόπῳ ἀλλήλοις ἐσυζευγμένα, οἷς δηλοῦται ὅτι τὰ τῶν Σιόνγκνου καὶ τὰ τῶν Οὔννων ἔθνη τῷ ὄντι τῇ αὐτῇ Παλαιοσιβιρικῇ γλώττῃ ἐκέχρητο καὶ αὕτη ἦν ἀρχαία τις μορφὴ τῆς Ἀρινικῆς γλώττης, τουτέστι τῆς Ἰενισσείας γλώττης συγγενοῦς τινος διαλέκτου. οὗτος ὁ ὁρισμὸς συμπληροῖ καὶ ἐπαληθεύει τινὰς προτέρους ζητήσεις γενετικάς τε καὶ ἀρχαιολογικάς, καὶ παρίστησι καινὴν ἀναζήτησιν διὰ πασῶν ἐπιστημῶν περὶ τοῦ τῶν Εὐρασιατικῶν ἐθνῶν παρῳχημένου χρόνου.

1. Introduction

The linguistic and ethnic prehistory of Inner Asia prior to the Turkic and Mongolic expansions is only imperfectly understood. Several ethnically and linguistically obscure tribal confederations are only known through foreign renderings of their names. One of the more prominent cases is a group of pastoral nomads known from Chinese sources as Xiōng-nú who founded a steppe empire in the 3rd century BC in Dzungaria and surrounding territories and who dominated Inner Asia up into the 2nd century AD (Yü 1990; Brosseder & Miller 2011; Vovin 2020). In spite of the recent discovery of the remains of a city in Mongolia probably identifiable as the Xiōng-nú capital Lóng Chéng (Vovin 2020), both the exact sphere of influence of the Xiōng-nú empire at the height of its powers and the linguistic constitution of this multi-ethnic state are unclear. The situation with regard to the Huns is similar: Even though the Huns established an enormously influential (though short-lived) multi-ethnic empire in South-Eastern Europe in the 4th and 5th centuries AD (cf. e.g. Sinor 1990; Heather 1996; Bóna 2002; Halsall 2007; Schmauder 2009; Kim 2013; Maas 2014; Pohl 2022), and although their Inner Asian origins are not disputed, their ethnicity is a matter of debate and especially their linguistic identity so far remains unclear due to a lack of autochthonous written sources (cf. e.g. Doerfer 1973; Pritsak 1982).

In our study, we demonstrate how the comprehensive analysis of linguistic evidence from four different domains – loanwords, glosses, anthroponymy and toponymic/hydronymic data – complements recent genetic, archaeological and historical research on human population history in showing (I) that the Xiōng-nú and the Huns probably spoke the same language, implying, in turn, that the ethnic core constituted by the ruling dynasty of the European Huns descended from the Inner Asian Xiōng-nú and (II) that this common language of the Huns and the Xiōng-nú was Old Arin, a member of the Yeniseian language family. In showing that the Huns and the Xiōng-nú probably spoke the same Paleo-Siberian language, we qualify previous hypotheses about their ethnicity suggesting a Turkic, Mongolic or Iranian origin.

The structure of this article is as follows: Section 2 seeks to provide an overview of earlier hypotheses on the linguistic origins of the Xiōng-nú and the Huns proposed in the literature so far. Sections 3–6 will then see a detailed demonstration of our alternative account of a common

Paleo-Siberian/Yeniseian origin of the Xiōng-nú and the Huns: In section 3, 5 probable Yeniseian loanwords in Turkic and Mongolic implying early linguistic influence of the Yeniseian languages and especially Arin on their neighbours will be discussed. Section 4 will focus on the only short text preserved in the Xiōng-nú language as well as Xiōng-nú glosses in Chinese texts that betray Yeniseian features. In section 5, it will be shown that at least three Hunnish personal names are most probably of a Yeniseian origin ultimately, while in section 6, a likely migratory path of Arin speakers from the Hunnish homeland in Inner Asia towards western Eurasia matching the probable migratory trajectory of the Huns will be established for the first time on the basis of toponymic and hydronymic data, implying that the Huns were indeed speakers of Arin. The findings of our investigation will finally be summarised, and their implications for future research will be discussed in the concluding section 7.

2. Earlier hypotheses on the linguistic origins of the Xiōng-nú and the Huns

Although direct evidence is lacking, Iranian, Turkic and Mongolic languages have all been proposed as the language of the ruling dynasty of the Xiōng-nú (cf. e.g. Shiratori 1900; Benzing 1959; Pritsak 1982; Bailey 1985; Dybo 2007; Janhunen 2010; Beckwith 2018; Beckwith 2022) and of the Huns (cf. e.g. Doerfer 1973; Pritsak 1982; Savelyev 2020; Savelyev & Jeong 2020), because in the 1st millennium AD languages from these three families were spoken in Inner Asia. Inscriptions dating between the 4th and 9th century AD demonstrate that Iranian languages (Sogdian, early 4th to 6th century AD, Sims-Williams 2011; Vovin 2018) and Mongolic ones (Khüis Tolgoi and Bugut inscriptions of the 5th–6th centuries AD, Vovin 2018) as well as, much later, Turkic languages (isolated Turkish phrases in Bactrian manuscripts of the 7th century AD, Orkhon and Yenisei Kirgiz inscriptions between the early 8th and 9th century AD, Erdal 2004: 4–8) were spoken in the territory between the Yenisei River in the West, the Tian Shan range in the South and Mongolia in the East. Other Indo-European languages were spoken in oasis cities along the northern and southern ridges of the Takla Makan desert in the 1st millennium AD including Indo-Iranian (Iranian Khotanese and Tumshuqese Saka, Bactrian, Indo-Aryan Prakrit, Sanskrit) and 'Tocharian' languages (Agnean and Kuchean).

However, this linguistic situation of a coexistence of Iranian, Turkic and Mongolic in Inner Asia can only be reliably established as such for the late 1st millennium AD. Hypotheses on an Iranian, Mongolic or Turkic identity of the Xiōng-nú primarily rest on written sources post-dating the Xiōng-nú era. While the theoretical possibility of a Mongolic or Turkic presence in Inner Asia already at the beginning of the common era cannot be ruled out *a priori*, it is important to note that there is, on the other hand, also no robust evidence – especially from textual sources – that could directly imply or prove a Turko-Mongolic presence in this area at such an early date. The earliest sources from the Tarim Basin and the territories alongside the Oxus River/Amu Darya (Chorasmia, Sogdia, Bactria) only document Indo-European languages from the Indo-Iranian and 'Tocharian' branches (to which might be added, as a cultural import, also Ancient Greek in Macedonian colonies). Judging by more indirect evidence – especially loanwords in other languages, toponyms, etc. – other Iranian languages, namely different Sakan varieties (Tremblay 2005) and 'Old Steppe Iranian' (Bernard 2023), must have been spoken in the steppe corridor from the Kazakh steppe to Dzungaria, and perhaps even to Gansu (see Beckwith 2022). It is only centuries later, namely in the Migration Period of the 5th–6th centuries AD, that a (Para-)Mongolic language might be attested in Inner Asia (Vovin 2018), and fragments of this (Para-)Mongolic language, in turn, are still much earlier documented than the earliest secure Turkic words dating from the 7th century AD.

There is thus neither direct nor indirect evidence supporting the claim of a Mongolic or Turkic presence in Inner Asia between the 3rd century BC and the 2nd century AD, and the hypothesis

of a Mongolic or Turkic identity of the ethnic core of the Xiōng-nú (as proposed by Benzing 1959, Pritsak 1982; Tenišev 1997; Dybo 2007; Janhunen 2010; Savelyev 2020) is thus rather unlikely from the outset, as is the hypothesis of a completely unknown or unclassifiable language without any living descendants (as proposed by Doerfer 1973). The same applies to the Huns: there is a complete lack of evidence supporting claims of a Turkic presence among the Huns.[1] On the other hand, an Iranian component in the Xiōng-nú Empire is possible, and indeed quite likely, although, as we intend to point out with the present study, such Indo-European ethnicity must not necessarily have been shared by the ruling dynasty or ethnic core of the Xiōng-nú (*pace* Bailey 1985; Beckwith 2022) or the Huns.

Concerning such an Iranian component, (Beckwith 2018, 2022) has argued recently that Xiōng-nú words preserved in Chinese texts are indicative of an Iranian language, which he calls 'East Scythian'. However, his interpretation depends on a reconstruction of the Old and Middle Chinese pronunciation of Chinese signs which significantly differs from established reconstructions such as the classic one of Pulleyblank, and which has also been criticised by Vovin et al. (2016: 129–30). In addition to this, his Iranian etymologies must be met with serious doubts. For instance, the ethnonym 'Aryan', which is amply attested in many Indo-Iranian languages, is given by Beckwith with a word-initial laryngeal sound (discussion in Beckwith 2022: 183–86, cf. particularly p. 186): 'East Scythian *ḫarya [ɣa.rya] "noble, royal; Scythian" → Old Chinese *ḫaryá 夏/*ḫâryá 華 "royal; Chinese, China"'. This would indeed be a remarkable Iranian word form, because no Indo-Iranian language points to an initial laryngeal (†*Hăr̥ia-* vel sim.): A word-initial laryngeal should have left direct traces in Persianide languages (see Kümmel 2018), but Old Persian <ariy-> /ariya-/ or inscriptional Middle Persian *ēr* 'Iranian' do not preserve such a sound. The hypothetical (East) Scythian would be the only Iranian language to preserve it, and independent evidence for this is entirely lacking. Other etymologies equally rest upon highly questionable *ad hoc* assumptions on Iranian historical phonology and must accordingly be dismissed (e. g. the etymology of Old Turkic *täŋri* 'heaven' that Beckwith 2022: 195, 203 wants to derive from an East Scythian *tagri through the application of an alleged Scythian syllable contact law of nasalization completely unheard of in the specialist literature and remaining without any reliable parallel; on this word rather cf. Georg 2001).

It must therefore be conceded that, while it is a priori likely that Iranian tribes were one factor among others in the ethnolinguistic melting pot of the eastern Eurasian steppe some 2000 years ago (the Sakan languages would be a good starting point for further research in this direction), the evidence adduced by scholars in favour of a dominant role of Iranian groups and their languages in the Xiōng-nú empire so far does not follow the rigorous methodological standards of Historical-Comparative Linguistics and is therefore insufficient to allow for any reliable inferences.

Etymological analyses of Xiōng-nú glosses in Chinese sources (collected by Pulleyblank 1962, criticised and reanalysed by Dybo 2007), complemented by the interpretation of the so-called Jié couplet, the only short text preserved in the Xiōng-nú language,[2] have led to a more promising alternative hypothesis. This hypothesis acknowledges both the multi-ethnic composition of the Xiōng-nú empire as such and the presence of

[1] Cf. Savelyev (2020: 448): 'While "Hunnic," that is the language of the European Huns of the late fourth and fifth centuries AD, is sometimes referred to as a Bulgharic variety, this connection is based mainly on historical rather than proper linguistic evidence. Extremely scarce remnants of 'Hunnic' – a number of personal names and only a few common nouns – do not provide any conclusive proof and may actually be linguistically heterogeneous'.

[2] As one reviewer rightly points out, it is in principle possible that the Jié did not constitute the core of the Xiōng-nú alone but could theoretically just have been one of the confederation's constituent tribes among others. This, however, does not exclude the possibility nor reduces the likelihood that the Jié constituted an integral part of the dynastic core of the Xiōng-nú both ethnically and linguistically. This is especially probable given the later political dominance of the Jié who established the Later Zhao dynasty in China between 319 and 351 AD.

Indo-European and specifically Iranian languages in Inner Asia at the beginning of the common era, yet adds to the complexity the idea that the native language of the ruling dynasty of the Xiōng-nú empire might have been a Yeniseian one (Ligeti 1950; Pulleyblank 1962; Dul'zon 1966; Dul'zon 1968; Vovin 2000; Vovin 2003; Vovin 2007; Werner 2014; Vovin 2020). Yeniseian languages are usually considered remnants or survivors of the original linguistic diversity of Siberia, historically spoken in retreat areas as the result of several waves of superimposition or displacement by expanding Uralic/Samoyedic, Turkic and Tungusic languages. Therefore, Yeniseian languages are also known as Paleo-Siberian languages.[3] Several different Yeniseian languages were spoken in the 18th century AD alongside the middle reaches of the Yenisei River and some of its tributaries, yet this probably reflects a northward migration from a point of departure further south, around the headwaters of the Yenisey, the Ob and the Irtyš rivers (see Dul'zon 1959a; Dul'zon 1959b; Dul'zon 1964; Maloletko 1992; Maloletko 2000; Vajda 2019: 194–95; cf. also Janhunen 2020: 167). From the six historically attested Yeniseian languages Ket, Yugh, Kott, Assan, Arin and Pumpokol, it has so far been suggested that Ket/Yugh (Ligeti 1950; Pulleyblank 1962) or Pumpokol (Vovin 2000, 2003, 2007, 2020; Vovin et al. 2016) may have been the native language of the Xiōng-nú ruling dynasty.

Adding value to this hypothesis is the fact that the northward migration of Yeniseian-speaking groups, as reflected in toponyms, from the Altai-Sayan area would well agree with detailed historical studies considering Indic, Iranian and Chinese written sources (de la Vaissière 2005; de la Vaissière 2014). These studies indicate that, following the eventual demise of their steppe empire, remnants of the Xiōng-nú migrated to the north of the Altai-Sayan Mountain ranges in the mid-2nd century AD and that this retreat area was the starting point of a secondary expansion of Xiōng-nú descendants roughly two hundred years later, between ca. 350–370 AD. This expansion occurred in three directions: One migratory trajectory led northward and left traces in the form of toponyms. This population movement downstream of the major rivers Yenisey, Ob and Irtyš perfectly explains the linguistic situation as documented for the first time in the 18th century and provides a direct link between Yeniseian languages and the Xiōng-nú. Another migratory route led to southern Asia and involved groups known from Iranian and Indic sources as Chionites, Kidarites, Hephthalites, Alchons as well as the so-called Huṇa (cf. Pfisterer 2013). A third migratory trajectory led westward, into Europe and involved the Huns who appeared in Eastern Europe in 370 and posed a threat to Roman hegemony until Attila's death in 453, the Battle of Nedao shortly afterwards and the ensuing disintegration of their confederation (cf. e.g. Heather 1996; Bóna 2002; Halsall 2007; Schmauder 2009; Maas 2014; Pohl 2022).

Several nomadic groups of late Antiquity that originated in Inner Asia and migrated to the southern and western peripheries of the Eurasian landmass apparently used the same ethnonymic constituent (*Chion*-ites – Al-*chon* – *Huṇa* – *Huns*; cf. de la Vaissière 2005; de la Vaissière 2014, but see Atwood 2012), and the traditional hypothesis of a link between the ethnic core of the European Huns of the 4th–5th centuries AD and the Inner Asian Xiōng-nú of the 3rd century BC–2nd century AD, first proposed by the French scholar Joseph de Guignes in the 18th century, has, strictly speaking, never been falsified (de la Vaissière 2005: 15). A genetic connection between the Xiōng-nú and the Huns is usually considered unlikely in modern archaeological and historical scholarship (e.g. Beckwith 2009: 72; Savelyev &

[3] The label *Paleo-Siberian* is also applied to other languages such as Chukotko-Kamchatkan, Nivkh and Yukaghir languages. These language isolates and small language families are all spoken in Northern Asia/Siberia and may represent the original linguistic situation in this area. However, although they are all labelled Paleo-Siberian they are not characterised by any securely established genetic relationship with each other. Paleo-Siberian as a term applied to all of them is thus not a genealogical term indicating a (macro-)family, but a collective term implying survival of autochthonous, yet marginalised languages in a particular area, namely Siberia.

Jeong 2020; Pohl 2022; Maenchen-Helfen 1944–1945; Maenchen-Helfen 1955; Maenchen-Helfen 1973; Schmauder 2009), partly because of the large chronological gap between the dissolution of the Xiōng-nú empire in the 2nd century AD and the appearance of the Huns in the 4th century AD, and partly because only two archaeological features render a connection likely: large bronze cauldrons of a certain type and artificially deformed or elongated skulls (Pohl 2022: 147).

Despite the prevailing scepticism of historians and archaeologists, the hypothesis of a connection between the Xiōng-nú and the Huns has been corroborated recently by previously unknown and unavailable genetic data analysed by Gnecchi-Ruscone et al. (2025): '(. . .) long-shared genomic tracts provide compelling evidence of genetic lineages directly connecting some individuals of the highest Xiongnu-period elite with 5th to 6th century AD Carpathian Basin individuals, showing that some European Huns descended from them'. On the provision that there was indeed some continuation between the ethnic core of the European Huns and the former Xiōng-nú, the ruling classes of both multi-ethnic confederations may have spoken the same language in two different diachronic stages (an older form and a younger one), implying that the identification of the linguistic affiliation of one of these groups probably also means identifying the native language of the other group. In the following, we will discuss previously unknown linguistic evidence from four domains independently supporting such a connection and thus corroborating the recent archaeological and genetic findings: (1) loanwords, (2) glosses, (3) anthroponyms and (4) toponyms/hydronyms.

3. Loanwords in Turkic and Mongolic (and how to detect them)

The identification of loanwords in the languages of the world necessarily draws on the well-established Comparative Method in linguistics that rests upon the axiomatic notion repeatedly confirmed empirically that all language change is regular and systematic and that variation in languages over time is the effect of the historical development of these languages (Hock & Joseph 2019; Campbell 2020). This historical development and the position of a particular linguistic item in language history can be established on empirically reliable grounds through the continuous and ever refining systematic comparison of this item with other comparable items, taking into consideration in each step of comparison what has been found out about the historical development of a respective language up to this point.

Following this methodology, a rigorous analysis of lexical items, which continue the same phoneme or phoneme sequence of an earlier evolutionary linguistic stage, will always reveal a recurrent synchronic phonological pattern. The first objective is therefore to detect regular recurrent sound patterns within the lexicon of a language or group of languages. Once these have been established, generalisations on expected or predictable phonological shapes of native, inherited words can be made. Vice versa, this implies that words which do not show expected phonological patterns must stem from an external source or be of a secondary nature. Consider, for instance, the correspondence set in Table 1 presenting data from the six historically documented Yeniseian languages: Ket, Yugh, Assan, Kott, Pumpokol and Arin.[4]

It can be observed that the very same lexical items in this table feature a word-initial voiceless velar stop /*k*-/ in Arin, but a zero onset in the other Yeniseian languages. A sound

[4] These six different Yeniseian languages are attested in sources from the 18th to 20th centuries, even though it is not always clear whether some of them were really independent languages or just dialects of the same language (notably Kott and Assan, cf. Werner 1997a, 1997b, 1997c, 2005; Georg 2007; Fortescue & Vajda 2022). The Yeniseian languages are tone languages with phonemic contrasts between four different tones in monosyllabic word forms. We transcribe the four tones in monosyllabic words and elsewhere according to the model developed by Vajda (2004) and Georg (2007: 46–56) and adopted by Hill (2008) and Bonmann et al. (2023): 1st tone: Ket *v̄*, Yugh *v̄*/*v̄*; 2nd tone: Ket and Yugh *v́*; 3rd tone: Ket and Yugh *v̂*; 4th tone: Southern Ket *v̀*, Central and Northern Ket *v̀*, Yugh *v̀*ˤ.

Table 1. Correspondence set: Arin *k-* ~ Pumpokol (*h-*), Assan, Kott, Yugh, Ket Ø- (zero), following Fries & Bonmann (2023)

†Arin	†Pumpokol	†Assan	†Kott	†Yugh	Ket	Meaning
kunčo			*un*		*ūˑn*	'quiet'
kus	*úta*	*učа*	*ûča*	*ùːˢs*	*ùs'*	'birch'
kus	*utú*		*učа*	*úsan*	*ús'en'*	'sleep'
kul	*ul*	*ul*	*úl*	*ūr*	*ūˑl'*	'water'
kúši	*utiči*			*ūs*	*ūˑs'*	'warm'
kus				*ūˑs*	*ūˑs*	'spear for hunting'
kuraasa	*uraít* (M)		*ur*	*ures*	*úl'es'*	'rain'
kem			*imi*			'crane'
kína	*híneaŋ*	*inéé*	*îna*	*ī̀n*	*ī̀n*	'two'
kere			*d'ira*/*d'era* 'lizard'	*ʌˀl*	*ʌˀl'*	'frog'
kej			*îji*	*ì̀ːˢt'*	*ì̀r'*	'spring'

The superscript dagger indicates dead/extinct languages.

correspondence like this probably reflects different developments in the individual descendant languages of a sound of their last common ancestor or proto-language (in this case, developments of a word-initial sound of Proto-Yeniseian). It is important to note that different sounds of an ancestral language can result in the same synchronic sound of particular languages (sound merger); in such cases, the very fact that we are dealing with underlyingly different sounds in the first place is only indicated through different correspondences between the members of a language family. To illustrate this, consider Table 2 which again lists lexical items with a word-initial voiceless velar stop /*k-*/ in Arin, yet this time with a different sound pattern in the other Yeniseian languages.

As can be seen, two different correspondences and thus probably two different sounds of the proto-language result in the same synchronic reflex, namely a voiceless velar stop /*k-*/ in Arin. This situation is complemented by yet another correspondence set showing voiceless /*k-*/ in Arin, cf. Table 3.

The systematic comparison of the relevant data from the Yeniseian languages has shown that all three correspondence sets depicted in Tables 1–3 most probably reflect different word-initial phonemes of the common ancestor of all Yeniseian languages, Proto-Yeniseian: the correspondence set displayed in Table 1 reflects a labiovelar approximant **u̯-* [w] (Alonso de la Fuente 2006; Fries & Bonmann 2023), the set given in Table 2 reflects Proto-Yeniseian **x-*, and the set displayed in Table 3 reflects Proto-Yeniseian **k-* (Bonmann et al. 2023: 69–71). Insights into the historical phonology of a particular language or group of languages like these allow for further comparison with other languages that may reveal loanwords in one or the other because they provide diagnostic criteria for establishing the source of a given lexical item (cf. recently Fries & Korobzow 2024 on different strata of loanwords in Ket and Yugh).

A systematic comparative and historical survey of the lexicon of 29 different Turkic,[5] 11 Mongolic[6] and 12 different Yeniseian varieties[7] according to the methodology set out above reveals 5 lexemes in Turkic and Mongolic (3 in Turkic, 2 in Mongolic) listed in Table 4 that

[5] These are: Old Turkic, Middle Turkic, Turkish, Karakhanid, Khakas, Shor, Kyzyl, Altai Turkic, Qumanda, Quu, Tuba-kiži, Teleut, Sagai, Koibal, Chulym Turkic, Tuvan, Tofan, Yakut, Dolgan, Siberian Tatar, Kirgiz, Uzbek, Kazak, Fu-yü, Yellow Uighur, Uighur, Azerbaidzhan, Oyrat, Chuvash.

[6] These are: Written Mongolian, Middle Mongolian, Khalkha, Buriat, Kalmuck, Ordos, Dongxian, Baoan, Dagur, Shary-Yoghur, Monguor.

[7] In the present study we count the different Yeniseian languages, their diachronic layers and dialects as separate varieties, including the so-called Eed-Šeš dialect of 18th century Ket. This makes for the following varieties: Southern Ket, Central Ket, Northern Ket, 18th century Imbat Ket, 18th century Eed-Šeš dialect, 20th century Yugh, 19th century Yugh, 18th century Yugh, Arin, Pumpokol, Kott, Assan.

Table 2. Correspondence set: Ket, Yugh, Arin, Pumpokol *k-* ~ Kott, Assan *h-*/Ø-, following Bonmann et al. (2023)

†Arin	†Pumpokol	†Assan	†Kott	†Yugh	Ket	Meaning
kel 'army'	*kari* 'war'		*hali*	*kà:ˢr*	*kàl'* C., N. *kà:l'i*, *kà:l'e*	'war'
kit, *qit*, *k'it*	*kit*	*hit* / *hɨt*	*hit* / *het* H *xit*	*kɛˀt*	*kɛˀt*	'human; child'
keln'a kekčo	*karise*		*hali-hit*	*kà:ˢrget*	*kál'get*	'warrior'
kɨzin 'footwear' *qisɨŋ* 'boots'		*bugor-édžan*, *bugur-eča* 'boots'	*hêči* 'shoe' M *hêča* 'boot', H *gečan* 'shoe'	*kiˀs*, pl. *kisɨŋ* 'leg'	*kiˀs'* (n., pl. *kíseŋ*) 'leg'	'leg; shoe; boot'
			ini / *in'i*	*kīn'*	*kī·n'*	'here'
kulep, *kuleb*			*hulup*, H *xulup*	*kulɛp*	*kúl'ep*	'stoat'
korólep, *kor'urub*	*xlepuk*	*xulu:p* / *xlup* / *xulup*	*hulup* / *hulûp*		*kul'úp*	'beard'
			hîla G *hîlâ*	*kɨ̄l*	*kɨ̄·l'*	'raven'
qus / *kus* 'horse', *qúše* 'mare'	*kut* 'horse, mare'	*huš* / *hɨš*	*huš* M, Kl *xuš* H *guš*	*kuˀs* 'horse'	*kuˀs'*	'cow'
kej 'power; chief, boss'		*hii* / *hɨ* / *hɨj*	*hi:ji* / *hi:je* M, Kl *hii*	*kɨj*	*kɨ̄·j*	'lord, ruler'

The superscript dagger indicates dead/extinct languages.

Table 3. Correspondence set: Pan-Yeniseian *k-* (but Kott, Assan, Arin partially *h-*/*x-*), following Bonmann et al. (2023)

†Arin	†Pumpokol	†Assan	†Kott	†Yugh	(Southern) Ket	Meaning
lot (?) 'winter'	(*kiičidin*, *kɨčidin* 'cold'?)		*kêti*, H *ket[e]*	*kə̄·t*	*kə̄·t* C., N. *kə̄·te*	'winter'
kute 'autumn'			H *kiga* 'it is fresh'	*kiˀ*	*kìs'*	'new, fresh'
			ki 'price; fraction'	*kiˀt'*	*kiˀt*	'price'
			kal-tapen 'splitting wedge'	*kɔˀl*	*s'uŋ-gul't*	'tree stump'
kínaŋ 'arm' *xinaŋ* 'shoulder'		*kéŋar* 'hand' *hénar* 'arm'	*kêgär* / *kêˀär* H *kenar* M, Kl *kéŋaran* 'hand' *hénaran* 'arm'	*kʌgd'at*	*kəgd'an* / *kagd'at*	'arm'

must belong to the oldest stratum of these languages, are not further etymologizable in Mongolic and Turkic terms and are at the same time shared with Yeniseian (the abbreviations in the Yeniseian data entries refer to earlier data collections and follow the conventions of Bonmann et al. 2023). The Turkic and Mongolic data were extracted from a database on 'Altaic' etymology (Starostin et al. 2006) and 6 etymological dictionaries (Ramstedt 1935; Räsänen 1969; Clauson 1972; Sūn 1990; Werner 2002a; Werner 2002b; Werner 2002c; Starostin et al. 2003) and checked against the more recent data provided by Khabtagaeva (2019) on language contact in the region. The Yeniseian data were extracted from a

Table 4. Loanwords in Turkic and Mongolic securely attributable to a Yeniseian language identical with or closely related to Arin

Turkic	Mongolic	†Arin	Other Yeniseian
'lake': Proto-Turkic *$k\bar{o}l$ cf. Old Turkic $k\bar{o}l$; Khakas *köl*; Shor *köl*; Altai Turkic *köl*; Tuvan *xöl*; Tofan *höl*; Chulym Turkic *köl*; Yakut *küöl*; Dolgan *küöl* ~ $k\bar{o}l$; Siberian Tatar *kül*; Kirgiz *köl*; Fu-yü *göl*; Kazak *köl*; Yellow Uighur *kᵉöl*		'water': Arin M, H *kul* (Arin H *kurlo* 'dew')	'water': Ket *ū·l'* (no pl.); Yugh *ūr* (no pl.); Kott C *ûl*, pl. *ûlaŋ*, H *ul*; Assan M *ul*; Pumpokol Kl *ul*
	'rain' Proto-Mongolic **kura* Written Mongolian: *qura*, Middle Mongolian: *qura*, *qora*, *qura*, *qora* Khalkha: *xur* Buriat: *xura* Kalmuck: *xur* Ordos: *xura* Dongxian: *Gura* Baoan: *Gura, Gora* Dagur: *xuar* Shary-Yoghur: *xura* Monguor: *xurā*	'rain': Arin H *kuraasa*; Arin M, Kl *kur* 'id'.	'rain': Ket *úl'es'*; Imbat Ket M *úlles*, Eed-Šeš *u:lette*, Yugh *úres*; 18th c. Yugh *ures*, Kott *ures* ~ *ur, ûr*; Pumpokol M *uraít*
'lizard': Proto-Turkic **kele-* (**keler* / **keleŕ* / **kelte*) Karakhanid: *keler*, Turkish: *keler* (dial.), *kelez* (dial.), *kelte-keler* (dial.) Middle Turkic: *keles*, Uzbek: *kälti-kälas*, *kälɔs* (dial.), *kältä* (dial.) Uighur: *kilɛr* (dial.) Yellow Uighur: *kesilkə* Azerbaidzhan: *kelez*, *käläz* Khakas: *kileskə* Shor: *kelesken* Oyrat: *keleski* Tuva: *xeleske* Bulghar: Chuvash *kalda*		'frog': Arin H *kere*	'frog; lizard': Southern Ket *ʌʔl'*, pl. *ʌtn* 'frog'; Yugh *ʌʔl*, pl. *ʌtn*, *ʌ́liŋ* 'frog'; Kott C *d'ira*, *d'era*, pl. *d'itn*, *d'etn*, *d'erán* 'lizard'
'silver': Proto-Turkic **kümüš* Common Turkic: Old Turkic *kümüš*; Khakas *kümüs*; Sagai, Koibal *kümüs*; Kyzyl *kümüs*; Shor *kümüš*; Altai Turkic *kümüš*; Tuba *kümiš*; Qumanda *kümiš*; Quu *kümüš*; Teleut *kümüš*; Tuvan *xümüš*; Chulym Turkic *kümüš*; Yakut *kömüs* 'silver, gold'; Dolgan *kömüs*; Kirgiz *kümüš*; Fu-yü *gümüš*; Kazak *kümis*; Yellow Uyghur *kümüs* ~ *kumus* ~ *kumos* ~ *kumïs* Bulghar: Chuvash *kĕměl*		'silver: Arin M, Kl *kumiš*	'tin': Ket *uml'a*, *umɔl'a*, Ket (18th century) M *úmula*, Eed-Šeš *umel*, Yugh (19th century) *ûmola*, Assan Kl *imatip* (cf. also Assan M, Kl *imajti* 'brass') (cf. later Turkic loans into Yeniseian: Kott *kumuš* 'silver, money', Kott H *kumiš* 'silver', Assan M, Kl *kumis* 'silver', Pumpokol M *kümmütsch* 'gold')

(continued)

Table 4. (continued)

Turkic	Mongolic	†Arin	Other Yeniseian
	'birch': Proto-Mongolic **kus-* Written Mongolian: *qusu (n)* Khalkha: *xusan* Buriat: *xuha(n)* Kalmuck: *xusm* Shary-Yoghur: *χus*	'birch': Arin M, Kl, H *kus*	'birch': Southern Ket *ùs'*, pl. *ús'eŋ*, Central Ket, Northern Ket *ù:s'/ ù:s'e*, Imbat Ket M *uuse*; Yugh *ù:ˤs*, pl. *úsiŋ/úseŋ*, 18th c. Yugh *uus'a*; Kott C *ûča / ûči*, pl. *ûčan*; Assan M, Kl *úča*, Kl *ičča*; Pumpokol M *úta*

variety of sources, including etymological dictionaries, grammars, word-lists and more recent articles on Yeniseian historical phonology (Xelimskij 1986; Werner 1997a; Werner 1997b; Werner 1997c; Werner 2002a; Werner 2002b; Werner 2002c; Werner 2005; Georg 2007; Hill 2008; Bonmann et al. 2023; Fries & Bonmann 2023; Hill et al. 2024). Due to their phonetic makeup and treatment in the phonological history of Yeniseian, Turkic and Mongolic, that is taking into consideration the established facts about the outer documented history and the historical phonology of the Yeniseian (Werner 1997a; Werner 1997b; Werner 1997c; Werner 2005; Georg 2007; Hill 2008; Fortescue & Vajda 2022; Bonmann et al. 2023; Fries & Bonmann 2023; Hill et al. 2024), Turkic (Doerfer 1976; Schönig 1999) and the Mongolic languages in the area (Weiers 1969; Poppe 1987; Janhunen 2012), the 5 items listed below must be considered Yeniseian loanwords in Turkic and Mongolic.

While the number of 5 lexemes may seem insignificant at first from a purely quantitative perspective, it is nonetheless considerable given the semantic and formal makeup of these lexemes. They refer to the core terminology of the geography ('lake, body of water', 'rain'), geology ('silver'), flora ('birch') and fauna ('lizard, frog') characteristic of Siberia and thus reflect deep cultural ties to Inner Asia and an originally prominent social or political status of the speaker community of the donor language from which these lexemes stem.

Previous studies analysed the Yeniseian languages mainly as recipients of Turkic and Mongolic loanwords (cf. e.g. Vajda 2009; Khabtagaeva 2019, but see also Georg 2001; Vovin 2007; Georg 2008; Vovin 2017). However, in the case of the 5 loanwords listed in Table 4, it can be established on independent grounds that (1) they belong to the Yeniseian inherited lexicon (Werner 2002a; Werner 2002b; Werner 2002c; Werner 2005; Bonmann et al. 2023; Fries & Bonmann 2023; Hill et al. 2024), (2) the directionality of the language contact situation was Yeniseian → Turkic, Mongolic and (3) the language contact situation had been established in Proto-Turkic and Proto-Mongolic times already.

This can be inferred from three facts. Firstly, the loanwords listed are attested in all primary branches of Turkic and Mongolic. Secondly, these loanwords participate in younger phonological changes known to have operated only in individual Turkic and Mongolic subbranches, languages and varieties. This implies with necessity that the lexemes entered Turkic and Mongolic at a time when these had not yet disintegrated into distinct daughter-languages, that is in Proto-Turkic and Proto-Mongolic times. Thirdly, all loanwords in Table 4 show a diagnostic trait that allows for unambiguously identifying their exact source of origin as one particular Yeniseian language, namely Arin: They all feature word-initial velar phonemes that reflect an original **k*- directly corresponding to word-initial *k*- in Arin words with identical or similar semantics, while the corresponding words in all other Yeniseian varieties feature no such onset. The items in Table 4 therefore instantiate the regular

correspondence set depicted in Table 1. It can thus be concluded that (a) the presence of the word-initial velar phoneme in the items in Table 4 is a valid diagnostic criterion for identifying the source language of the Turkic and Mongolic loanwords and that (b) judging by the regular sound correspondences of Table 1 this language was a Yeniseian language that must have been phylogenetically close to or identical with Arin. For reasons of parsimony and a lack of evidence suggesting otherwise, we tentatively assume that this variety was identical with an early stage of Arin that we call *Old Arin*.

The alternative possibility that the items were independently borrowed by Arin or the other Yeniseian languages from Turkic or Mongolic would either separate the Arin word forms from their otherwise exact cognates in the Yeniseian sister languages without initial *k*-, or it would imply that the other Yeniseian languages lost word-initial **k*-. There are two arguments against such an alternative scenario: Firstly, the items displayed in Table 4 cannot be further etymologized in Turkic and Mongolic terms, but belong to the Yeniseian inherited lexicon, as becomes evident from different derivatives to the underlying roots (e.g. Arin H *kur* 'water' forming the base for Arin H *kuraasa* 'rain', which, in turn, was borrowed into Proto-Mongolic). Secondly, the word-initial *k*- in the Arin form regularly corresponds to a zero onset in the other Yeniseian languages and is thus paralleled in other parts of the lexicon (Fries & Bonmann 2023). As word-initial Proto-Yeniseian **k*- was neither lost in Arin nor in the other Yeniseian languages (cf. Arin H *kute* 'autumn': Southern Ket *kə̄·t*, Yugh *kə̄·t*, Kott C *kêti* 'winter', Pumpokol M *kütschidȉn* 'cold' and the other items in Table 3), the word for 'water' cannot be a Proto-Yeniseian loanword from a non-Yeniseian language and must therefore be regarded as an Old Arin loanword in Turkic, notwithstanding negligible semantic shifts (e.g. 'water' > 'body of water, lake') and minor phonological adaptations concerning the vocalism.

Language contact between members of two or more phyla can occur repeatedly at different periods of time and with different languages acting as the donor. This becomes clear from 'silver' which must belong to the Yeniseian inherited lexicon judging by the following cognates: 'silver' is Arin M, Kl *kumɨš*, while 'tin' is Ket *uml'a*, *umɔl'a*, Ket (18th century) M *úmula*, Eed-Šeš *umel*, Yugh (19th century) *ûmola*, Assan Kl *ɨmatɨp* (cf. also Assan M, Kl *imajti* 'brass'). Based on the established facts about Yeniseian historical phonology (Arin *k*-: zero onset in Ket, Yugh, Assan), the first parts in 'silver' and 'tin' – taking them as compounds, respectively – can be cognate, while the second parts are different.[8] We conclude that Proto-Yeniseian had a simplex or base **u̯um*- denoting either 'silver' or 'tin' (or rather 'greyish metal'?) which could be used to form either compounds or derivatives. In any case, **u̯um*- developed into Old Arin **kum*-. A form **kumiš* 'silver' (> Arin *kumɨš*) was borrowed into Proto-Turkic, adapted to Turkic phonotactics (vowel harmony: *kümüš*) and then, at some indeterminable point in time, secondarily borrowed again into a Yeniseian language (Kott C *kumuš* 'silver, money') as a result of cultural hegemony of Turkic tribes in Inner Asia. The Bulghar word for 'silver' reflects lambdacism with /*l*/ for Common Turkic /*š*/, which is one of the most basic and characteristic innovations that sets apart Bulghar from Common Turkic (Schönig 1999: 69, fn. 65). This shows that the borrowing of the word for 'silver' took place in Proto-Turkic times, because the division into the two primary Turkic branches Bulghar and

[8] An alternative explanation of Ket *uml'a*, *umɔl'a* etc. 'tin' as borrowings of Russian *olovo* 'brass', 'pewter' has been suggested to us by a reviewer. However, as the exact phonetic development remains unclear in this explanation, and it cannot account for Kott *kumuš* 'silver' etc., it seems to us that our account is more economical. What is relevant for our line of argumentation in particular are the first parts of the compounds which end in *-m*, not the second elements with a lateral sound or sibilant (Ket *um*-[*(ɔ)l'a*] ~ Arin *kum*-[*iš*]). The second part of 'tin, brass' might very well be the result of cyclical renewal of compound elements, or it could continue the derivative suffix *-la* in the sense Proto-Yeniseian **u̯um*- 'silver': pre-Ket **u̯um-(V)l'a* 'silver-ish' discussed in more detail further below (cf. Werner 1997c: 69; Georg 2007: 140).

Common Turkic must by necessity postdate the borrowing of these Yeniseian words into Proto-Turkic, as otherwise they would not have participated in the defining Bulghar phonological innovation *-*š* > -*l*. In Mongolian, the word for 'birch' likewise undergoes Post-Proto-Mongolic spirantization of *k > q/x, as does the parallel case of the word for 'rain'. This shows that the borrowings equally took place in Proto-Mongolic times.[9]

The fact that Proto-Turkic and Proto-Mongolic borrowed forms with a word-initial voiceless velar stop /*k*/ indicates that all hypothesized changes from a Proto-Yeniseian labiovelar approximant *$\underset{\sim}{u}$- [w] to Arin *k*- had been completed by the time of the borrowing. The language contact situation manifest in the items of Table 4 can thus be used (1) to calibrate the age of Proto-Turkic and Proto-Mongolic by means of providing a rough *terminus post quem* (viz. roughly contemporary with the Xiōng-nú empire – implying, for instance, that the Turkic split into Bulghar and Common Turkic is max. ca. 2,200 years old, and probably even more recent) and (2) to infer a *terminus ante quem* for sound changes relevant for Yeniseian historical phonology. In particular, a sound change of word-initial Proto-Yeniseian *b- > p- and *d- > t-, structurally parallel to *g- > k-, constitutes an important phonological isogloss of the Yeniseian phylum which separates Kott, Assan and Arin from Pumpokol, Yugh and Ket into a Northern and Southern group (see Bonmann et al. 2023: 66–69). The language contact situation discussed here implies that the isogloss between a northern Yeniseian group (Ket, Yugh, Pumpokol) and a southern one (Kott, Assan, Arin) in terms of the devoicing of Proto-Yeniseian word-initial voiced stops in Kott, Assan and Arin dates back to a period preceding the language contact with Proto-Turkic and Proto-Mongolic. Both Proto-Turkic and Proto-Mongolic preserve Old Arin words like 'water' or 'birch' with a devoiced onset in a fossilised form and thus demonstrate that by the time of the borrowing the donor language had already devoiced at least word-initial velar stops, even secondary ones (*k- < *g- < *$g\underset{\sim}{u}$- < *$\underset{\sim}{u}$-). The *terminus ante quem* for this sound change may therefore be dated to the time between the end of the Xiōng-nú empire and the later expansion of Xiōng-nú descendants after ca. 350 AD.

The presence of Arin loanwords in Proto-Turkic and Proto-Mongolic indicates that Old Arin was a prestigious language in ancient Inner Asia. This view is very well compatible with the hypothesis that it was the native language of the ruling dynasty of the Xiōng-nú empire. Three other sets of primary linguistic data support this identification: (1) the so-called Jié couplet and Xiōng-nú glosses in Chinese texts, (2) Hunnish personal names and (3) toponymic/hydronymic evidence.

4. The Jié couplet and Xiōng-nú glosses

The so-called Jié couplet is a passage included in the Jìn shū, a 7th century Chinese chronicle, that seems to preserve two phrases in the Xiōng-nú language written in contemporary Chinese characters. It refers to incidents in 307–311 AD among a subgroup of the Xiōng-nú, namely the Jié 'barbarians', and is thus widely considered the only text known so far directly documenting the Xiōng-nú language (though note Vovin 2020). The couplet has traditionally been interpreted as preserving a Turkic language (Shiratori 1900; Bazin 1948; von Gabain 1949; Dybo 2007; Shimunek et al. 2015), but recently Vovin et al. (2016) have convincingly falsified these Turkic hypotheses and offered a new reading and interpretation, concluding that the text contains two Yeniseian verb phrases which they regard as Pumpokol (cf. Vovin 2000; Vovin 2003; Vovin 2020). Table 5 gives the interpretation of the Jié-couplet according to Vovin et al. (2016: 138).

[9] We would like to thank a reviewer for pointing out to us the similarity of Arin *kus* 'birch' with Proto-Uralic **kuće* 'birch'. This might either be a coincidental similarity or reflect a loan from Old Arin into Proto-Uralic.

Table 5. Analysis, reconstruction and interpretation of the Jié couplet according to Vovin et al. (2016)

Chinese	秀支	替戾岡	僕谷	劬禿當
Reconstruction	*sjuwH ke	t^{h}ejH lejH kaŋ	bok kok	guo t^{h}ok taŋ
Glossing	Army	go out	[barbarian title]	catch
Yeniseian reconstruction	*śuke	t^{5}-il^{2}-ek^{0}-aŋ-^{1}	Bokkok	got^{7}-o^{4}-kt^{0}-aŋ-^{1}
Morpheme divisions	?	out^{5}-PAST^{2}-go^{0}-3ANIM.PL.SBJ-^{1}	?	foot(?)^{7}-3MASC.SG.OBJ^{4}-take^{0}-3ANIM.PL.SBJ-^{1}
Glossing	army (? armies)	they went out	[barbarian title]	they (will) catch
Translation	'Armies went out and will catch Bokkok!'			

The systematic comparison of some of the elements of the couplet with inherited Yeniseian lexical items and morphological markers in accordance with the established facts on the historical phonology and morphology of the Yeniseian languages laid out in recent grammatical descriptions and research articles (Werner 1997a; Werner 1997b; Werner 1997c; Werner 2005; Georg 2007; Hill 2008; Fortescue & Vajda 2022; Bonmann et al. 2023; Fries & Bonmann 2023; Hill et al. 2024) reveals that due to its morphological and phonological makeup it most probably reflects Arin rather than Pumpokol, because the phonological and semantic makeup of the constituents of the couplet match Arin better. Vovin et al. (2016: 137) point out themselves that the grapheme glossed as 'army' and read as /*ke*/ is strikingly reminiscent of the Arin word for 'army', both in form and meaning. The comparable forms Southern Ket *kàl'*, Central and Northern Ket *kà:l'i*, *kà:l'e*, 18th century Imbat Ket (Ad) *kal*, Yugh *kà:ˤr*, Kott C *hali* and also Pumpokol (VW) *karɨ* all display the vowel /*a*/ and mean 'war', only Arin (H) *kel* shows the vowel *e* and means 'army' which fits the reading <*ke*> much better. The lack of a liquid/rhotic coda /*l* ~ *r*/ should probably be attributed to the Chinese writing system.

Apart from this, the two verb phrases both end in velar nasals: 'they went out' uses a final grapheme read by Vovin et al. as <*kaŋ*>, while 'they (will) catch' ends in <*taŋ*>. Verbal endings in *-ŋ* have first been interpreted as indicating a Yeniseian variety by Pulleyblank (1962: 246). While third person subject predicative endings in *-aŋ* are featured by all Yeniseian languages alike (Fortescue & Vajda 2022: 430–31), the presence of <*taŋ*> rather suggests that the third person subject ending of the second verb-form 'they (will) catch' was indeed *-taŋ*, which is attested as a third person plural ending only – and remarkably so – in Arin (Werner 2005: 152).

This also holds true for some glosses in Chinese texts that preserve Xiōng-nú words (Pulleyblank 1962: 240), mostly personal names, but also some common nouns. While most glosses betray a Yeniseian background but cannot be attributed to one Yeniseian language in particular, the Xiōng-nú title **ṭengri k^{w}ala* 'Son of Heaven' (Pulleyblank 1962: 241, 244–45; Vovin 2003: 391; Vovin 2020: 320) or at least its second element can be considered Arin with utmost probability. The first part, **ṭengri*, has been discussed in detail by Georg (2001) as being the ultimate source of the Turkic and Mongolic word for 'sky, sky god' and is either Turkic in origin or reflects heavy secondary adaptation of an originally Yeniseian word to Turkic grammar. The second part, Xiōng-nú **k^{w}ala* 'son', is strikingly reminiscent of words denoting 'son' in two Yeniseian languages, namely Arin H *akel* 'son' (cf. also *akel'a* 'daughter'), Arin M, Kl *bik'ál* = *bi=k'ál* 'my son' and Pumpokol M *phálla* 'son'.

A closer look, however, reveals that *k^w*ala* (Vovin 2020: 320) is phonetically only compatible with the Arin form rather than the Pumpokol one. A change of word-initial *k^w* into Pumpokol *p-* is undocumented and remains without a parallel. Instead, the Pumpokol form is better segmented as *p=hálla* 'my = son'. The prefix *p-/b(i)-* is repeatedly used in the Yeniseian languages to express possession in the first-person singular, as Arin M, Kl *bik'ál = bi=k'ál* 'my son' illustrates (Werner 2005: 151; Fortescue & Vajda 2022: 404–9). The form *k^w*ala* therefore most probably reflects an intermediary developmental stage in the process from Proto-Yeniseian *u̯al- 'son' to *akel, bi=k'al* in Arin, namely *ku̯al- < *gu̯al- (cf. Fries & Bonmann 2023). This *ku̯al-/*k^w*ala* could be directly continued in the second element of Arin M, Kl *bik'ál = bi=k'ál* 'my son'.

Something similar holds true for the Xiōng-nú word for 'milk' (Pulleyblank 1962: 251–52), which has been read by Pulleyblank as *tịóŋ* and connected with Arin H *tenkul* (literally, 'milk-water'), Pumpokol M *den* 'milk'. The voiceless onset of the Xiōng-nú word also favours an Arin origin, because unlike the Pumpokol form that features a voiced word-initial *d-* the Arin form also regularly features voiceless *t-* in this position (Bonmann et al. 2023). It can thus be established on the basis of a systematic comparison of the Jié couplet and the glosses with what we know about Yeniseian historical phonology and morphology that the language of the Xiōng-nú was most probably an early form of Arin or at least contained an early Arin element. This can also be demonstrated with some probability for Hunnish personal names.

5. Hunnish anthroponymy

Xiōng-nú descendants migrated into the Altai-Sayan region in the 2nd century AD and settled in an area where one would expect Arin to have been spoken afterwards. As mentioned earlier, toponymic data indicate that the attested 18th century range of Yeniseian languages probably reflects a later northward movement from a place of origin in the Altai-Sayan area, around the headwaters of the Yenisey, the Ob and the Irtyš rivers (see Dul'zon 1959a; Dul'zon 1959b; Dul'zon 1964; Maloletko 1992; Maloletko 2000; Vajda 2019: 194–95; cf. also Janhunen 2020: 167). The presumed Proto-Yeniseian homeland in the Altai-Sayan area does therefore probably not represent the original Yeniseian *Urheimat*, but a retreat area of the Xiōng-nú following their decline. This retreat was then secondarily also a place of origin from where Yeniseian languages spread northwards, southwards and westwards ca. 350 AD.

In the west, the Huns did not leave any textual remnants of their language (or at least none are known to us).[10] The only trace of the Hunnish language is personal names of members of the ruling dynasty or of courtiers, which have been collected by Doerfer (1973) and Pritsak (1982). The Hunnish realm was without doubt multilingual and multi-ethnic, encompassing inter alia Germanic tribes and Iranian elements (Alans), yet the ethnic core came from the East and consisted of Xiōng-nú descendants (de la Vaissière 2005; de la Vaissière 2014; Gnecchi-Ruscone et al. 2025). Previous works on the Hunnish language interpreted the names of the ethnic core mainly as Turkic, Germanic, Iranian or Slavic (see, in addition to Doerfer 1973; Pritsak 1982 also Werner 2014 with references). However, a rigorous historical-comparative analysis of the onomastic material has never been published

[10] Three allegedly Hunnish terms have been documented by ancient historiographers (discussion in Doerfer 1973: 14–9): 1. *strava* 'funeral banquet (?)', attested/documented in Iordanes, Getica 49, 258: *Postquam talibus lamentis est defletus, stravam super tumulum eius, quam appellant ipsi, ingenti comessatione concelebrant*. The questionable word, *strava*, has been connected with Old Polish *strawa* 'epulae, feralis' and Old Czech *strava* 'funeral meal' and might thus be a Slavic term.–2. μέδος *médos* 'drink, mead', documented in Prisc. 8,65 (Carolla 2008: 28): ἀντὶ δὲ ὄνου ὁ μέδος ἐπιχωρίως καλούμενος. This is most likely an Indo-European word, cf. Sanskrit *mádhu* n. 'sweet drink; honey'; Greek μέθυ n. 'wine'; Old High German *metu* m., Old Saxon *medo* m. 'mead'; Old Irish *mid* n./m. 'mead'; Old Church Slavonic *medъ* 'honey', Russian *mëd*, Czech *med* 'honey, mead' etc.–3. κάμον *kámon* 'drink, beverage', according to Prisc. 8,65 (Carolla 2008: 28): τὸ ἐκ κριθῶν (…) πόμα· κάμον οἱ βάρβαροι καλοῦσιν αὐτό.

(Dul'zon 1968; Werner 2014). We briefly discuss three names which indicate that the Hunnish language was a Yeniseian variety: first, the name of the most famous Hun, Ἀττίλα/*Attila* (see Doerfer 1973: 29–32; Pritsak 1982: 434, 444), then Ἀτακάμ (*Atakám*, a member of the Hunnish royal dynasty) and Ἐσκάμ (*Eskám*, an alleged father-in-law of Attila, see Pritsak 1982: 434, 442–45).

Attila is arguably the most famous Hunnish name. Usually, *Attila* is explained as a Germanic nickname with diminutive semantics – 'little father' –, based on Gothic *atta* 'father' and a diminutive suffix *-ila* (Doerfer 1973; Maenchen-Helfen 1973: 386). However, a Yeniseian interpretation is equally possible. Modern Southern and Northern Ket *aˀt*, Yugh *aˀt'* 'quick, early, soon' have cognates in Arin H *atɨ* (Cyrillic *аты*) 'quick' and Kott C univerbated *et=paŋ* 'not so soon' (reversed order in Yugh *bən' aˀt'* 'not so soon'; see Werner 2002a: 72, 81, 86). As the Arin form shows, the word originally ended in a central vowel /ɨ/ (lost in Ket, Yugh and Kott) and had /a/-vocalism in the first syllable (unlike Kott, which seems to show secondary umlaut). Since this is an adjectival stem, adjectival suffixes might have been attached in order to derive other words. Modern Ket has an emphasising suffix *-la*, 'which may, according to context, also convey the notion that the quality expressed by the adjective holds only to a certain degree: *úkde* "long": *úkde-la* "longer, quite long, rather long, long-ish"' (Georg 2007: 140; cf. also Werner 1997c: 69). Quite interestingly, the very same suffix is also reflected in both Kott (here with restrictive semantics resembling the Ket situation, cf. *ton* 'knife': *ton=la* 'only/just a knife', cf. Castrén 1858: X, 151, 153, 212; Werner 2002b: 1) and in Arin nominal word formation (cf. M *kur* 'wet; water; rain': H *kur=lo* 'dew'; H *otši* 'forest': H *otši=l* 'tree'; M *sájbi* 'tomorrow': M *sábe=la* 'the day after tomorrow', cf. Werner 2005: 160, 162, 164), and is thus almost certainly of Proto-Yeniseian date. Most probably it originally expressed different degrees of the realisation of a given property ranging from restrictive to elative semantics just like English *-ish* as in *long-ish* 'somewhat long, relatively long', *green-ish* 'somewhat green, relatively green' etc.

Accordingly, we propose that the Hunnish name *Attila* can plausibly – though certainly by no means necessarily – be explained as an Old Arin emphasised adjective **atɨ-la* 'quicker, quite quick, rather quick, quick-ish', which might have been an epithet in origin. This explanation would on the one hand follow established principles of Yeniseian word formation and phonology. On the other hand, it would also point to Arin, because only Arin features a disyllabic root *atɨ* 'quick', unlike Ket, Yugh and Kott. Epithets of the type 'quick' are typologically common (cf. the frequent Roman cognomen *celer* 'swift' on which cf. Strothmann & Eck 2006, the English surname *Swift* as in *Jonathan Swift*, or the Sanskrit male given name *Raghu* 'quick' best known from the legendary King Raghu whose story is told in Kālidāsa's *Raghuvaṃśa*). The only concern may be the geminate *-tt-* that is almost always attested instead of the expected single *-t-* (with the sole exception of the 11th/12th century Historia Pseudoisidoriana attesting *Atal-*, cf. Hist. Ps.-Isid. 10 as per Mommsen 1894: 384). This is perhaps due to an ancient folk etymology of speakers of Germanic languages among the Hunnish empire's multi-ethnic population, or simply an artefact of the documentation owed to an imperfect rendering of the original phonetic makeup of the name by Greek historians such as Priscus (in post-classical Greek the phonemic difference between geminates and non-geminates had been given up so that geminate spellings can be secondary, cf. Schwyzer 1939: 230–32; Mayser 1970: 185–98; Gignac 1976: 154–65).

Two other Hunnish names, Ἐσκάμ and Ἀτακάμ, are transparent compounds with a second part preserved in Greek writing as -κάμ and different first parts. Pritsak (1982) connects -κάμ with Middle Turkic *kām*, Uigur *kam* etc. 'shaman' which, however, probably represents a loanword in Turkic (Räsänen 1969: 228). He further explains Ἐσ- as having meant 'great' and Ἀτα- as 'father'.

However, a Yeniseian explanation of Ἐσ- is suggested by Yeniseian cognates meaning 'sky, god': Ket *ēˑsʼ*, pl. *esʼâŋ*, Eed-Šeš *oësh*, Yugh *ēs*, pl. *esêŋ*, Pumpokol M *etsch*, Kl *eč*, Arin H *ɛs*, M *es*, Str *eš*, Assan M *öš*, *ös*, F *ɛs*, *ɛš*, Kl *eč*, Kott C *êš*, pl. *êčán*, H *ɛš*, M *eš*. The other compound, Ἀτακάμ, may be formed either with Old Arin **atɨ* 'quick' like *Attila* or with the Yeniseian word for 'alive', reflected in Southern Ket *èt*, Central and Northern Ket *èːte*, Imbat M *eddi*, Kl *eetedu*, Yugh *èːʕt*, 18th c. *eetedu*, Pumpokol M *átodu*, VW *etʼgeg*, Arin M *átie*, Kl *ätie*, Kott C *êti*, pl. *êtaŋ*, M, Kl *éditu*, Assan M, Kl *éditu*, Kl *etutu*. Only Pumpokol and Arin show *a*-vocalism in the root syllable, compared with *e*-vocalism in Ket, Yugh, Kott and Assan. While 'sky, god' is not exclusive to Arin, the second name's first constituent suggests an Arin or Pumpokol origin continuing a preform **ata*. The second element -κάμ of both names can also be interpreted in Yeniseian terms. It finds a seemingly exact counterpart in Arin *-qam* 'wife' as featured in M *bɨqam alte* '(my) wife' (with possessive *bɨ-*). The *a*-vocalism of *-qam* is specifically Arin and not matched in the other Yeniseian languages, where we find Pumpokol M *il-sèm* 'wife' (also with a palatalised consonant *-sˈ-*), Ket *qīˑm*, Yugh *χēm*, *χim* 'woman, wife' with an *e-* or *i*-vowel. This almost certainly suggests an Arin origin of the onomastic element -κάμ and the names formed with it.

The compound Ἀτακάμ (the name of a member of the Hunnish dynasty) may therefore be analysed as a determinative compound of the type *blackbird* = '(being a) black bird': Ἀτακάμ = Old Arin **ata-* 'alive'/* + *-qam* 'woman, wife' = '(being a) lively woman'. The compound Ἐσκάμ (allegedly the father of one of Attila's wives) is either a possessive compound like *redhead* = 'having a red head (hair)' – i. e. Ἐσκάμ = Arin *es* 'sky, god' + *-qam* 'wife' = 'having a heavenly/godly (beautiful, noble) wife' – or a determinative compound like Ἀτακάμ: Ἐσκάμ = Arin *es* 'sky, god' + *-qam* 'wife' = '(being a) heavenly/godly wife'. The latter scenario seems much more probable in light of the fact that quite remarkably the very same compound is attested in 20th century Ket as the female title *Esʼqim* 'goddess, god's wife' (Werner 2006: 37–8; cf. also Ket *Esʼta qīˑm* lit. 'god's wife' with *-ta* functioning as a possessive marker). Based on a fragmentary passage narrated by Priscus,[11] the name Ἐσκάμ is usually understood as a male name, namely the name of the father of a woman Attila took as a wife (Pritsak 1982: 442–43). However, due to the lack of a clear morphological marking of the form, the context of the passage is ambiguous in this regard and allows for the interpretation of Ἐσκάμ as either a male or a female given name. As it seems very unlikely to us that the attestation of *Esʼqim* 'goddess, god's wife' as a female title in 20th century Ket should be a coincidence given the possibility to derive Ἐσκάμ from an Old Arin determinative compound consisting of Arin *es* 'sky, god' + *-qam* 'wife' and meaning 'heavenly/godly wife', we therefore conclude that Hunnish Ἐσκάμ is also a female given name and that thus it refers to the woman Attila married or her mother rather than her father.

As both the first and second element of the Hunnish personal names *Attila*, Ἀτακάμ and Ἐσκάμ can therefore be derived from Arin nominals, it can rather confidently be concluded that they are Arin in origin. This implies that the ethnic core of the Huns was at least partly constituted by speakers of a variety of Arin. Further independent support for this assumption is provided by an entirely different domain of linguistic evidence: toponyms and hydronyms in Inner Asia.

[11] Prisc. 8,63 (Carolla 2008: 28): Τοῦ δὲ Βιγίλα ἐξορμήσαντος, μίαν μετὰ τὴν ἐκείνου ἀναώρησιν ἡμέραν ἐπιμείναντες τῇ ὑστεραίᾳ ἐπὶ τὰ ἀρκτικώτερα τῆς χώρας σὺν Ἀττήλᾳ ἐπορεύθημεν, καὶ ἄχρι τινὸς τῷ βαρβάρ ῳ συμπροελθόντες ἑτέραν ὁδὸν ἐτράπημεν, τῶν ξεναγούντων ἡμᾶς Σκυθῶν τοῦτο ποιεῖν παρακελευσαμένων, ὡς τ οῦ Ἀττήλα ἐς κώμην τινὰ παρεσομένου, ἐν ᾗ γαμεῖν θυγατέρα Ἐσκὰμ ἐβούλετο, πλείστας μὲν ἔχων γαμετάς, ἀγό μενος δὲ καὶ ταύτην κατὰ νόμον τὸν Σκυθικόν.–The lack of any unambiguous morphological marking of the name Ἐσκὰμ allows for interpreting it as the name of the father of the θυγατέρα as usually assumed (although it lacks a genitive marking), of her mother, or as an apposition to θυγατέρα, i. e. the name of the woman herself.

6. Toponymic and hydronymic evidence

Although hydronyms and toponyms of Yeniseian origin have already been collected and led to important insights into aspects of the population history of Inner Asia in general and the Yeniseian-speaking peoples in particular (cf. already Dul'zon 1959a; Dul'zon 1959b; Maloletko 1992; Maloletko 2000; more recently Vajda 2019), a detailed linguistic account of the relevant data in areal and geographical terms correlating the distribution of the Yeniseian toponyms and hydronyms with early waves of migration extending beyond the most central parts of Inner Asia has so far been wanting.

Our analysis of two representative samples of 171 and 108 Yeniseian hydronyms and hydronym-derived toponyms presented here is intended as a further step towards such an account. The two samples were created through determining with the help of geographic information systems (Yandex, QGIS) the coordinates and geographical distribution of a given set of established toponyms and hydronyms in all six Yeniseian languages that are listed by name and partly also roughly located in the relevant treatises (Dul'zon 1959a; Dul'zon 1959b; Maloletko 1992; Maloletko 2000). They are provided in all detail (including a list of all the particular hydronyms and toponyms together with their coordinates and coordinated languages) as the Supplementary Material (S1). The comparison of the geographical distribution of the items of these two samples with the established historiographical, archaeological and genetic findings concerning the Yeniseians and their migration on the one side (Werner 2005; Vajda 2019; Janhunen 2020) and the Xiōng-nú and Huns and their respective migration on the other (de la Vaissière 2005; de la Vaissière 2014; now Gnecchi-Ruscone et al. 2025) allows for interesting inferences concerning the relation between the Yeniseians, Xiōng-nú and Huns.

Figure 1 shows a map of Inner Asia depicting the geographical distribution of the first sample, a representative collection of 171 hydronyms and hydronym-derived toponyms built

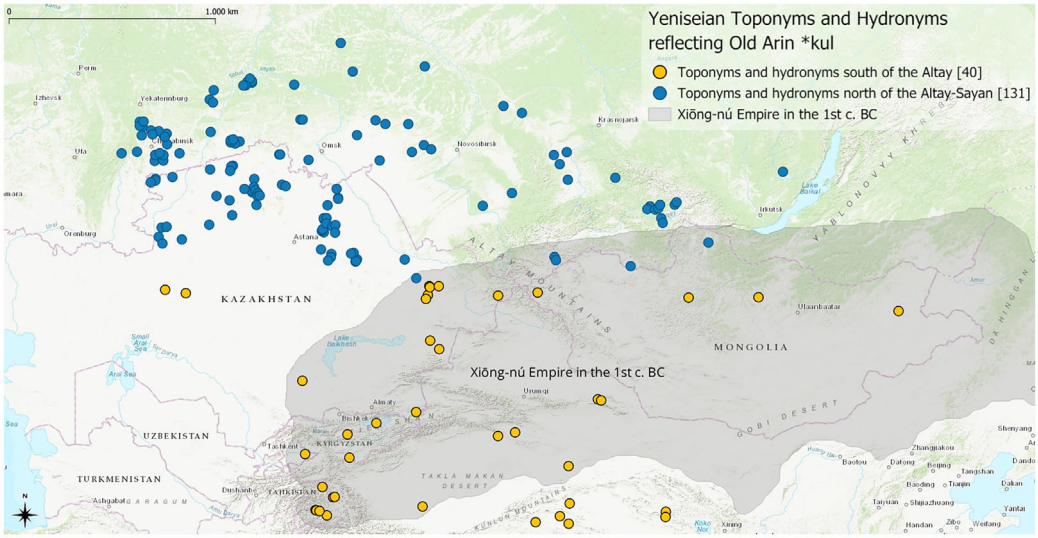


Figure 1. Toponyms and hydronyms reflecting Old Arin **kul* in Inner Asia [Based on the 'World Topographic Map' by Esri. Sources: Esri, HERE, Garmin, Intermap, INCREMENT P, GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), © OpenStreetMap contributors, GIS User Community, Simon Fries. Created with QGIS 3.36.]

with the element *-kul/-kül/-köl* vel sim. (extracted from Dul'zon 1959a; Dul'zon 1959b; 1966–1980; Resursy poverkhnostnyx vod SSSR; Maloletko 1992; Maloletko 2000 and the 'Esri World Topographic Map' with the help of Yandex and QGIS). As the map shows, 131 of these names occur north of the Altai-Sayan Mountain Range, while 40 occur to its South. The large majority occur north-west of the Altai-Sayan and in our view reflect Old Arin **kul* 'water' as it was also borrowed into Proto-Turkic (cf. Table 4 in section 3).

The hydronyms have been widely attributed to the Turkic expansion of the 1st millennium AD (Dul'zon 1959a; Maloletko 2000) superposing an older layer of Iranian toponyms in Inner Asia (Dul'zon 1964). However, they are strikingly in accordance with Arin M H *kul* 'water' and it is likely that they reflect the former extent of an Arin-speaking or Arin-dominated territory that partly overlaps with the sphere of influence of the Xiōng-nú and the Huns. This is especially probable given the fact that hydronyms in *-kul* are not only featured in areas where Turkic languages have predominantly been spoken but also in the Siberian region north of the Altai and Sayan Mountains that in the 1st millennium AD was dominated by a Yeniseian-speaking population (cf. Werner 2002c: 55–6). This is also reflected in numerous other hydronyms and toponyms that are undoubtedly of Yeniseian origin (cf. Vajda 2019 and our Figure 2 below). Forms in *-kül/-köl* etc. such as Kirgiz Ysyk-Köl (Ысык-Көл 'warm lake' in the western Tianshan Mountains) with slight vocalic and consonantal variation are thus probably due to secondary Turkic folk etymology adopting older Arin hydronyms with the element **kul* 'water' in accordance with individual reflexes of the inherited Proto-Turkic **kōl* 'lake' that was itself borrowed from Old Arin **kul*. If the toponyms with **kul* south of the Altai-Sayan area were not coined by Turkish peoples but by speakers of Old Arin they might be a good proxy for the Xiōng-nú sphere of influence which apparently encompassed also the Tarim Basin and its surroundings.

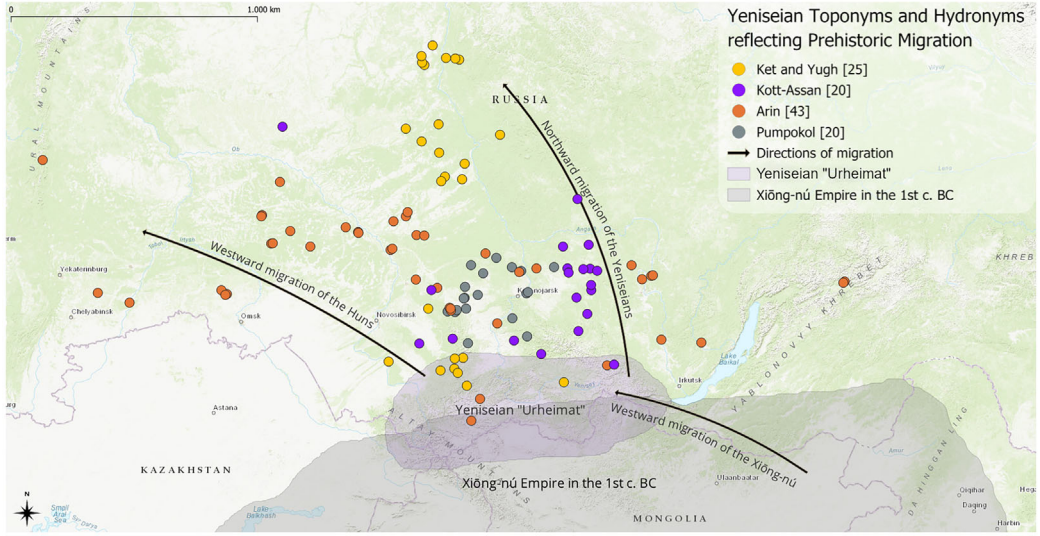


Figure 2. Yeniseian toponyms and hydronyms reflecting prehistoric migration [Based on the 'World Topographic Map' by Esri. Sources: Esri, HERE, Garmin, Intermap, INCREMENT P, GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), © OpenStreetMap contributors, GIS User Community, Simon Fries. Created with QGIS 3.36.]

The geographical distribution of the items of the second representative sample of 108 additional Yeniseian hydronyms and hydronym-derived toponyms in Inner Asia depicted in Figure 2 (extracted from Dul'zon 1959a; Dul'zon 1959b; *Resursy poverkhnostnyx vod SSSR* 1966–1980; Maloletko 1992; Maloletko 2000 and the 'Esri World Topographic Map' with the help of Yandex and QGIS) in our view provides the final conclusive clue indicating that those parts of the Xiōng-nú that later constituted the ethnic core of the Huns were indeed speakers of an early form of Arin. The items were for the most part chosen for the sample and allocated to a particular Yeniseian language according to two simple criteria: They were chosen if (a) they contained a more or less secure reflex of the common Yeniseian word for 'river' serving as a diagnostic criterion to identify hydronyms and hydronym-derived toponyms of Yeniseian origin and distinguish their respective Yeniseian source, and if (b) they could be located geographically more or less reliably.

The Proto-Yeniseian word for 'river' has different outcomes in the historically documented Yeniseian languages: Kott C *šêt*, Assan M *šet*, Arin M *sat*, Pumpokol M *tát-aŋ* (a secondary plural of °-*tat*), Yugh *sēs*, Ket *s'ē·s'* (cf. Bonmann et al. 2023: 60; Hill et al. 2024: 256). One can see that the word-initial consonant and the word-final consonant vary: the word-initial consonant is a postalveolar fricative *š-* in Kott-Assan, a dental/alveolar fricative *s-* in Arin, a similar fricative in Ket-Yugh, but a dental/alveolar plosive *t-* in Pumpokol, while the word-final consonant is a dental/alveolar plosive *-t* in Kott-Assan, Arin and Pumpokol, but a dental/alveolar fricative in Ket-Yugh (with palatalization in Ket). Hydronyms or hydronym-derived toponyms featuring the Yeniseian word for 'river' can therefore be distinguished reliably according to the consonantal makeup of the respective reflex: names reflecting *š-* and *-t* are most probably Kott-Assan, hydronyms reflecting *s-* and *-t* are most probably Arin, names reflecting *t-* and *-t* are Pumpokol, and names mirroring *s-* and *-s* are Ket-Yugh in origin.

As both the consonantal and vocalic makeup of the reflex of the word for 'river' can be subject to trivial phonetic variability, voiced or voiceless and palatalized/affricated or non-palatalized/non-affricated variants of the consonants were also taken into consideration, and the quality of the vocalic reflex was ignored (in accordance with Dul'zon 1959a; Dul'zon 1959b; Maloletko 1992; Maloletko 2000) so that items featuring the following admissible reflexes were collected: *-zas* (8 instances), *-čes* (7), *-sis* (1), *-ses*$^{(')}$ (8) for Ket-Yugh, *-šet* (6), *-žet* (2), *-čet* (10), *-šat* (1), *-čat* (1) for Kott-Assan, *-dat* (7), *-det* (1), *-tat* (7), *-tet* (3) for Pumpokol, and *-zat* (2), *-zet* (5), *-zed* (4), *-sat* (7), *-set*$^{(')}$ (3), *-žet* (2) for Arin (the latter form being indistinguishable from the corresponding Kott-Assan form, which does not distort the over-all picture, however). In addition to this, unambiguous cases of hydronyms or hydronym-derived toponyms containing Arin *-kul* 'water' were also counted (20 instances), and in the case of two Pumpokol names and one Ket-Yugh name a few more ambiguous cases were also included in accordance with earlier assessments (made by Maloletko 2000). We thus arrive at a sufficiently large sample of 25 Ket-Yugh, 20 Kott-Assan, 20 Pumpokol and 43 Arin hydronyms and hydronym-derived toponyms that provide a fairly representative picture of the original geographical distribution of the Yeniseian languages and the Yeniseian-speaking population. Comparing this distribution with the migratory trajectories of the Huns and the Xiōng-nú as depicted in Figure 2 reveals a striking correlation.

It can be established that apart from the place names in *-kul*/*-kül*/*-köl* vel sim. the Yeniseian hydronyms and toponyms north-west of the Altai-Sayan Mountain Range are predominantly Arin, while toponyms and hydronyms from the other Yeniseian languages are rather found to the north. From this, it must be inferred that Arin speakers migrated westward from the alleged Yeniseian *Urheimat* in the Altai-Sayan region, while the speakers of the other Yeniseian languages migrated towards the north. This westward migration of the Arin speakers exactly corresponds to the well-known westward migration of the Huns (de la

Vaissière 2005; de la Vaissière 2014). In light of the fact that (a) the ethnic core of the Huns was most probably constituted by Xiōng-nú, who migrated into the Altai-Sayan region in the 2nd century AD (cf. now Gnecchi-Ruscone et al. 2025) and that (b) the Xiōng-nú were most probably speakers of an early form of Arin, as discussed above, this can hardly be a coincidence. We therefore conclude that the Arin speakers migrating westward from the Altai-Sayan region were identical with the Huns migrating westward from the very same region and that consequently the ethnic core of the Huns spoke Old Arin.

7. Conclusion

Our investigation has shown that (a) there are several Old Arin loanwords in Proto-Turkic and Proto-Mongolic, (b) the Jié couplet, Xiōng-nú titles and glosses betray Arin features and thus probably reflect an old form of Arin, (c) Hunnish personal names likewise seem to be Arin in origin ultimately and (d) the Yeniseian hydronyms and hydronym-derived toponyms along the westward migration route of the Huns are predominantly Arin suggesting a correlation between speakers of Arin and the Huns. In a variation of a word by the master detective Sherlock Holmes (in the short story 'The Adventure of the Devil's Foot') it can therefore be established in our view that while each of these pieces of evidence are suggestive, together they are conclusive, because they independently corroborate the implications of each other.

It therefore seems an inevitable conclusion to us that Huns and Xiōng-nú both spoke the same early form of Arin that we have tentatively termed Old Arin here and that consequently the linguistic and thus most probably also the ethnic core of the Huns derived from the Xiōng-nú. These findings corroborate recent archaeological and genetic findings and show that the application of the methodology sketched out here can lead to substantial insights into the linguistic history even of regions such as Inner Asia that are at present underresearched and the history of which is much less perfectly understood than that of many other parts of the world such as Central Europe or the Mediterranean. It is to be hoped that future archaeological excavations may uncover autochthonous texts of the Xiōng-nú or the Huns (perhaps in the recently identified Xiōng-nú capital Lóng Chéng or in southeastern Europe) that allow for further testing of our Old Arin hypothesis. The synthesis of historiographical, archaeological, genetic and linguistic data and the continued application of the methodology presented here will then hopefully gradually lead to an ever deeper understanding of the linguistic history of Inner Asia and similarly underresearched parts of the world so that one day we can draw a consummate picture of the linguistic evolution of mankind.

Acknowledgments

Both authors contributed equally to the writing of this article. We would like to take this opportunity to thank Delia Bentley for her great editorial support, two anonymous reviewers for their valuable comments on an earlier version of this article, and Jürgen Hammerstaedt for his proofreading of the abstracts in the classical languages. Open Access funding enabled and organized by Projekt DEAL.

Data availability statement

The data that supports the findings of this study are available in the supplementary material of this article.

Correspondence
Svenja Bonmann
Department of Linguistics, University of Cologne
Cologne, Germany
Email: svenja.bonmann@uni-koeln.de

Simon Fries
Faculty of Linguistics, Philology, and Phonetics, University of Oxford
Oxford, United Kingdom
Email: simon.fries@classics.ox.ac.uk

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SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

Data S1. Toponymic and hydronymic datapoints.