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## Approaching the historical phonology of three highly eroded Sino-Tibetan languages: Naxi, Na and Laze.

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*Summary:* Naxi, Na and Laze are three languages whose position within Sino-Tibetan is controversial. We propose that these languages are descended from a common ancestor ("proto-Naish"). Unlike conservative languages of the family, such as Rgyalrong and Tibetan, which have consonant clusters and final consonants, Naxi, Na and Laze share a simple syllabic structure (consonant + glide + vowel + tone) due to phonological erosion. This raises the issue of how the regular phonological correspondences between these three languages should be interpreted, and which phonological structure should be reconstructed for proto-Naish. The regularities revealed by the comparison of the three languages are interpreted in light of potentially cognate forms in conservative languages. This comparison brings out numerous cases of phonetic conditioning of the vowel by the place of articulation of a preceding consonant or consonant cluster. Overall, these findings warrant a relatively optimistic conclusion concerning the feasibility of unraveling the phonological history of highly eroded language subgroups within Sino-Tibetan.

*Zusammenfassung:* Naxi, Na und Laze sind Sprachen, deren genaue Anbindung innerhalb der sino-tibetischen Sprachen kontrovers diskutiert wird. Wir schlagen in diesem Beitrag vor, dass die drei Sprachen nah verwandt sind und aus einer gemeinsamen, von uns "Proto-Naish" genannten, Ursprache hervorgegangen sind. Anders als konservative sino-tibetische Sprachen, die wie Rgyalrong und Tibetisch über Konsonantencluster und finale Konsonanten verfügen, sind Naxi, Na und Laze aufgrund phonologischer Erosion durch eine einfache Silbenstruktur aus Konsonant, Glide, Vokal und Ton gekennzeichnet. Dieser Umstand wirft die Frage auf, wie die phonologischen Gemeinsamkeiten zwischen Naxi, Na und Laze zu interpretieren sind und was sie für die Rekonstruktion der phonologischen Struktur des Proto-Naish bedeuten. Wir interpretieren die Regularitäten, die sich aus dem Vergleich der drei Sprachen herauskristallisiert haben, vor dem Hintergrund möglicher verwandter Formen in konservativen sino-tibetischen Sprachen. Durch dieses Vorgehen ergeben sich zahlreiche Fälle, in denen Vokale durch den Artikulationsort des vorangehenden Konsonanten bzw. Konsonantenclusters phonetisch konditioniert werden. Diese Ergebnisse lassen insgesamt die optimistische Schlussfolgerung zu, dass wesentliche Fortschritte in der Rekonstruktion der phonologischen Entwicklung von selbst hochgradig erodierten Sprachgruppen innerhalb der sino-tibetischen Familie möglich sind.

*Résumé:* Le naxi, le na et le lazé sont trois langues dont la position précise au sein du sino-tibétain demeure un sujet de controverse. Nous défendons l'hypothèse selon laquelle elles partagent un ancêtre commun, le "proto-naish". A la différence de langues conservatrices telles que le rgyalrong et le tibétain, qui possèdent des groupes de consonnes à l'initiale et des consonnes finales, naxi, na et lazé partagent une structure syllabique simple, conséquence d'une érosion phonologique poussée. L'interprétation des correspondances régulières entre ces langues requiert la formulation d'hypothèses au sujet de la structure phonologique du proto-naish. L'analyse, en partie guidé par des formes potentiellement apparentées dans les langues conservatrices, fait ressortir de nombreux cas de conditionnement phonétique de la voyelle par le lieu d'articulation de l'élément consonantique qui la précédait. Cette étude illustre le fait que des avancées importantes sont possibles dans l'étude de la phonologie historique de langues sino-tibétaines même très érodées.

*Keywords:* phonological erosion; consonantal conditioning of vowels; syllable structure; Sino-Tibetan; Naxi; Na; Laze

## Introduction. Historical phonology in a Sino-Tibetan context: the pitfalls of comparison between simple forms

The aim of this study is to approach the historical phonology of three highly eroded Sino-Tibetan languages: Naxi, Na and Laze.<sup>1</sup>

"Sino-Tibetan is instructive for the challenges it offers to classification and to the application of the comparative method. For one, the predominance of monosyllabic roots makes it more difficult to distinguish inheritance from sheer chance when monosyllabic words are compared among the languages. There is just a higher chance of possible accidental similarity when it comes to compared short forms (...). Another complication is the extensive borrowing among languages in the area where Sino-Tibetan languages are found" (Campbell and Poser 2008:112).

The target languages of this study are a case in point. Some words are identical in the three languages, raising the issue whether these correspondences may not be due to borrowing, e.g. (giving the forms in the order *Naxi:Na:Laze*) /gɣʰ˥:gɣʰ˥:gɣʰ˥/ for "back (body part)". Others are so different that it is not obvious whether they are cognate at all, e.g. /ku˥˥:ku˥˥:tsi˥/ for "star" and /ku˥˥:ku˥˥:tsi˥/ for "gallbladder, gall".

The Laze forms for "star" and "gall", being phonetically dissimilar to the Naxi and Na forms, were counted among non-cognates between Laze and Naxi in a preliminary attempt to assess the degree of closeness of Laze with Yi/Loloish and Naxi (Huang Bufan 2009). On the other hand, the search for systematic sound correspondences, which constitutes the backbone of comparative work, leads to the opposite conclusion, since the syllabic correspondence /ku˥˥:ku˥˥:tsi˥/ between Naxi, Na and Laze is illustrated by three examples (the third is "tight"; Appendix 2 lists all the items for which cognate sets and reconstructions are proposed). Sifting through all the available vocabulary (about 3,000 entries), the number of words for which there is a reasonably certain correspondence between Naxi, Na and Laze is about 700, leaving aside loanwords and compounds (see, again, Appendix 2). The sheer mass of regular correspondences leads to the conclusion that these three languages belong within one single branch of Sino-Tibetan, to which we refer below as the Naish branch. "We may assert or hypothesize a genetic relation on the basis of [regular sound correspondences]. But the proof of the linguistic pudding remains in the follow-up, the systematic exploitation, the full implementation of the comparative method, which alone can demonstrate, not just a linguistic genetic relationship, but a linguistic history" (Watkins 1990:295). Investigating

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<sup>1</sup> These three languages are spoken in Southwest China; background data, including geographic coordinates and an brief review of available publications, are provided in Appendix 1.

<sup>2</sup> Throughout the article, tones are indicated by means of Chao tone-letters: ˥ for H(igh), ˥ for M(id), ˥ for L(ow), ˥ for MH.

this linguistic history – the historical phonology of Naish – involves proposing reconstructions for phonetic correspondences. Again taking the words for "star" and "gall" as examples, a number of different hypotheses can be advanced to account for the /k:k:ts/ correspondence, such as reconstructing additional consonants or vowels. The choice among the wealth of competing hypotheses should be guided by considerations of plausibility of the evolutions that one needs to postulate from the proto-forms to the present-day forms. The degree of plausibility is to be assessed in phonetic terms, in structural terms, and also in areal terms.

*How data from conservative languages help interpret correspondences observed within the Naish branch*

Naxi, Na and Laze all have a simple syllabic structure: (C)(G)V + T, where C is a consonant, G an on-glide, V a vowel, and T a tone. Brackets indicate optional constituents. There are neither initial clusters nor final consonants in any of the Naish languages and dialects studied so far, and given the wide coverage of the surveys conducted since the early years of the People's Republic of China, it is a safe guess that none will come to light as more varieties come under academic scrutiny.

It is standard practice in historical linguistics to turn to conservative languages within the language family for analysing the history of eroded languages (on this topic, see Fox 1995:57-91 and references therein). We hypothesise that, in the course of their history, the Naish languages have undergone a simplification of their syllable structure, and that certain characteristics of the earlier segments conditioned the evolution of forms up to the modern languages. This hypothesis, which is central to the present study, makes evidence from conservative languages especially useful to interpret the correspondences between Naxi, Na and Laze. However, unlike in the case of the Lolo-Burmese branch of Sino-Tibetan, where the study of historical phonology can draw heavily on a conservative language within the branch (namely Old Burmese)<sup>3</sup>, the Naish languages are not closely related to any conservative language, so that points of reference to analyse nontransparent correspondences (such as /k:k:ts/) have to be sought further out. Table 1 proposes comparisons with three conservative languages of the family.

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<sup>3</sup> About the role of Old Burmese in Lolo-Burmese reconstruction, see Matisoff 1968's review of Burling 1967.

Table 1. Some correspondences between Na, Laze and Naxi, with potential cognates in Rgyalrong<sup>4</sup>, Burmese and Tibetan.

meaning	Naxi	Na	Laze	proto-Naish <sup>5</sup>	Rgyalrong	Burmese	Tibetan
star	kuɿ	kuɿ	tsiɿ	*kri	ʒŋgri	kray <sup>2</sup>	—
gallbladder	kuɿ	kuɿ	tsiɿ	*kri	-ɕkrut < *- ɕkrit	saŋ <sup>3</sup> khre <sup>2</sup>	mkhris
saliva	kiɿ	tɕiɿ	tɕiɿ	*tɕi	-mci	—	—
to tie, to attach	tsuɿ	tsuɿ	tsuɿ	*tsi	—	—	—
muntjac	k <sup>h</sup> iɿ	tɕ <sup>h</sup> iɿ	ts <sup>h</sup> iɿ	*k <sup>h</sup> i	—	khye <sup>2</sup>	—

The /k:k:ts/ correspondence among initials (lines 1 and 2) can only be explained through the reconstruction of a fourth term (neither *ts* nor *tɕ* nor *k*), since we already need to reconstruct \*k<sup>(h)</sup>i, \*tɕ<sup>(h)</sup>i and \*ts<sup>(h)</sup>i to account for the correspondences in the last three lines of Table 1. The reconstruction of a cluster \*kr- is guided by the Rgyalrong and Burmese forms; it receives support from the presence of an -r- in these words in other Sino-Tibetan languages which to this day still allow this medial (see Matisoff 2003:23, 202). In Laze, \*ki and \*kri merge as *tsi*, whereas in the two other languages \*ki merged with \*tɕi instead and the \*-r- in \*kri coloured the vowel, bleeding the palatalisation rule.

Ideally, guidance in reconstructing characteristics of proto-Naish could be sought by referring back to available reconstructions of a higher-level node within Sino-Tibetan; however, no such reconstruction is available – indeed, there is no consensus on the subgrouping of Naish (see section 2 of Appendix 1). Another option would be to refer back all the way up to proto-Sino-Tibetan. However, the reconstruction of proto-Sino-Tibetan is up against considerable difficulties. In addition to the vast amounts of language contact and the widespread phonological erosion mentioned above, Sino-Tibetan offers a third challenge to reconstruction: it is becoming increasingly clear that a thoroughly complex morphology existed in proto-Sino-Tibetan,<sup>6</sup> in most languages (both archaic and modern) this morphology is not well-preserved – in particular, very few irregular paradigms are found – but it left deep traces, which tend to obscure the phonetic correspondences between the

<sup>4</sup> Rgyalrong is a highly conservative language spoken in Sichuan, China. We will be referring to Japhug Rgyalrong, unless otherwise indicated. See Sun 2000b for a definition of the Rgyalrong subgroup, and Sun 2000a, 2005 and Jacques 2004, 2008 for analyses of Rgyalrong languages.

<sup>5</sup> The reconstruction of a vowel \*i for these words will be justified below, §1.2.

<sup>6</sup> Lepsius (1861) is credited with the first formulation of the observation that several affixes could be reconstructed for the proto-Sino-Tibetan stage. Conrady (1896) brought out a causative \*s- prefix, a finding which has been amply corroborated since then; see also Wolfenden 1929, Benedict 1972:106, Bauman 1974, Jacques 2010, and the synthesis by DeLancey 2010.

languages. Still taking the same example, "gallbladder" is *mkhris* in Old Tibetan and /tu-ɕkrut/ in Rgyalrong; although these two languages share the same root, the /m-/ in Tibetan and the /tu-/ and /ɕ-/ in Rgyalrong are of an affixal nature and must be factored out in comparative work. These two languages are conservative in the sense that they preserve complex clusters; thus, while many processes of affixation are not productive anymore, affixal elements can still be identified and distinguished from the root. On the other hand, in the case of languages with a more eroded phonology, fossilised morphology is much less easy to identify: the consonant clusters created by affixation later simplified, and the only traces that remain of the preinitial reside in the manner of articulation of the initial – for instance, the aspiration alternation in Burmese pairs like *mraŋ*<sup>1</sup> "be high" and *hmraŋ*<sup>1</sup> "raise" originates in an earlier causative \*s- prefix.

The complexity of this lost morphology is the main reason why, after more than a century of scholarly endeavours, no equivalent of Grimm's law is yet available for Sino-Tibetan, not even for well-documented languages such as Tibetan and Burmese. There is still a long way to go before proto-Sino-Tibetan can be reconstructed with a degree of precision approaching proto-Indo-European or proto-Austronesian. Two reconstruction systems are currently available for Sino-Tibetan: Peiros and Starostin (1996) and Matisoff (2003) – the latter focusing on Tibeto-Burman, defined as excluding Chinese. Neither of these systems is actually based on a set of explicit phonetic laws; in view of the uneven state of our present knowledge, Matisoff (2003:9) endorses the method applied by Benedict (1972) under the name of "teleoreconstruction". Benedict attempted at reconstructing as far back as proto-Sino-Tibetan on the basis of a selected set of languages (in particular Tibetan, Burmese, and Jingpo). Benedict's main aim was to establish etymologies between widely different languages; he had a moderate interest for working out the exact phonetic laws, and he essentially relied – to state things somewhat bluntly – on educated guesswork instead. This is slightly at variance with the principles of reconstruction, whereby "a reconstructed form does not constitute one monolithic unit: it consists in the sum of several pieces of phonetic reasoning, and each of its parts always remains open to reexamination. Restituted forms have always mirrored faithfully the generalisations that apply to the words at issue" (Saussure 1916:300, our translation<sup>7</sup>).

Our work focuses specifically on the Naish languages; its backbone consists in the establishment of phonetic rules. No attempt is made here to propose any reconstructions for the Sino-Tibetan level. It appeared more rigorous to compare Naish languages with a closed

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<sup>7</sup> Original text: "Une forme reconstruite n'est pas un tout solidaire, mais une somme toujours décomposable de raisonnements phonétiques, et chacune de ses parties est révocable et reste soumise à l'examen. Aussi les formes restituées ont-elles toujours été le reflet fidèle des conclusions générales qui leur sont applicables."

set of well-documented conservative languages, rather than to refer to reconstructed forms. The languages chosen are Rgyalrong, Old Burmese, and Old Tibetan – where the syllable canon is an impressive (C)(C) $C_{\text{initial}}$ ( $C_{\text{medial}}$ )V(C)(C) –, which will be referred to below as "the conservative languages".<sup>8</sup> While comparison with the conservative languages provides irreplaceable insights, it goes without saying that the state of affairs found in these languages cannot be mechanically postulated for proto-Naish. In theory, proto-Naish may have evolved consonant clusters that are unattested in other branches, for instance through morphological processes; conversely, the inventory of consonant clusters of proto-Sino-Tibetan may have already simplified by the stage of proto-Naish. However, the general hypothesis that proto-Naish had initial clusters and that syllable structure simplified from proto-Naish to the modern languages appears fully plausible in view of the documented history of other languages of the area, for instance the dramatic phonological erosion undergone by various Tibetan dialects since the stage of Old Tibetan (c. 7<sup>th</sup> century AD). Rhymes are studied in section 1, and onsets in section 2. The diachronic study of tones in the Naish languages is a highly complex topic, which must be deferred until a later study.

## 1. An analysis of rhyme correspondences in light of cases of complementary distribution with respect to the initial

### 1.1. Vowel \*a

There are numerous vowel correspondences between the three languages under investigation. Leaving aside those that are illustrated by less than three examples, we found no less than fifty correspondences. It would obviously make no sense to reconstruct that many different vowels in proto-Naish: on the whole, the number of vowels in conservative Sino-Tibetan

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<sup>8</sup> There are other languages within the Sino-Tibetan family whose phonological complexity makes them suitable for this type of research, namely Dulong/Trung, Rawang, Jingpo/Jinghpaw and Kuki-Chin. For want of sufficient acquaintance with these languages, we do not take them into account here. As for Chinese, the oldest written language of the family, Old Chinese did have a degree of syllabic complexity that makes it theoretically relevant for our purpose, but in practice there remain numerous uncertainties concerning the reconstruction of Old Chinese consonant clusters (see in particular Ferlus 2009 and Sagart and Baxter 2009). As a result, the comparison of reconstructed Old Chinese forms with the Naish languages is not fruitful at this stage.

The phylogenetic distance between Naish, Rgyalrong and Burmese is relatively great – although we believe that they belong together with the Naish languages in a Burmo-Qiangic branch of Sino-Tibetan: a tentative family tree is proposed in Appendix 1. The distance between Naish and Tibetan is even greater. Some justifications for referring to these distant languages in the reconstruction of proto-Naish, instead of relying on data from the more closely related languages Shixing, Namuyi and Ersu/Tosu/Lizu, are provided in Appendix 1.

languages is low, e.g. five in Classical Tibetan and six in Old Chinese (Baxter 1992:180). Large vowel inventories, involving length contrasts and diphthongs, are not unheard of in East Asian languages, but they result from well-identified evolutions of relatively little time depth: in Khmer, the vowel system underwent a two-way split, as phonation-type register contrasts transphonologised into vowel contrasts, resulting in a complex system generally described as having five levels of vowel aperture as well as prediphthongisation (Ferlus 1979, 1992 and references therein). The models needed to understand vowel correspondences within Naish are clearly to be sought elsewhere.

A close look at the vowel correspondences between Naxi, Na and Laze brings out relatively clear distributional properties. In the following discussion, K stands for velar obstruents, TS for coronal affricates and fricatives, and R for rhotics and retroflexes (or, more accurately, proto-initials that are reflected as present-day retroflexes). The correspondence /e:i:ie/ (e.g. "moon": /leʃ:hiʃ:hiɛʃ/) is never found in syllables beginning in K-, TS- or R-. On the other hand, the correspondence /e:e:e/ (e.g. "salt": /ts<sup>h</sup>eʃ:ts<sup>h</sup>eʃ:ts<sup>h</sup>eʃ/) is only found after TS-<sup>9</sup>, and the correspondence /u:i:i/ (e.g. "lake": /huʃ:hiʃ:fiʃ/) is only found in association with a small set of initial correspondences: /h:h:f/ and /Ø:Ø:v/ (see example set a5 in Appendix 2). Looking beyond the Naish languages, these three correspondences, /e:i:ie/, /e:e:e/ and /u:i:i/, involve words that end in the vowel *-a* in Rgyalrong, Tibetan and Burmese, as illustrated by the examples in Table 3. These two facts – that these three correspondences are in complementary distribution with one another, and that they correspond to the same vowel in related languages – lead us to reconstruct them back to one and the same rhyme in proto-Naish. We propose to reconstruct this rhyme as *\*-a*.

In addition to these three, other correspondences also point to the vowel *\*a*. The correspondence /ɑ:a:ɑ/ is likely to have several origins, since it does not fall neatly in complementary distribution with /e:i:ie/; however, after velar-initial (or h-initial) syllables, there is a sizeable number of etyma that correspond to words that have a vowel *-a* after a velar in the conservative languages. By the same reasoning, /u:e:u/ after R- and /i:i:i/ after η- can be interpreted as modern reflexes of *\*-a* in these environments. (Note, however, that the /i:i:i/ correspondence after η- can also result from *\*-i*, as illustrated in the cognate sets a4.01 and a4.02 in Appendix 2; it should therefore be reconstructed as *\*-a/-i*.)

Thus, there are at least seven different correspondences for the rhyme *\*-a* depending on the preceding consonant in proto-Naish, as recapitulated in Table 3. In proto-Naish, the correspondence /ɑ:a:ɑ/ after velars will be reconstructed as *\*-a/-aC<sub>1</sub>*, as Naish-internal

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<sup>9</sup> The only context where there is a phonemic contrast between /i/ and /e/ in Yongning Na and in Laze is TS-. For instance: Na /siʃ/ 'wood', /seʃ/ 'to walk'; Laze /siʃdziʃ/ 'tree', /seʃ/ 'to flow (water)'. The diachronic reason why the distribution of /e/ is so restricted in Na and Laze is because its only diachronic origin is *\*a* after *\*TS-*.



evidence does not allow to distinguish these two rhymes in this context; on the issue of rhymes that come from checked syllables, see §1.4.

Table 3. Examples of reflexes of proto-Naish \*a. The context indicated is the initial consonant in proto-Naish.

meaning	Rgyalrong	Burmese	Tibetan	Naxi	Na	Laze	correspondence	proto-Naish	context	nb of examples
bitter	—	k <sup>h</sup> a <sup>3</sup>	k <sup>h</sup> a	k <sup>h</sup> aɫ	k <sup>h</sup> aɭ	k <sup>h</sup> aɫ	a:a:a	*a/aC <sub>1</sub>	*K	5
salt	—	c <sup>h</sup> a <sup>3</sup>	ts <sup>h</sup> wa	ts <sup>h</sup> eɫ	ts <sup>h</sup> eɭ	ts <sup>h</sup> eɫ	e:e:e	*a	*TS	8
to borrow	—	hja <sup>3</sup>	rja < *rja	ŋiɫ	ŋiɭ	ŋiɫ	i:i:i	*a/*i	*ŋ	2
tooth	-ɕya < *wa	swa <sup>3</sup>	so < *swa	huɫ	hiɭ	fiɫt <sup>h</sup> uɫ	u:i:i	*a	*w	5
hoof	-qa < *qwa	—	—	k <sup>h</sup> waɫ	q <sup>h</sup> wɣɫ	k <sup>h</sup> wɣɭ	wa:wɣ:wɣ	*a	*Kw, *ŋw	3
meat	—	sa <sup>3</sup>	ɕa	ʂuɫ	ʂeɭ	ʂuɫ	u:e:u	*a	*R	3
thin (not thick)	mba	pa <sup>3</sup>	—	mbeɫ	biɭ	bieɭ	e:i:ie	*a	(others)	21

*Note to Table 3:* The /e/ vowel in the correspondence /u:e:u/ does not contrast with /i/, since there is no /ʂi/ in Na. For the sake of phonetic precision, the notation used here is nonetheless *e*.

Once hypotheses have been proposed about the interpretation of correspondences, with the help of data from the conservative languages, these hypotheses can be extended to other cases, for which no cognates are present in the conservative languages. The number of examples for each vowel correspondence is indicated on the right hand-side of each table; the full list is provided in Appendix 2.

The complementary distribution of vowel correspondences with regard to the initial consonant is by no means an unprecedented observation. The laryngeals in proto-Indo-European are the most famous instance of phonetic conditioning of the rhyme by the place of articulation of the preceding consonant. In Sino-Tibetan, such phenomena are widespread: for instance, Matisoff (2007:2) distinguishes three distinct reflexes of proto-Lolo-Burmese \*-a in Achang depending on the onset. However, with seven different reflexes for the rhyme \*-a, the complexity of the correspondences observed in the Naish languages for this rhyme is (to the best of our knowledge) without equivalent elsewhere in the family. The Naish languages thus stand out among Sino-Tibetan languages by the amount of phonetic changes depending on the place of articulation of initial consonants.

#### *On the usefulness of the study of vowel \*a for the dating of borrowings*

The above conclusions about the evolution of proto-Naish \*a shed light on the interpretation of some words as borrowings, and also offer indications as to their relative chronology. The

vowel correspondence /a:a:a/ after a non-velar initial, straightforward as it may seem, can actually only result from a borrowing that has taken place after the change from \*a to /e:i:ie/.<sup>10</sup> The words for "tiger" /la:la:la/, "hemp" /sa:sa:sa/ and "crossbow" /ta.na:ta.na:ta.na/ illustrate this situation. "Tiger" is probably a loanword of Austroasiatic origin, likely to have been borrowed via Lolo-Burmese languages (Old Burmese *kla*; reconstructed as \*k-la<sup>2</sup> in proto-Loloish by Bradley 1979). "Crossbow" could be another borrowing from an Austroasiatic language (about this notorious *Wanderwort*, see Blench manuscript; about the Austroasiatic substratum in Southwest China: Norman and Mei Tsulin 1976). "Hemp" is of unknown origin but also looks like a borrowing: it is also found in Rgyalrong, with the same vowel (*ta-sa*), where the expected correspondence would be with Naish /e:e:e/.

These three words belong in a different layer from "tea", /le:li:lie/. "Tea" appears to be an early borrowing, from an Austroasiatic word for "leaf", in the same way as happened in Lolo-Burmese languages:

"The early Tibeto-Burman invaders, Lolo, Lisu, Burmans, etc. generally called it *la?*, the Austroasiatic word for "leaf", often adding their own word for Economic Leaf, p'ak ; and passed on the term *la?* p'a? (le? p'ε?) to other languages of Burma" (Luce 1985:16; note that in more recent work, "tea" is reconstructed as \*sla?: Shorto 2006:119).

The present-day correspondence /e:i:ie/ suggests that the word for "tea" was pronounced \*-a when it was originally borrowed, and later underwent the regular sound changes of the native vocabulary; the process of borrowing must therefore predate the sound change from \*a to /e:i:ie/.

After velar initials, on the other hand, the change from \*a to /e:i:ie/ did not take place, so that the correspondence /a:a:a/ does not carry any hint to distinguish cognates from loanwords; such is the case of "bitter", for instance. (Again after velar initials, there is no way to distinguish \*-a from \*-aC<sub>1</sub>, about which see Table 9 below.)

## 1.2. Vowel \*i

Without an external point of comparison, it is not possible to decide with certainty which of the correspondences appearing after dentals and which of the correspondences occurring after retroflexes come from the same proto-rhyme. The method presented above for \*-a consisted in grouping correspondences that are in complementary distribution with regard to

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<sup>10</sup> This is similar to the textbook example of the consonant correspondence *p:p* between English and French, of which there are numerous examples: all the words at issue are either borrowings or learned words, e.g. *paternal:paternel*, whereas the real English/French cognates exhibit the phonological correspondence *f:p*, e.g. *father:père* (Campbell and Poser 2008:174).

initial consonants in light of potential cognates in the conservative languages: Rgyalrong, Burmese and Tibetan. The same method yields the set of reflexes for proto-Naish \*-i shown in Table 4.

Table 4. Examples of reflexes of proto-Naish \*-i.

meaning	Rgyalrong	Burmese	Tibetan	Naxi	Na	Laze	correspondences	proto-Naish	context	nb of ex.
to know	sus < *-is	si <sup>1</sup>	ces	suɿ	suɿ	suɿ	u:u:u	*i	*TS, *R	12
fire	smi	mi <sup>3</sup>	me	miɿ	myɿ	myɿ	i:y:y	*i	*m	5
star	zɿgri	kray <sup>2</sup>	—	kuɿ	kuɿ	tsiɿ	u:u:i	*i	*kr	3
small	xtci	—	—	kiɿ	tciɿ	tciɿ	i:i:i	*i	(others)	17
pus	—	prap <sup>2</sup>	—	mbəɿ	bəɿ	bəɿ	ə:æ:æ	*iN	*Pr- / *Cr-	7
wood	si	sac [sik]	ciŋ	səɿ	siɿ	siɿ	ə:i:i	*iN	*TS	4

For the last two correspondences in Table 4, the reconstruction of a rhyme \*iN is proposed. For the etymon "wood", note that while some languages such as Tibetan have a nasal final, proto-Lolo-Burmese has a velar stop (Matisoff 2003:283-4); here Naish patterns like Tibetan rather than Lolo-Burmese, as it presents the same correspondences as "liver" (Tibetan *mchin-pa*), for which a nasal must be reconstructed. General reflections about final consonants will be set out in §1.4.

### 1.3. Back vowels

Table 5 presents the correspondences pointing to rounded back vowels in proto-Naish.

Table 5. Examples of proto-Naish \*u and \*o.

meaning	Rgyalrong	Burmese	Tibetan	Naxi	Na <sup>11</sup>	Laze	corr.	proto-Naish	context	nb of ex.
to sit	-mdzu < *-mdzu	—	—	ndzuɿ	dziɿ	dzyɿ	u:i:y	*u	TS-	3
price	-p <sup>h</sup> u < *p <sup>h</sup> u	phui <sup>3</sup>	—	kaɿp <sup>h</sup> ɿ	ka.p <sup>h</sup> ɿ <sup>#H</sup>	kaɿp <sup>h</sup> ɿ ɿ	y:y:y	*u	(others)	49
yak	qambruu	—	mbri	bəɿ	bɿɿ	bɿɿ	ə:y:y	*u	Pr-	5
head	-ku < *ko	—	mgo	kuɿ (kuɿlyɿ)	kuɿ (ku.q <sup>h</sup> wɿ <sup>L#</sup> )	uɿ (uɿtuɿ)	u:u:u	*o	(others)	16
to spread	ək <sup>h</sup> o < *ək <sup>h</sup> aŋ	khaŋ <sup>3</sup>	—	k <sup>h</sup> uɿ	k <sup>h</sup> u <sup>H</sup>	k <sup>h</sup> uɿ	u:u:u	*o		

<sup>11</sup> The tones of disyllabic words in Na are transcribed according to the conventions set out in Michaud 2008, which indicate the syllabic anchoring of the tones.

It appears that proto-Naish \*-o corresponds both to proto-Rgyalrong \*-o and \*-aŋ, suggesting a merger between a closed syllable and an open syllable.

After coronal fricatives and affricates, the change from \*u to *i* and *y* in Na and Laze respectively appears at first blush as a case of fronting; however, the change to *w* in Naxi would then have to be explained as a wholly different process. We propose that the evolution of \*u after TS- in Naxi is in fact another instance of apicalisation, resulting in a rounded apical vowel, \*-ɥ in Yuen-ren Chao's non-IPA notation (the IPA notation for this sound, a syllabic /z/ with lip rounding, is a rather unwieldy /ʐ/). This rhyme contrasts with \*-ɣ, which is the product of the apicalisation of \*i after \*TS- (/ɣ/ is another symbol coined by Yuen-ren Chao; the IPA recommends using /ʒ/). A contrast between /ɣ/ and /ɥ/ is attested in some Sino-Tibetan languages – including Laze, where /zyɿ/ "son", realised [zɥɿ], contrasts with /zuɿ/ "grass", realised [zɣɿ]. In Naxi, the rhymes \*-ɣ and \*-ɥ merged to [ɣ]; this sound is phonemically interpreted as /w/, as was mentioned above. In Na and Laze, \*-ɥ had a different evolution from \*-ɣ: it changed to \*-y. Later, it underwent the merger of \*-i and \*-y in Na, along with all the other \*-y rhymes in the language.

A result of the separate evolution of \*u after TS is that there are no syllables consisting of a dental affricate and a rhyme /ɥ/ in Na or Naxi. In Laze, these syllables exist, as part of a /<sup>w</sup>ɛ:ɿ:ɥ/ correspondence (/t͡ɕ<sup>hw</sup>ɛ̃:t͡ɕ<sup>h</sup>ɿ̃:t͡ɕ<sup>h</sup>ɥ̃/ "to hold, e.g. a knife", /t͡ɕ<sup>hw</sup>ɛ̃:t͡ɕ<sup>h</sup>ɿ̃:t͡ɕ<sup>h</sup>ɥ̃/ "lungs", /t͡ɕ<sup>w</sup>ɛ̃:t͡ɕɿ̃:t͡ɕɥ̃/ "to cough") and as an isolated /u:i:ɥ/ correspondence: /dzuɿ:dziɿ:dzyɿ/ "chisel". As will be shown in §2.2, the likely origin of the /<sup>w</sup>ɛ:ɿ:ɥ/ correspondence is \*rts<sup>(h)</sup>U: the preinitial \*r- coloured the vowel and prevented apicalisation.

#### 1.4. *The issue of final consonants*

There is little debate that at least nine final consonants should be reconstructed for proto-Sino-Tibetan: \*-p \*-t \*-k / \*-m \*-n \*-ŋ / \*-r \*-l \*-s (Matisoff 2003:247; 313-4; 383; 439). It has repeatedly been observed in Sino-Tibetan that rhymes with identical vowels and different final consonants tend to undergo widely diverging historical evolutions. In the Lolo-Burmese branch, for instance, "Vowels in syllables which are terminated by nasals or stops almost invariably show radically different correspondences than the vowels of open syllables. So different are the correspondences that reconstructions for open, nasal and stopped syllables rarely support one another" (Burling 1967:10). Postulating final consonants could therefore be a convenient tool for sorting out the vowel correspondences observed between the Naish languages. However, there is some evidence suggesting that all final consonants had already disappeared by the proto-Naish stage. In this section, we will

successively discuss rhymes whose main vowel is (i) a front vowel, (ii) a back vowel, and (iii) a low vowel with a final consonant in the conservative languages.<sup>12</sup>

### 1.4.1. Front vowels

In Table 4 and in the list of words provided in Appendix 2, it can be seen that words that correspond to Burmese *-ac*, *-ip* and *-it* follow the same correspondences as those that correspond to a plain *-i* in Burmese. The correspondences with Rgyalrong are similarly revealing, though the comparison has to be based on reconstructed forms rather than on present-day Rgyalrong pronunciations. Rgyalrong *-uy*, *-xy*, *-ut* and *-uw* originate in *\*-ik*, *\*-ek*, *\*-it* and *\*-ip*, respectively (Jacques 2004:266); the correspondences with the Naish languages are the same as for the plain *\*-i* of Rgyalrong. This suggests that the three final stops *\*-p*, *\*-t* and *\*-k* have disappeared after *\*-i* in Naish without leaving any trace: see Table 6.

Table 6. Two words reconstructed with proto-Naish *\*-i* corresponding to rhymes ending in stops in other languages. The dash (—) indicates the absence of any identifiable cognate term.

meaning	Rgyalrong	Burmese	Tibetan	Naxi	Na	Laze	proto-Naish
sleep	nuzuw < *jip	'ip	—	iᵛ	ziᵛ	ziᵛ	*ji
goat	ts <sup>h</sup> yt < * ts <sup>h</sup> et	chit	—	ts <sup>h</sup> uᵛ	ts <sup>h</sup> uᵛ	ts <sup>h</sup> uᵛ	*ts <sup>h</sup> i

The only indirect trace of a final consonant is the rhyme reconstructed *\*-iN* (i.e. nasal [ĩ], or [i] plus a nasal consonant) after *\*TS-*, *\*Pr-* and *\*R-*. Table 7 presents examples showing that, apart from the context *\*TS-*, *\*Pr-* and *\*R-*, nasal rhymes *\*-iN* had entirely merged with *\*-i* by the proto-Naish stage.

Table 7. Some words reconstructed with proto-Naish *\*-i* corresponding to nasal vowels or rhymes ending in nasals in other languages. Pumi data are from our fieldwork in Muli, Sichuan, China.

meaning	Rgyalrong	Tibetan	Pumi	Naxi	Na	Laze	corr	context	proto-Naish
urine	tu-rmbi	—	bî	mbiᵛ	—	—	i:i		mbi
to hear	—	—	mě	miᵛ (k <sup>h</sup> o+miᵛ)	myᵛ	myᵛ	i:y	*m-	mi
tight	—	grim po	—	—	kuᵛ	tsiᵛ	u:u	*kr-	kri

<sup>12</sup> The final consonants as reconstructed in Matisoff's work always agree with the Tibetan, Burmese and Rgyalrong data cited in the present article.

In the analysis of the cognate sets in Table 7, we allow ourselves to take a peek at Pumi: although this language is too eroded phonologically to be used as a language of reference for reconstruction, it can occasionally provide useful cues. Pumi has nasal vowels that are likely to originate in earlier nasal codas, though to our knowledge this hypothesis has not yet been stated explicitly. For "urine" and "to hear", Pumi provides crucial evidence of nasality over the rhyme. Pumi, unlike Rgyalrong, preserves a trace of final nasal consonants as nasality on the vowel. In Rgyalrongic languages, the only nasal final that is preserved is *-m*, though *\*-ŋ* can be reconstructed in a few environments.

The merger of all the rhymes with front vowels found in the Naish languages is an unusual evolution, unattested as such in other branches of the family whose phonological development is well-documented, such as Lolo-Burmese and Tibetan dialects. In the Loloish languages, the outcome of proto-Lolo-Burmese *\*-i* and *\*-iC* is rarely identical. For instance, in Lahu, the correspondences are the following (Matisoff 2003:186, 248-249, 314):

proto-Lolo-Burmese	*-i	*-ik	*-it	*-ip	*-iŋ	*-in	*-im
Lahu	-i	-iʔ	-iʔ	-iʔ	-ɛ	-i	-ɛ

### 1.4.2. Back vowels

As with front vowels, the rhymes with back vowels ending in a stop coda all merged with the corresponding proto-Naish high vowel *\*-u*, as illustrated in Table 8.

Table 8. Correspondences of proto-Naish *\*-u* with closed-syllable comparanda in conservative languages.

meaning	Rgyalrong	Burmese	Tibetan	Naxi	Na	Laze	proto-Naish
sew	tʃuβ	khyup	ndrub	zyʋ	zyʋ	zyʋ	*C-ru
go out <sup>13</sup>	—	thut	—	tʰyʋ	tʰyʋ	tʰyʋ	*tʰu
bent	ŋgɣy	—	gug	gyʋ	la.gv <sup>LM</sup>	laʎgyʋ	*gu

Examples of Naish words corresponding to etyma with back vowels and nasal codas are too few in our data to be studied with any profit; further research is needed to determine their exact correspondences.

<sup>13</sup> The Burmese form means 'to take out'.

As in the case of front vowels (discussed in §1.4.1), the massive merger of rhymes with rounded vowels in Naish is rather unusual in the languages of the area. Taking again the example of Lahu, the reflexes for proto-Lolo-Burmese rhymes with \*-u- as their main vowel are of no small degree of complexity (Matisoff 2003:180, 248-249, 314):

proto-Lolo-Burmese	*-u	*-uk	*-ut	*-up	*-uŋ	*-un	*-um
Lahu	-u	-uʔ	-əʔ	-ɔʔ	-ɔ	-ə	-ɛ

### 1.4.3. Low vowels

Unlike the rhymes with back and front vowels, the rhymes –aC (where C stands for a consonant) in conservative languages do not correspond to the same proto-Naish rhymes as those in open syllable -a. With nasal finals, we have already seen that proto-Rgyalrong \*-aŋ and \*-o both correspond to proto-Naish \*-o. It is clear that at an earlier stage, two rhymes existed, but that they had already merged to \*o in proto-Naish, without even a trace of nasality. For rhymes with \*a + stop codas, we find two sets of correspondences, shown in Table 9.

Table 9. Correspondences for proto-Naish \*-aC, where C is an etymological final stop.

meaning	Rgyalrong	Burmese	Tibetan	Naxi	Na	Laze	proto-Naish	nb of ex.	
to cover	fkaβ	—	ŋgebs, bkab	ka᷉	ka᷉	ka᷉	a:a:a	*-a/-aC <sub>1</sub>	
black		nak	nag	na᷉	na᷉	na᷉	a:a:a	*-aC <sub>1</sub>	13
to strike	lɤt	—	—	la᷉	la᷉	la᷉	a:a:a	*-aC <sub>1</sub>	
sharp		t <sup>h</sup> ak	—	t <sup>h</sup> a᷉	t <sup>h</sup> a᷉	t <sup>h</sup> a᷉	a:a:a	*-aC <sub>1</sub>	
to climb	taɤ "top"	—	—	ndo᷉	do᷉	du᷉	o:o:u	*-aC <sub>2</sub>	13
to jump	mtsak	—	—	ts <sup>h</sup> o᷉	ts <sup>h</sup> o᷉	ts <sup>h</sup> u᷉	o:o:u	*-aC <sub>2</sub>	
needle	-qaβ	ap	k <sup>h</sup> ab	ko᷉	ɤu᷉ (no contrast with /ɤo/)	u᷉	o:o:u	*-aC <sub>2</sub>	
thick	jaɤ	—	—	la᷉	lo᷉	lu᷉		*-aC <sub>1</sub> /aC <sub>2</sub>	5
hand	-jaɤ	lak	lag	la᷉	lo.q <sup>h</sup> wɣ LM	la᷉		*-aC <sub>1</sub> /aC <sub>2</sub>	

The double correspondence (a:a:a and o:o:u) calls for an explanation. Unlike in the case of proto-Naish \*a, \*i, \*u (Tables 3, 4 and 5), it cannot be ascribed to a conditioning by initial consonants. At present, we are not able to propose an interpretation of this distinction; in order to reflect it in the reconstruction nonetheless, we adopt the following notation: \*-aC<sub>1</sub>

for  $\alpha:\alpha:\alpha$ , and  $*-aC_2$  for  $o:o:u$ . The phonetic interpretation of  $*-aC_1$  and  $*-aC_2$  in proto-Naish is a difficult issue; these two rhymes were clearly distinct from  $*-a$ , but it is highly unlikely that the final stops were preserved in proto-Naish. In this perspective,  $*-aC_1$  and  $*-aC_2$  could be reconstructed as  $*[\alpha]$  and  $*[\omega]$  respectively, and  $*-a$  as  $*[\æ]$ .

There exist isolated "mixed" correspondences,  $/\alpha:o:u/$ ,  $/\alpha:o:\alpha/$  and  $/o:o:\alpha/$ , only attested by one or two cognate sets each: the forms in the shaded cells are those expected for  $*-aC_1$ , whereas the others are expected for  $*-aC_2$ . A full study of the origin of these correspondences must be deferred until future investigations (as a wild guess: language contact within Naish or vowel sandhi may have been at work here), but it is unlikely that we need to reconstruct distinct proto-rhymes for these marginal correspondences.

The reconstructed Naish chain shift whereby (i)  $*-a$  undergoes fronting in open syllables and (ii)  $*-aC$  ( $*a$  in checked syllables) becomes a simple  $/-a/$  appears panchronically plausible in light of similar developments that took place in Tangut: all types of proto-Tangut  $*-a + \text{stop}$  rhymes (including at least  $*ap$ ,  $*at$ , and  $*ak$ ) lost their final stop, and preserved an  $a$  vowel while proto-Tangut  $*-a$  underwent raising plus fronting (Jacques 2006). The Tangut and Naish facts are of course fully independent.

### *1.5. Some reflections on phonetic paths of evolution*

The purpose of the present study is to establish and interpret correspondences, not to reflect on the evolutionary paths from one state to the other. "As all comparativists know, what is important is not the phonetic similarity between compared lexical items, but the regularity of the correspondences between elements. If a correspondence is regular, we can even say that the more phonetically different the elements are, the better evidence they provide for a common ancestry. Nonetheless, after a common ancestry has been established, and a reconstruction proposed, it is necessary to relate the forms of the reconstructed language to the modern language or languages by a plausible story in terms of general linguistic knowledge, that is, to postulate a sequence of plausible changes, understood as phonetically well-motivated changes or changes attested somewhere else among the world's languages" (Mazaudon in press). In the case of the Naish data, a few preliminary hypotheses can be put forward concerning these paths.

#### *1.5.1. Hypotheses on the detail of the phonetic evolution from $*a$ to $/e:i:ie/$*

Concerning  $*-a$ , the phonetic evolution can be hypothesised to have taken place as follows. The preservation of the original vowel quality after velars may be due to an overall back articulation of the syllable, possibly close to a phonetically uvular realisation:  $[q\alpha]$  for  $/ka/$ , etc. Vowel raising takes place in other contexts.



The hypothesis that velars had uvular allophones before \*a at the time when the sound change began implies that velars and uvulars were not contrastive in this context. This is not without consequences for the relative chronology of the sound changes from proto-Naish to the modern languages. If the hypothesis is correct, it entails that velar and uvular initials had already ceased to be contrastive before \*a by the time this vowel began to undergo raising. Of course, this does not entail that velars and uvulars did not remain contrastive in other contexts, as they do to this day in Yongning Na.

Similar developments towards *e* or *i* are known to have occurred independently in Rgyalrongic (Tshobdun and Zbu), as well as in Tangut (see in particular Bradley 1975:102, 1997:38). Matisoff 2004 refers to this change as 'brightening', using a term used in Germanic historical phonology to describe the change from /a/ to /æ/. Interestingly, like proto-Naish \*a, proto-Western Germanic \*a has numerous reflexes in Old English: no less than six (Lass 1994:41). As for the correspondence /hu:hi:fi/, it is to be interpreted in light of the evolution of the entire syllable. Concerning the initial, we propose that the proto-Naish form was \*Swa, and that the initial went through a stage \*w̥- at some point between the proto-Naish stage and the modern languages, whereas the correspondence /u:i:vi/ goes back to proto-Naish \*wa: the initial \*w- fuses with the rhyme in Na and Naxi, and evolves to /v-/ in Laze. Concerning the correspondence /u:e:u/, \*-a first fronted to \*-i in Naxi and Laze (there is no way to ascertain whether this was a parallel development, or a common innovation not shared by Na) and this change occurred before the \*-i > -u change discussed in the next section. Thereafter, the \*-i coming from \*-a underwent the same \*-i > /-u/ change as the other \*-i.

### ***1.5.2. About the change from \*i to u after s***

The change from \*i to /u/ after *s* calls for some explanations. It does not consist in a movement from a front articulation [i] to a back articulation [u] – which would be a surprising evolution. It is in fact an instance of apicalisation – a common phenomenon in the area, as noted by Baron 1974, in particular – which results phonetically in the combination [sz] (in Yuen-ren Chao's notation: [sɿ]); the vowel in this syllable is to be analysed phonemically as an allophone of /u/, as noted by He Jiren and Jiang Zhuyi (1985:9). The change from \*i to /ɿ/ after *m*- may result from a similar process whereby the rhyme loses any independent articulatory target, resulting in a syllabic consonant \*m̥,<sup>14</sup> the syllable is then reinterpreted as having the rhyme /ɿ/. No scenario can be offered at present concerning

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<sup>14</sup> Bradley refers to this process as 'rhyme-gobbling': "In various Loloish languages some or all of the nasals occur as syllabics. In most such cases the diachronic source is syllables with a nasal initial and a high vowel; sometimes one dialect has nasal syllabics where others have nasals plus a high vowel. This could be called rhyme-gobbling" (Bradley 1989:150; see also Björverud 1998:8).

the developments that led up to the correspondence /u:u:i/ illustrated in Table 1 (e.g. /ku:kʉ:tsi/ for "star").

Tibetan loans corroborate the reconstruction of \*i after sibilants. For instance, the proper name /tʃæʃsu-/ in Yongning Na clearly comes from the Tibetan name *bKraŋhis* (IPA interpretation: Old Tibetan [pkraŋhis]); whatever the donor dialect of Tibetan, the second syllable must have been either [çi] or [çis], and this word later underwent the regular change from \*çi to /ʃsu/.<sup>15</sup>

#### 1.6. The proto-Naish vocalic system: a provisional summary

The above analyses lead to the reconstruction of the following vowel system for proto-Naish:

i	u
	o
	ɔ
æ	a

The symbols /æ/, /a/ and /ɔ/ are proposed as phonetic values for the entities reconstructed as \*a, \*aC<sub>1</sub> and \*aC<sub>2</sub> respectively. The contrast between /æ/ and /a/ was neutralised after velars. This is a somewhat unbalanced system, crowded with back vowels. The changes that occurred in most consonantal contexts can be schematised as follows:

i	ɥ ←	u
		↑
		o
		↑
		ɔ
↙		
æ	a	

A chain shift occurred among back vowels, reducing the four-way height contrast to a three- or two-way contrast depending on the language, while a height contrast between /i/ and /e/ was created for front vowels.

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<sup>15</sup> In turn, this opens into the question of the time frame of this sound change; the distinction among layers of Tibetan loans remains a question for future research.

## 2. Onsets

The available evidence strongly suggests that proto-Naish had already lost all codas; on the other hand, the evidence for initial clusters can be considered to be strong, as was exemplified in the Introduction through the example of the cluster \*kr-. It is more common for a language to retain final stops whereas initial clusters are lost: examples in the Sino-Tibetan domain include Lhasa Tibetan, which retains final *-p* and nasal *-m -n -ŋ* whereas it has lost all consonant clusters, and Cantonese, which also retains final *-t* and *-k*. The reverse situation is attested, however: there exist Sino-Tibetan languages that preserve some initial clusters whereas they have lost all final consonants, such as the Tibetan dialect of Zhongu (Sun 2003). This section sets out a historical scenario of the evolution of initial clusters from proto-Naish to the modern languages.

### 2.1. Stop consonants

The basic correspondences for voicing features across the three languages are straightforward. Table 10 provides examples for labials; similar examples can be found for dental and velar stops and affricates.

Table 10. Examples of correspondences among initials, and proposed proto-Naish reconstructions. N stands for a nasal pre-initial.

meaning	Rgyalrong	Tibetan	Naxi	Na	Laze	corresp.	proto-Naish
white <sup>16</sup>	wyrum	—	p <sup>h</sup> əɿ	p <sup>h</sup> ɿɿ	p <sup>h</sup> ɿɿ	p <sup>h</sup> :p <sup>h</sup> :p <sup>h</sup>	*p <sup>h</sup> (*p <sup>h</sup> ru)
to pluck	—	—	pəɿ	pɿɿ	pɿɿ	p:p:p	*p (*pru)
yak	qa-mbruu	mbri	bəɿ	bɿɿ	bɿɿ	b:b:b	*b
village	—	—	mbeɿ	fɿ.bi <sup>L</sup>	bieɿ	mb:b:b	*mb
to steam	—	—	pɿɿ	bɿɿ	bɿɿ	p:b:b	*Np

The first three reconstructions in Table 10, \*p<sup>h</sup>, \*p and \*b, are straightforward. As for \*mb, the evidence for a series of prenasalised stops comes from Naxi; the facts can be described simply as a merger of proto-prenasalised stops with plain voiced stops in Na and Laze.<sup>17</sup> Finally, nasal + unvoiced clusters such as \*Np are tentatively postulated on the basis of the presence in Naxi of unvoiced stops corresponding to voiced stops in Na and Laze. Data from outside the Naish group do not shed light on this issue. The hypothesised change in Na

<sup>16</sup> Alternatively, this Na form could be related to Burmese *phru*<sup>2</sup>'white'.

<sup>17</sup> Looking beyond Naish, the history of prenasalised stops in Burmo-Qiangic is complex: the prenasalised stops of Naxi do not correspond to those of Lolo-Burmese, as already pointed out by Bradley 1975.

and Laze is a merger of \*Np and \*mb (to \*mb) before the merger of \*mb and \*b (to b). In Naxi, nasality was lost in \*Np initials, leading to a merger with \*p.

The rendering of Naxi place names in Chinese in the *Yuan Yi Tongzhi* (元一统志), a book dated 1286, provides equivalences between voicing features in Yuan-dynasty Mandarin and Yuan-dynasty Naxi. Table 11 sets out the data.

Table 11. Transcription of two Naxi place names in a 13<sup>th</sup>-century Chinese record, and phonetic interpretation.

place name	transcription in the 元一统志 (date: 1286; cited from Fang Guoyu 2008:89) and Pinyin romanisation	'Phags-pa in transliteration <sup>18</sup>	'Phags-pa as reconstructed by Coblin 2007	present-day Naxi
Lijiang	样渠头 yàng qú tóu	yang k̥y̥u t <sup>h</sup> i:w	*jaŋ gy dəw	ɪɣyɿdyɿ
Yongning	楼头 lóu tóu	l <sup>h</sup> i:w t <sup>h</sup> i:w	*ləw dəw	lyɿdyɿ

The Chinese phonetic equivalents for present-day Lijiang and Yongning are 样渠头和楼头, respectively. In the variety of Chinese recorded in the 14<sup>th</sup>-century rhyme table *Zhongyuan Yinyun* (中原音韵), the initials of 渠 and 头 are unvoiced; however, using the reconstruction of 'Phags-pa by Coblin 2007, they are interpreted as \*gy and \*dəw, i.e. with the same voicing features as present-day Naxi. This observation provides evidence on a disputed point of Chinese historical linguistics: it is currently an issue whether the standard dialect of Yuan dynasty Chinese (Northern Mandarin) retained voiced obstruents or not; the facts in Table 11 suggest that it did (we have no reason to suspect that the present-day voiced obstruents of Na, Laze and Naxi are secondary). Had the Chinese dialect of the person transcribing these names already lost the voicing contrast and developed aspiration on previously voiced obstruents, the transcriber would have used unvoiced stops, rather than aspirated stops, to match the Naxi voiced initials.

Table 12 sets out correspondences for complex initials, again taking labials as an example.

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<sup>18</sup> 'Phags-pa is a writing system that was invented at the end of the 13<sup>th</sup> century to transcribe Chinese and Mongolian. It is the first fully consistent spelling system for Chinese. Except for its disregard for tonal contrasts, it is the most faithful source about early Mandarin pronunciation. The dialect transcribed in 'Phags-pa script is not the direct ancestor of any modern Chinese dialect; however, it was still very close to the ancestor of most Mandarin dialects.

Table 12. Examples of correspondences pointing to *pre-initial + initial* clusters in proto-Naish. S stands for either \*r or \*s, and C stands for a stop; it should be kept in mind that the phonetic value of the units S and C is unrecoverable in these contexts

English	Rgyalrong	Burmese	Tibetan	Naxi	Na	Laze	corresp.	proto-Naish	nb of ex.
(predicted correspondance)							(p <sup>h</sup> :p <sup>h</sup> :f)	*S-p <sup>h</sup>	
dry	spu < *spu	—	—	pyɿ	pyɿ	fɿɿ	p:p:f	*S-p	1
(predicted correspondance)							(p:b:v)	*S-Np	
intestine	-pu	u <sup>2</sup>	pho-	bɿɿ	bɿɿ	ɿɿ	b:b:v	*S-b	2
snow	-jpa	—		mbeɿ	biɿ	vieɿ	mb:b:v	*S-mb	2
garlic	ɕku	—	sgog-	kɿɿ	kɿɿ	fɿɿ	k:k:f	*S-k	1
head	-ku		mgo	kuɿ	kuɿ	uɿ	(k:ɕ:w)	*S-Nk	1
to do	pa		byed, byas	beɿ	iɿ	vieɿ	b:Ø:v	*C-b	3
difficult	nqa		dka		lo.ha <sup>M</sup>	luɿhaɿ	?:h:h	*C-k	1
maternal uncle		u <sup>3</sup>	a k <sup>h</sup> u	əɿgɿɿ	ə.v <sup>MH#</sup>	æɿɿ	g:Ø:v	*C-g	1

The Laze data offer good evidence for reconstructing clusters. At this juncture, the history of other languages of the Sino-Tibetan family, as well as of the neighbouring Austroasiatic family, provides precious insights. In Sino-Tibetan and Austroasiatic, many languages are known to have lost complex onsets. Three mechanisms of cluster simplification are attested. First, deletion of one element of the cluster: for instance, in Lhasa Tibetan, Cp-, Ct-, Ck- > p-, t-, k- where C stands for one of {r, s, b, d, g}. Second, coalescence of the two consonants into one: for instance, in Lhasa Tibetan p<sup>h</sup>r- and k<sup>h</sup>r- simplify to the affricate tʂ<sup>h</sup>- (the syllable acquiring a high tone in the process). Third, lenition of one of the consonants within clusters involving two obstruents: see for instance the comparison of Laven and Nha Heun by Ferlus 1971. Unlike Naxi, where pre-initials disappeared without leaving any traces before stops, in Laze these pre-initials caused a lenition of the following stop – a phenomenon akin to that observed in Vietnamese, where medial consonants were spirantised (Ferlus 1982; about the term "spirants", see Martinet 1981, 1985). In Na, we also find spirantisation in some etyma, and we posit a distinct preinitial \*C- to explain these cases.

There is no evidence of spirantisation in the case of dentals in either Na or Laze. This observation is placed in cross-linguistic perspective in Table 13.

Table 13. Data from several East Asian languages concerning the lenition of  $C_2$  stops in  $C_1C_2$  clusters. Amdo Tibetan data from Hua Kan and Long Bojia 1993. Rgyalrong data and analysis from Jacques 2009. Situ Rgyalrong data from Huang Liangrong and Sun Hongkai 2002. The Shuiluo Pumi data are set out in Table 14.

	labial	velar	coronal
Lhasa Tibetan	spirantisation of one single cluster: db-; e.g. dbang > /wá/ "power"	preserved	preserved
Rgyalrong	spirantisation of *jb and *zb; e.g. *zb- > zw- (e.g. /zwɣɾ/ "mugwort", cp. Situ Rgyalrong /spor <sup>22</sup> pram <sup>52</sup> /)	preserved	preserved
Amdo Tibetan	spirantisation of all labial stops; db- > ɣ- or ɣw-, e.g. dbu "head" > /ɣə/; sp- > hw-, e.g. spu "hair" > /hwə/	preserved; e.g. dka "difficult" > /hka/	preserved; e.g. gtam "speech" > /htam/
Laze	spirantisation of all labial stops	spirantisation of all velar stops	preserved
Tangut	spirantisation of all labial stops	spirantisation of all velar stops	spirantisation of ts-; rare cases of spirantisation of t-
Shuiluo Pumi	preserved	spirantisation of all velar stops	spirantisation of all coronal affricates and some dental stops
Vietnamese	spirantisation of all obstruents in medial position		

The Pumi data being hitherto unpublished, relevant examples are provided in Table 14. The Shuiluo dialect lost *s + obstruent* clusters still found in the Lanping dialect (Lu Shaozun 2001). The clusters found in Lanping Pumi regularly correspond to fricatives in Shuiluo, whereas simple stops always correspond to stops; this warrants the conclusion that a process of spirantisation took place in Shuiluo Pumi. Labial stops are an exception: they never undergo spirantisation.

Table 14. Correspondences showing the spirantisation of nonlabial stops in Shuiluo Pumi. Data from 2009 fieldwork in Muli, Sichuan, China.

meaning	Shuiluo Pumi	Lanping Pumi
to cook	xô	sqó
nine	γiâ	sgiuú
to chop	ɕê	t <sup>h</sup> ə stʃá
to feed	ɕ <sup>h</sup> ě	t <sup>h</sup> ə stʃ <sup>h</sup> é
trousers	zǎ	sdʒó
beard	a só	à stiáu
to choose	s <sup>h</sup> é	t <sup>h</sup> ə st <sup>h</sup> ié
deaf	za bǒ	sdə bǒ
leaf	pǎ	sè spà
to patch	p <sup>h</sup> iě	xə sp <sup>h</sup> è
ice	bu bǒ	sbù sbǒ

From the data in Table 13, it is clear that there is no universal hierarchy of propensity to spirantisation according to place of articulation. In Tibetan, Rgyalrong and Laze, dental stops appear to resist spirantisation; conversely, in Shuiluo Pumi, labial stops resist spirantisation.

Apart from \*C- and \*S-, there is evidence to reconstruct a third preinitial, \*r-, in proto-Naish. The evidence does not come from initial lenition, but from vowel correspondences. Unfortunately, most of the cases involve so few examples as to be inconclusive; the only syllable types that can be reconstructed with confidence with a preinitial \*r- are shown in Table 15.

Table 15. Cognate sets reconstructed back to \*rts(h)V in proto-Naish.

meaning	Rgyalrong	Burmese	Tibetan	Naxi	Na	Laze	proto-Naish
articulation	tu-rtsɿγ	chac	ts <sup>h</sup> igs	ʈʂə̃	ʈʂæ̃	tsuɿ	*rtsi
wash	χtɕi (Situ rtɕi)			ʈʂ <sup>h</sup> ə̃	ʈʂ <sup>h</sup> æ̃	ts <sup>h</sup> uɿ	*rts <sup>h</sup> i
medicine		che <sup>2</sup>	rtsi	ʈʂ <sup>h</sup> ə̃ɿwɿ	ʈʂ <sup>h</sup> æ̃.u <sup>#H</sup>	ts <sup>h</sup> uɿfiɿ	*rts <sup>h</sup> i
waist					i.ʈʂæ̃ <sup>L+MH#</sup>	iɿtsuɿ	*rtsi
to hold				ʈʂ <sup>hw</sup> ə̃	ʈʂ <sup>h</sup> ɿ̃	ts <sup>h</sup> ɿ̃	*rts <sup>h</sup> U
lungs	tu-rts <sup>h</sup> ɿs < *rts <sup>h</sup> ɿs	chut		/ʈʂ <sup>hw</sup> ə̃	ʈʂ <sup>h</sup> ɿ̃	ts <sup>h</sup> ɿ̃	*rts <sup>h</sup> U
to cough				ʈʂ <sup>w</sup> ə̃	ʈʂɿ̃	tsɿ̃	*rtsU

In these examples, the initial correspondences /t͡s<sup>(h)</sup>:t͡s<sup>(h)</sup>:ts<sup>(h)</sup>/ are associated with the rhyme correspondences /ɔ̃:æ:u/ and /ɔ̃:ɿ:y/. Cognates in Rgyalrong and Tibetan suggest the presence of a preinitial \*r-, and the evidence is overwhelming for reconstructing a front vowel \*i in the first case, and a rounded vowel (either \*u or \*o) in the second. In Laze, \*rts<sup>(h)</sup>i and \*ts<sup>(h)</sup>i merged as /ts<sup>(h)</sup>u/, while in the two other languages both the initial and the rhyme underwent retroflexion (note that correspondence between Naxi /ɔ̃/ and Na /æ/ is the same as for the rhyme \*iN reconstructed after \*Pr-). The vowel /æ/ of Na probably went through a stage \*ɔ̃ as in Naxi. The vowel /æ/ of many cognate sets originates in a syllable with preinitial or medial \*r- in proto-Naish; most other examples of /æ/ are in fact loanwords.

### 2.2. Sonorants

Table 16 provides examples of correspondences for sonorants.

Table 16. Examples of correspondences for sonorants.

English	Rgyalrong	Burmese	Tibetan	Naxi	Na	Laz	corr.	proto-Naish	nb of ex.
black	-naɕ	nak	nag	naɭ	naɭ	naɭ	n:n:n	*n-	10
work	—	lup	—	loɭ	loɭ	luɭ	l:l:l	*l-	20
moon	-sla	la <sup>1</sup>	zla	leɭ	ɦi.mi <sup>M</sup>	ɦieɭ	l:l:l	*Sl-	3
red	-rni	ni <sup>2</sup>		hyɭ	hỹɭ	hĩ	h:h:h	*Sn-	3
rib	-rnom	naɱ <sup>2</sup>	snam-gzogs, snam-logs "side", snam-brag "bosom"	hoɭ	ɦoɭ	ɦuɭ	h:l:l	*l̥-	4
soul	-rla	-pra <sup>2</sup>	bla, brla	heɭ	æ.ɦi <sup>L+#H</sup>	ɦieɭ	h:l:l	*l̥-	

The three-way correspondence /h:l:l/, /l:l:l/ and /h:h:h/ points to three different initials in proto-Naish. Nasality is present on the entire syllable in the Na and Laze word for "red", while vowel nasality is entirely absent in Naxi – though it was partly transphonologised as a contrast of initials: \*hỹ > /hy/, and \*hy > /çy/; this is the only context in Naxi where /ç/ is contrastive (Michaud 2006a). This suggests the possibility of a voiceless nasal \*ŋ (corresponding to present-day /h:h:h/) at an earlier stage.

To account for all the correspondences, as many as four different initials must be reconstructed. Proposing concrete values for these entities is a thorny task, because all of them appear to have gone through a phase where they were realised as one of /l̥/ or /ŋ̥/. A complex evolutionary path must be hypothesised. Table 17 sets out a model of the sequence of changes in each of the three languages.



Table 17. Reconstructed sequence of changes in each of the three languages leading to the correspondences in Table 16.

	Naxi	Na	Laze
(i)	$*\eta\text{-}, *l\text{-} > *l\text{-}$ (merger of $*\eta\text{-}$ and $*l\text{-}$ )		
(ii)	$*l\text{-} > *h\text{-}$		
(iii)	$*sl\text{-} > *l\text{-}$ (merger with $*l\text{-}$ ) $*sn\text{-}, *sm\text{-}, *s\eta\text{-}$ $> *n\text{-}, *m\text{-}, *\eta\text{-}$	$*sl\text{-} > *l\text{-}$ $*sn\text{-}, *sm\text{-}, *s\eta\text{-}$ $> *n\text{-}, *m\text{-}, *\eta\text{-}$	$*sl\text{-} > *l\text{-}$ $*sn\text{-}, *sm\text{-}, *s\eta\text{-}$ $> *n\text{-}, *m\text{-}, *\eta\text{-}$
(iv)	$*\eta V, *mV, *s\eta V >$ $*h\tilde{V} > hV$	$*\eta V, *mV, *s\eta V > h\tilde{V}$ $*l\text{-} > t\text{-}$	$*\eta V, *mV, *s\eta V > h\tilde{V}$ $*l\text{-} > t\text{-}$

Since proto-Naish  $*l\text{-}$  corresponds both to Cn- and Cl- clusters in Tibetan and Rgyalrong, it is reasonable to assume that it results from the merger of still earlier  $*\eta\text{-}$  and  $*l\text{-}$ . This merger, which constitutes a common Naish innovation, has parallels in Chinese. Old Chinese  $*hn\text{-}$  and  $*hl\text{-}$  merge in Middle Chinese. These initials yield  $t^h\text{-}$  or  $\text{ʈ-}$  in Middle Chinese, depending on the type of syllable (Baxter 1992:194, 197).

### 2.3. Correspondences pointing to a contrast between uvulars and velars in proto-Naish

There exists a small set of examples following the correspondence  $/\gamma:\text{ɔ}:\text{o}/$ , as shown in Table 18.

Table 18. Cognate sets comprising a uvular in Na.

meaning	Rgyalro ng	Burmese	Tibetan	Naxi	Na	Laze	proto- Naish
sleeve	—	—	—	laJɣʰkʰoɬ	i.qʰɣ <sup>L</sup>	jaɬqʰɔɬ	*qʰU
swallow	mqlaɕ	—	—	koɬ	ɕɣɬ	ɕɔɬ	*NqU
cave	—	—	—	ŋɣɣɬkʰoɬ	ɕwɣ.qʰɣ <sup>M</sup>	læɬqʰɔɬ	*qʰU
throat	-rɣo < *rɣaŋ	—	—		qɣ.tɕæ <sup>MH#</sup>	qɔɬtsuɬ	*qU
horn	-ɕru < *qru	kʰyui <sup>2</sup>	ru	kʰoɬ	qʰɣɬ	qʰɔɬ	*qʰU

Potential cognates in the reference languages do not suggest one single proto-rhyme (proto-Rgyalrong  $*\text{-aq}$ ,  $*\text{-aŋ}$  and  $*\text{-u}$  all correspond to this set). On the other hand, these examples do have a common characteristic, namely the presence of a uvular initial in Na. It is probably not a coincidence that the corresponding terms in Rgyalrong, the only conservative language that likewise contrasts uvulars and velars, also have a uvular initial. The

homogeneity of the /ɣ:ɔ:ɔ/ correspondence may therefore result from the influence of a proto-Naish uvular initial over a proto-Naish rounded rhyme such as \*o, \*u or \*aC. All these rhymes are here subsumed under a capital *u* symbol: \*U.

As a concluding note concerning onsets, the present analyses confirm that the evolution of vowels from proto-Naish to the modern languages is influenced by the consonantal onset: simple initials and complex consonantal onsets both left some marks on the following vowel – a phenomenon already pointed out by Huang Bufan 1991 for the Sino-Tibetan family at large.

## Conclusion

The Naish languages, with their absence of segmental inflection and their limited syllable inventory, constitute a typological extreme and offer an exceptional challenge to the application of the comparative method, due to the high opacity of the phonological changes that have taken place in this branch. The present study constitutes a first step towards unraveling the phonological history of the Naish languages; it exemplifies the well-established fact that conservative languages provide useful indications for interpreting present-day correspondences among the short forms of phonologically eroded languages.<sup>19</sup>

The present study also contributes pieces of evidence for a general inventory and typology of sound changes. First, phonetic conditioning of the rhyme by the place of articulation of the preceding consonant, though not entirely unheard of (see, again, Matisoff 2007 on Loloish, or the laryngeals in proto-Indo-European), is considerably rarer than the opposite: an influence of a consonant on a vowel that precedes it. Second, the Laze language provides evidence for the typology of stop lenition in *obstruent + stop* clusters. Third, the development of \*u and \*i after dental fricatives and affricates offers insights into the mechanisms that govern the evolution of apical vowels.

Finally, while language classification is not the main focus of this research, the insights gained into the historical phonology of Naxi, Na and Laze put to rest any doubt that they belong within a single subgroup (clade) of Sino-Tibetan.

Needless to say, for proto-Naish as for any other proto-language, the addition of new data from the languages at issue and from other closely related languages will lead to improvements and modifications of the reconstruction. The importance of documenting a greater number of related language varieties cannot be overemphasised.

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<sup>19</sup> Within the Sino-Tibetan family, a similar approach could be applied in future to the reconstruction of Tujia or Bai.

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## Appendix 1. Background data about the Naish languages

This Appendix provides (i) information on the geographic coordinates of Naxi, Na and Laze, and a brief review of the literature; (ii) phylogenetic reflections on the Naish group and its position within Sino-Tibetan; and (iii) reasons why no comparison with languages closely related to the Naish languages was attempted in the present research.

### *Geographic coordinates and a brief review of the literature*

Naxi is the best-documented of the three languages studied in the present article. This is due in part to the scholarly attention devoted to the Naxi scripts (pictographic and syllabic), which indirectly stimulated linguistic work (Fang Guoyu and He Zhiwu 1995, Li Lincan, Zhang Kun et al. 1953, Rock 1963-1972). Annotated editions of Naxi ritual texts also constitute important resources for linguists (see in particular Fu Maoji 1981-1984 and the 100-volume "*Annotated collection of Naxi Dongba manuscripts*", 1999-2000). Specialised linguistic work includes reflections on the position of Naxi respective to the Yi (a.k.a. Ngwi, Lolo) subgroup of Tibeto-Burman (Okrand 1974, Bradley 1975); preliminary field notes by Hashimoto Mantaro (Hashimoto 1988); and a book-length glossary (Pinson 1998) which provides data on several dialects (see Pinson 1996). Finally, the rudimentary word lists collected at the turn of the 20<sup>th</sup> century provide a few useful hints: on this topic, see Michaud and Jacques 2010.

The specific language varieties studied here are indicated on the map (Figure 1):

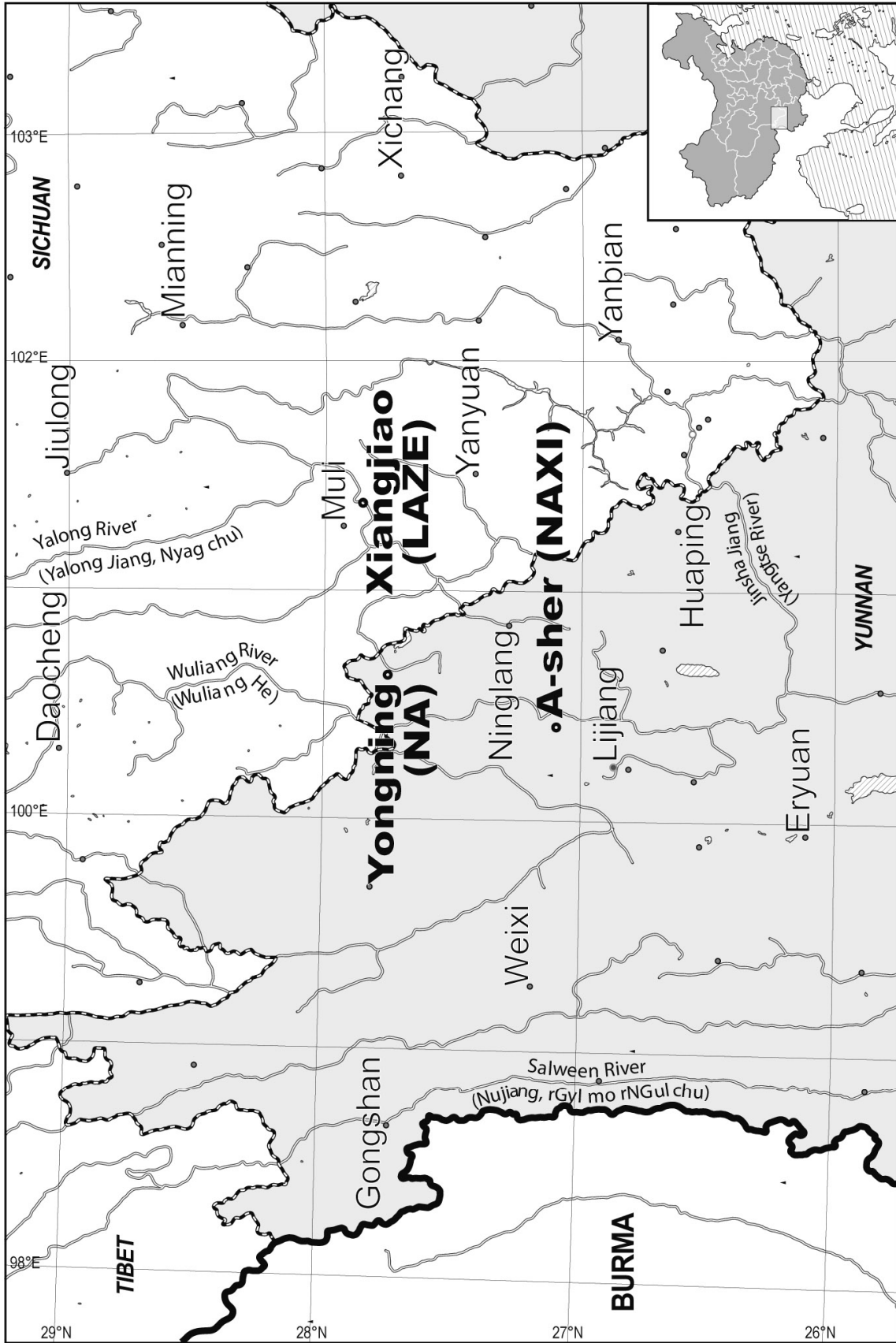
(i) Naxi (autonym: /naɰhi˥/), as spoken in the hamlet of A-sher (/a˥ʂə˥/); Chinese coordinates: Wenhua township, Lijiang Municipality, Yunnan, China.

(ii) Yongning Na (autonym: /na˥/), as spoken in Yongning township, Lijiang municipality, Yunnan, China.<sup>20</sup> A neighbouring dialect is described by Lidz (2006, 2007, forthcoming).

(iii) Laze (autonym: /la˥ze˥/; referred to in China as Muli Shuitian 木里水田 or Lare 拉热), as spoken in Xiangjiao township, Muli prefecture, Sichuan, China. (See Huang Bufan 2009 for a general overview of a neighbouring dialect.)

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<sup>20</sup> This language is also known as "Mosuo"; for a discussion of this exonym, see Yang Fuquan 2006.



**Figure 1.** Map showing the locations of fieldwork on Naxi, Na and Laze (in bold). The shaded area corresponds to the province of Yunnan.

**BURMA** state  
**YUNNAN** province  
**Eryuan** city

— state boundary  
 - - - province boundary  
 0 55,2 km

The present research essentially relies on first-hand data collected by A. Michaud from 2002 to 2009. With apologies for self-references, here is a list of published results: analyses of the phonemic system of Naxi (Michailovsky and Michaud 2006, Michaud 2006a) and of its tone system (Michaud 2006b, Michaud and He Xueguang 2007); a phonemic and tonal analysis of Yongning Na (Michaud 2008); and a tonal analysis of Laze (Michaud 2009).

*The Naish group and its position within Sino-Tibetan*

Although language classification is not the main focus of the present paper, it is essential to provide evidence of the close phylogenetic relatedness of Na, Laze and Naxi in order to legitimate the attempt made in the present article: to contribute to the reconstruction of their common ancestor, 'proto-Naish', and to document the evolution from this common ancestor to Naxi, Na and Laze, referred to as 'Naish languages'.

It is widely accepted in Chinese scholarship that Naxi and Na are closely related. He Jiren and Jiang Zhuyi 1985:107 consider them as dialects of the same language, which they call "Naxi", even though speakers of Na do not call their own language "Naxi". The boundaries of "Naxi" as defined by He and Jiang are so broad that they actually coincide with what we call Naish languages. "Naxi" in the sense used in the present article (i.e. restricting its extent to the area where speakers use the name "Naxi" for their own language) coincides with what He and Jiang refer to as "Western Naxi" (纳西语西部方言), whereas they consider Na as part of a looser set of dialects to which they refer as "Eastern Naxi" (纳西语东部方言). Laze is not mentioned in He and Jiang (ibid.); the question of its inclusion within Naish ("Naxi" as defined by He and Jiang) has been the object of some controversy in Chinese scholarship. With fewer than 300 proficient speakers, Laze is less well documented than the other two varieties. In their *History of the Naxi People*, Guo Dalie and He Zhiwu, adopting the same broad understanding of the term "Naxi" as He and Jiang, classify the Laze as one out of eight subgroups within the Naxi ethnic group on the basis of cultural and linguistic similarities with another proposed Naxi subgroup, the Nari 纳日 (Guo Dalie and He Zhiwu 1994 [2nd ed. 1999]:6-7). Huang Bufan (2009) expresses reservations on this topic, concluding that "...the relationship [of Laze] with Naxi, and its position within Tibeto-Burman, call for more in-depth investigation". Our own research results point to a degree of closeness between Naxi, Na and Laze which is clearly greater than with other languages of the area. In addition to a fair amount of basic vocabulary, they share some lexical innovations. A short list of probable such innovations is provided in Table 19, including two disyllables: "medicine" and "noble". Not all the words in the list belong to the basic vocabulary, witness the word for the Bai ethnic group. On the other hand, their

correspondences for initials and rhymes all coincide with one of the regular phonetic correspondences brought out in this article, suggesting that they may all be actual cognates.

Table 19. A short list of probable Naish lexical innovations.

meaning	Naxi	Na	Laze	proto-Naish
to stumble	peɿ	k <sup>h</sup> u.pi <sup>M</sup>		*(S)pa
cloud <sup>21</sup>	kiɿ	tɕiɿ	tɕiɿsuɿ	*ki
village	hiɿmbeɿ	fɿ.bi <sup>L</sup>	ɕuɿbieɿ	*mba
Bai ( <i>ethnic group</i> )	leɿbyɿ	ɬi.bi <sup>M</sup>		*Sla
noble		suɿ.p <sup>h</sup> i <sup>M</sup>	suɿp <sup>h</sup> ieɿ	*si p <sup>h</sup> a
medicine (2 <sup>nd</sup> syllable)	tɕ <sup>h</sup> əɿɿ	tɕ <sup>h</sup> æ.u <sup>#H</sup>	ts <sup>h</sup> uɿfiɿ	*rts <sup>h</sup> i Swri

Moreover, Laze, Na and Naxi share structural properties of numeral-plus-classifier determiners which are not found in other languages of the area (Michaud submitted).

The boundaries of the Naish branch remain to be worked out in detail; the list of "subfamilies" (支系) of the "Naxi nationality" (纳西族) provided by Guo and He (op. cit., pp. 5-9) can serve as a starting-point, keeping in mind that this list was essentially based on anthropological criteria, and that the inclusion of a language in the Naish branch requires a systematic comparative study such as the present one.

As for the position of the Naish languages within the Sino-Tibetan family, it remains controversial. Naxi was initially classified within the Loloish branch of Tibeto-Burman (Shafer 1955); however, Bradley (1975) shows that it does not share the innovations that characterise this group and concludes that Naxi is "certainly not a Loloish language, and probably not a Burmish language either" (p. 6). Thurgood (2003:19) lists Naxi among the unsubgrouped languages of the Sino-Tibetan family. This issue links up with more general uncertainties about subgroupings within a relatively large portion of the family, which encompasses Lolo-Burmese and Qiangic. The Naish languages appear closely related to the Shixing language, spoken in Muli county, Sichuan, and which was initially classified by Sun Hongkai 2001 within a "Southern Qiangic" branch on purely typological grounds. A relatively close relationship with other languages likewise classified as "Southern Qiangic", such as Namuyi (a.k.a. Namuzi, Namzi) and Ersu, Tosu and Lizu, is also plausible; specific investigations are required in order to ascertain the degree of closeness between these languages. Bradley (2008) proposes the following set of hypotheses: Naxi and Na are closest to Namuyi, the second closest is Shixing, and the third closest is Ersu. In the family tree

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<sup>21</sup> Lookalikes to this etymon are found in Lizu: /tɕe<sup>35</sup>/, Shangyou Shixing: /tɕi<sup>55</sup>rō<sup>21</sup>/, and Xiayou Shixing: /ti<sup>55</sup>rō<sup>21</sup>/, as pointed out by Katia Chirkova (p.c.). The Shixing form, however, is more profitably compared instead to proto-Lolo-Burmese \*C-dim<sup>1</sup> and Rgyalrong /zdum/. As for Lizu /tɕe<sup>35</sup>/, more research is needed to determine whether or not this could be an external cognate.

proposed in Figure 2, the name "Naic" is proposed for a node grouping Naish with Shixing and Namuyi.

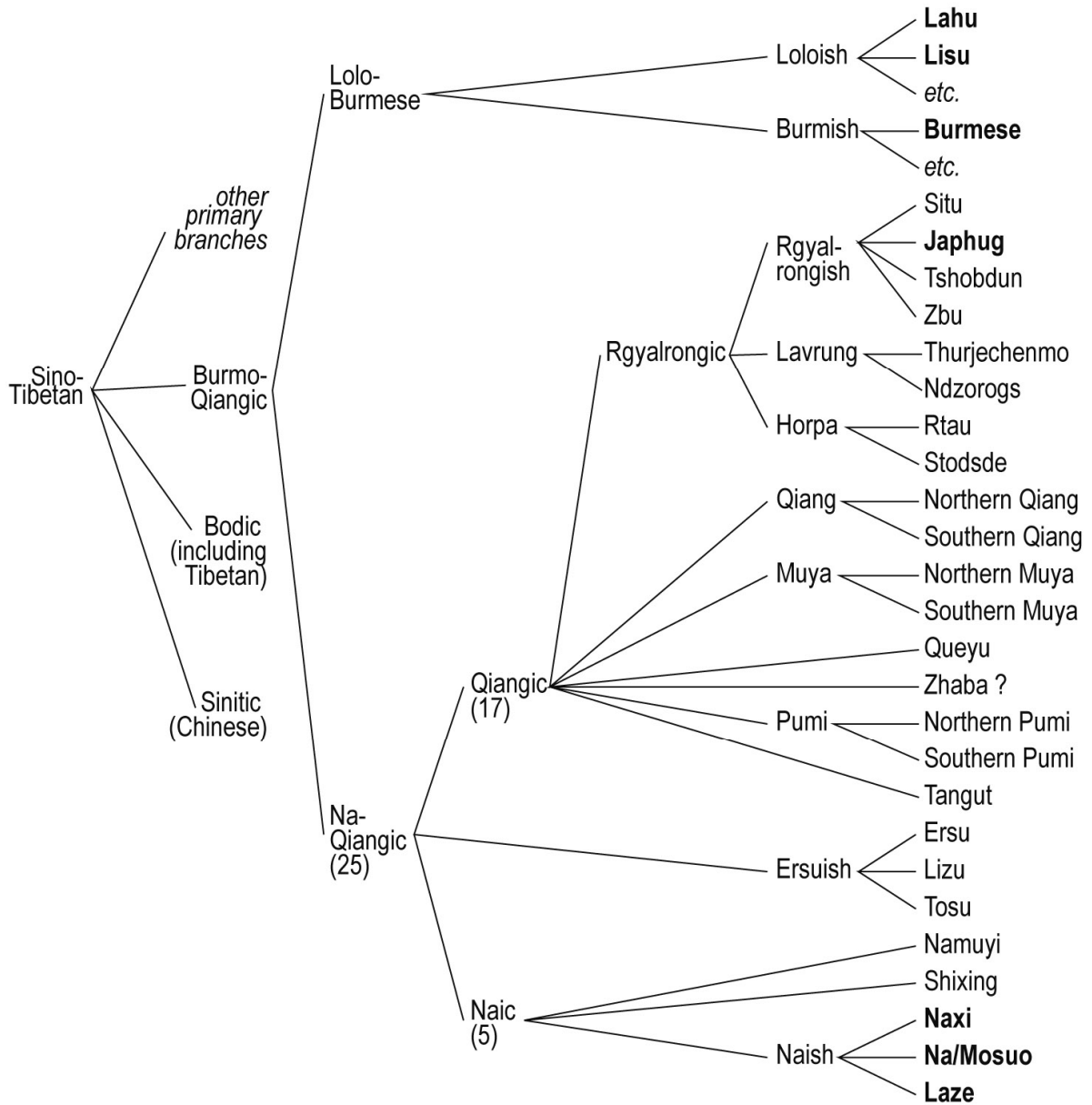


Figure 2. A tentative family tree showing the position of Naxi, Na and Laze within a Burmo-Qiangic branch Sino-Tibetan.

Some of the groupings in Figure 2 are by now well-established, in particular the Rgyalrongic group (Sun 2000a). Higher-level groupings are more controversial. Under the present proposal, the Qiangic group only includes Rgyalrongic, Tangut, Pumi (a.k.a. Prinmi), Muya and Qiang, i.e. languages that can be shown to have an extensive amount of uniquely shared vocabulary (there remain doubts concerning Zhaba). Ersu, Tosu and Lizu are generally considered to be Qiangic languages, following Sun Hongkai's 1983 classification (see, e.g., Yu 2009), but evidence for their inclusion in this subbranch is weak; our hypothesis is that these languages may in fact belong to the Burmo-Qiangic group but not to

Qiangic proper; more research is needed before any conclusion can be reached on this issue.<sup>22</sup>

The family tree outlined in Figure 2 reflects the hypothesis that Naish is closely related to Lolo-Burmese and Qiangic, and that it belongs in an independent branch of a larger Burmo-Qiangic group. This Burmo-Qiangic group is close to "Eastern Tibeto-Burman" as proposed by Bradley 1997. This hypothesis will be briefly defended here on the basis of lexical evidence, since Lolo-Burmese and Naic languages have not preserved much morphology.

One such piece of evidence is the suppletion found for the noun "year", with a labial-initial root (proto-Tangut \*C-pja) in "this year, next year, last year" and a different root (proto-Tangut \*kjuk) with numerals: see Table 20. Rgyalrong has generalized the labial form ("next year" is innovative) and the velar root was lost. In Lolo-Burmese languages, only the root related to Tangut \*kjuk is found.

Table 20. Suppletion for the noun "year" in several Burmo-Qiangic languages. About the proto-Naish forms, see Appendix 2, items a7.20 and u3.14

meaning	Tangut	Rgyalrong	Shuiluo Pumi	Muya	proto-Naish
last year	.ji <sup>2</sup> .wji <sup>1</sup>	japa	zépə	jø <sup>33</sup> za <sup>24</sup>	... *C-ba
this year	pji <sup>1</sup> .wji <sup>1</sup>	ɣujpa	pəpə	pə <sup>33</sup> βə <sup>53</sup>	... *C-ba
next year	sjij <sup>1</sup> .wji <sup>1</sup>	fsɣq <sup>h</sup> e < *psaŋ-q <sup>h</sup> o-j	zək <sup>h</sup> iú	sæ <sup>33</sup> βə <sup>53</sup>	... *C-ba
one year	.a-kjiw <sup>1</sup>	tu-xpa	tá-kó	tə <sup>55</sup> -kui <sup>53</sup>	... *k <sup>h</sup> u
two years	nji <sup>h</sup> -kjiw <sup>1</sup>	ɰnɯ-xpa	ɲí-kó		... *k <sup>h</sup> u

Table 21 presents a preliminary list of common etyma between Qiangic, Naish and LB not found elsewhere in ST (to the best of our knowledge). It should be kept in mind that finding uniquely shared lexical innovations is a difficult task. This short list will require revision in future; if the hypothesis is correct, it is expected that an increasing number of cognates and uniquely shared lexical innovations will come to light.

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<sup>22</sup> Fieldwork about these languages is under way, so that the necessary basis for comparative studies should become available in the near future: see in particular Chirkova 2008, 2009. Further research will also be necessary to clarify the relationship of Guiqiong and Tujia to the Burmo-Qiangic group as defined here.

Table 21. Correspondences for lexical items that may constitute Burmese-Qiangic innovations. The Naish forms are Na, apart from those marked as NX, which are from Naxi. Achang belongs to Burmish, and Hani to Loloish.

meaning	Rgyalrong (S = Situ)	Tangut	Naish (NX = Naxi)	proto- Naish	Burmese	Achang	Hani
copula	ɲu	ɲwu <sup>2</sup>	ɲiɿ	?			ɲu <sup>31</sup>
star	zɲgri	gijj <sup>1</sup>	kuɿ	*kri	kray <sup>2</sup>	k <sup>h</sup> zə <sup>55</sup>	a <sup>31</sup> gu <sup>55</sup>
forget	jmwt	mji <sup>2</sup>	mɣ.p <sup>h</sup> æ <sup>L+MH#</sup>	*mi	me <sup>1</sup>	ji <sup>35</sup>	ji <sup>55</sup>
be ill	ngo < *ngaŋ	ŋo <sup>2</sup>	guɿ	*go			
flint	ɛdurtsa		tse.mi <sup>H#</sup>	*tsa			
to hide	nɿtsu		tsuɿ NX	*tsu			
to swallow	mqlaɕ		ɛɣɿ	*NqU < *Nqak			
dry	spu		pɣɿ	*Spu			
thick	jaɕ	laa <sup>1</sup>	loɿ	*laC <sub>2</sub>			
jump	mtsəɕ		ts <sup>h</sup> oɿ	*ts <sup>h</sup> aC <sub>2</sub>			
winter	qartsu	tsur <sup>1</sup>	ts <sup>h</sup> iɿ	*ts <sup>h</sup> u	c <sup>h</sup> oŋ <sup>3</sup>	tɛ <sup>h</sup> oŋ <sup>31</sup>	ts <sup>h</sup> o <sup>31</sup> l gə <sup>33</sup>
knee	tə-mŋa S	ɲwer <sup>2</sup>	ɲwɿ.ko <sup>H#</sup>	*ɲwa			
sun	ɛmbyi	be <sup>2</sup>	biɿ NX	*bi			

Note that the inclusion of Rgyalrongic within Qiangic contradicts Randy LaPolla's hypothesis of a Rung group, distinct from Qiangic, that would include Rgyalrongic as well as Kiranti and Dulong/Rawang. LaPolla's proposed grouping is based on the hypothesis that the morphology found across these languages is a common innovation (LaPolla 2003:30 and references therein). However, the comparison of Rgyalrong to Kiranti reveals very little common vocabulary: a careful examination of Boyd Michailovsky's unpublished Kiranti etymological dictionary brought out less than 150 potential cognates, which are too widespread within the Sino-Tibetan family to be convincing instances of shared innovation. If Rgyalrong and Kiranti were closely related in the Sino-Tibetan family tree, one would expect more cognate vocabulary, including some lexical innovations.

The view of the Sino-Tibetan family presented in Figure 2 has the important implication that any morphology that is found in both Rgyalrong and Kiranti, or Rgyalrong and Tibetan, must be of great antiquity (predating the split between proto-Burmo-Qiangic and other branches), and that it was lost almost without traces in Lolo-Burmese and Naish. In this light, vestigial phenomena such as the traces of vowel alternation found in the Naic language Shixing (Chirkova 2009) deserve special attention: they may point to an earlier verb conjugation system.

*Why no comparison with languages closely related to the Naish languages was attempted in the present research*

The phylogenetic distance between Naish, Rgyalrong and Burmese is relatively great – although we believe that they belong together with the Naish languages in a Burmo-Qiangic branch of Sino-Tibetan, as explained above. The distance between Naish and Tibetan is even greater. Some justifications must be provided for referring to these distant languages in the reconstruction of proto-Naish, instead of relying on data from Shixing, Namuyi and Ersu/Tosu/Lizu, which, while they do not belong to the Naish branch by our criteria, appear to be its closest relatives and could belong in a Naic group (see Figure 2). There are in fact three pressing reasons not to attempt to incorporate data from these languages at the present stage. (i) Available phonemic analyses for these languages are not fully satisfactory. A thorough synchronic description, including a complete inventory of syllables, is required before these languages can be put to use in historical comparison. In the case of the Naish languages, a preliminary to the present research consisted in elaborating a comprehensive synchronic phonological analysis. By 'comprehensive', we mean an analysis which, in addition to the inventory of vowel and consonant phonemes in the language, comprises a list of all attested syllables. As the Naish languages tend to present many phonological contrasts in restricted contexts, the inventory of syllables is necessary to study the full extent of gaps in the combinations of onsets and rhymes. For Shixing, Namuyi and Ersu, such inventories are not yet available. (ii) In addition to this practical reason, there is a methodological reason for postponing comparison with these languages: they are almost as eroded as the Naish languages, and therefore extremely difficult to use for comparative purposes. Naish, Shixing, Namuyi and Ersu have undergone an enormous amount of phonological changes independently from one another, and do not share most of their phonological innovations. Comparing them directly to one another only yields a lengthy list of opaque correspondences, offering precious few insights as to how these correspondences should be sorted out and reconstructed. Since these languages are mostly isolating and have almost no inflections (except in their tonology), we cannot rely on the reconstruction of vowel alternations to solve these issues. (iii) Last but not least, areal diffusion has had a conspicuous influence on Shixing and Namuyi, whose speakers are currently multilingual, raising with extreme acuteness the classical issue of inheritance versus borrowing (about which see Aikhenvald and Dixon 2001, among others).



**Appendix 2. Examples of five rhymes of proto-Naish (\*a, \*i, \*o, \*u and \*aC<sub>1</sub>/\*aC<sub>2</sub>) with comparanda in the conservative languages and proposed reconstructions.**

The question mark after a reconstructed form indicates that this form has other possible origins, and that the form indicated is a rule-of-thumb hypothesis. The "Ref[erence]" consists of (i) the proto-vowel, (ii) the number assigned to the vowel correspondence among the three Naish languages under study, and (iii) the number assigned to the cognate set. In the "HTB" column, we indicate the page number corresponding to the etymon in Matisoff's handbook (2003). The words provided in the "Rgyalrong" column are Japhug Rgyalrong forms, except those with the mention "(Situ)", which are Situ Rgyalrong forms from Huang Liangrong and Sun Hongkai 2002. The notation of the tones for Na disyllables follows the conventions set out in Michaud (2008). Finally, it must be emphasised that the data in the "other languages" column do not partake in the comparative study carried out here: these potential cognates are provided solely as stepping-stones for future comparative work with these languages (Tangut, Pumi and Lisu). For Pumi, SL refers to the Shuiluo dialect (unpublished fieldwork data), and LP to the Lanping dialect (Lu Shaozun 2001). Personal communications from James Matisoff are labelled "(JAM)".

Table 22. Rhyme \*-a

meaning	Ref	HTB	Rgyalrong	Burmese	Tibetan	other languages	Naxi	Na	Laze	proto-Naish
to win	a1.01		βka				ŋga˧	ka˧		ŋga/aC <sub>1</sub>
strength <sup>23</sup>	a1.02	170-4				Tangut yie < *C-ka	ka˧tu˧	ka˧	ka˧zi˧	Nka/aC <sub>1</sub>
bitter	a1.03	164-8		kha <sup>3</sup>	k <sup>h</sup> a		k <sup>h</sup> a˧	q <sup>h</sup> a˧	k <sup>h</sup> a˧	k <sup>h</sup> a/aC <sub>1</sub>
to step across	a1.04		mɕla					ka˧	(ɕu˧) ka˧	ŋga/aC <sub>1</sub> (or Nka/aC <sub>1</sub> )

<sup>23</sup> It is likely that 'to win' \*ŋga/aC<sub>1</sub> and 'strength' \*Nka/aC<sub>1</sub> originally belong to the same root, but they need to be distinguished at the proto-Naish stage. A relationship with Burmese a<sup>3</sup> and its Lolo-Burmese cognates (Matisoff 2003:170) is possible.

difficult <sup>24</sup>	a1.05		nqa		dka			lo.ha <sup>M</sup>	lu-tha <sup>+</sup>	Cka/aC <sub>1</sub>
knee <sup>25</sup>	a2.01		tə-mŋa (Situ)			Tangut ŋwer <sup>2</sup> < *ŋwa		ŋwɤ.ko <sup>H#</sup>	ŋwa <sup>+</sup> tu <sup>+</sup>	ŋwa
bowl	a2.02					Pumi k <sup>h</sup> wǎ	k <sup>h</sup> wa <sup>+</sup>	q <sup>h</sup> wɤɣ	k <sup>h</sup> wɤɣ <sup>+</sup>	k <sup>h</sup> wa
hoof	a2.03	170	tu-qɑ			Pumi kwá	k <sup>h</sup> wa <sup>+</sup>	q <sup>h</sup> wɤɣ.ʂe <sup>L#</sup>	k <sup>h</sup> wɤɣ <sup>+</sup> bie <sup>+</sup>	k <sup>h</sup> wa
a pair	a3.01							dze <sup>+</sup>	dze <sup>+</sup>	dza
to lock	a3.02							tse <sup>+</sup>	tse <sup>+</sup>	tsa
wheat <sup>26</sup>	a3.03	162- 5	ndza	ca <sup>3</sup>	za		dze <sup>+</sup>	dze.lu <sup>M</sup>	dze <sup>+</sup>	dza
naemorhedus goral	a3.04						se <sup>+</sup>	se <sup>+</sup>	se <sup>+</sup>	sa
steel (for flint)	a3.05		ɤdurtsa				tse <sup>+</sup> ma <sup>+</sup>	tse.mi <sup>H#</sup>	tse <sup>+</sup> mie <sup>+</sup>	tsa
salt	a3.06	172		cha <sup>3</sup>	ts <sup>h</sup> wa		ts <sup>h</sup> e <sup>+</sup>	ts <sup>h</sup> e <sup>+</sup>	ts <sup>h</sup> e <sup>+</sup>	ts <sup>h</sup> a
nephew	a3.07	171- 2	tu-ftsa		ts <sup>h</sup> a-bo		dze <sup>+</sup> tu <sup>+</sup>	ze.ɣ <sup>L</sup>	ze <sup>+</sup>	Cdza
to walk	a3.08							se <sup>+</sup>	se <sup>+</sup> se <sup>+</sup>	sa
to borrow	a4.01	162- 5		hŋa <sup>3</sup>	ɣna		ŋi <sup>+</sup>	ŋi <sup>+</sup>	ŋi <sup>+</sup>	ŋi/a

<sup>24</sup> We also find forms such as Lahu /ha<sup>11</sup>/ 'difficult' (Matisoff 1988:1066), which could point to an alternative etymology.

<sup>25</sup> The Na word is pronounced [ŋwɤ]. Since the combination of an initial velar and a rhyme /wa/ is not attested in Na, one may consider that the contrast between the rhymes /wɤ/ and /wa/ is neutralised in this context, and hence compare Na [ŋwɤ] with Laze [ŋwa].

<sup>26</sup> This was originally a nominalised form of the verb 'to eat'; a semantic change from 'food' to 'wheat' occurred in this etymon. The free verb 'to eat' in Naish, /dzur/ in Na and /ndzur/ in Naxi, points to a reconstruction \*ndzi in proto-Naish, which is not compatible with the vowel in the languages of reference. The \*-a / \*-i alternation found in this pair of words can only be a trace of morphology. The rhyme \*-i of the verb might be the result of the fusion of the root with a suffix. Such a phenomenon is found in Rgyalrongic languages: in Japhug Rgyalrong, transitive verbs with open-syllable -a final (including *ndza* 'to eat', the cognate of proto-Naish \*ndzi) have a non-past form singular stem in -e (for instance /ndze/ 'he eats') that results from the fusion of the root vowel with a suffix \*-jə attested as a free form in other Rgyalrongic languages (Jacques 2004:356). An explanation for the form \*ndzi in Naish is that it represents the generalisation of the non-past form of the verb, thereby preserving a trace of a historical stage when Naish languages had verbal morphology of the type that Rgyalrong preserves to this day.

fish	a4.02	162		ŋa <sup>3</sup>	ja		ŋi˧	ŋi.zu <sup>#H</sup>	ŋi.lze˧	ŋi/a
span	a5.01		tu-tya	thwa <sup>2</sup>	mt <sup>h</sup> o < *mtwa			t̥i˧		twa
tooth	a5.02	171-2	tu-ɕya	swa <sup>3</sup>	so < *swa		hu˧	hi˧	fi˧t <sup>h</sup> u˧	Swa
rain	a5.03	171-3		rwa <sup>2</sup>			hu˧	hi˧	fi˧	Swa
lake	a5.04				mts <sup>h</sup> o < *m-swa		hu˧	hi.na.mi <sup>LM+#H</sup>	fi˧	Swa
cow	a5.05					Tangut ŋwe <sup>2</sup> < *ŋwa	u˧	i˧	vi˧	wa
to fall (rain)	a6.01		ŋgra "to fall"	kya <sup>1</sup>			gu˧	gi˧		gra
meat	a6.02			sa <sup>3</sup>	ɕa		ʂu˧	ʂe˧	ʂu˧	ɕa
earth <sup>27</sup>	a6.03						t̥ʂu˧	t̥ʂe˧	t̥ʂu˧	tra
axe	a7.01	171-2	tu-rpa				la.lmbe˧	bi.mi˧		(S)mba
to stumble	a7.02						pe˧	k <sup>h</sup> u.pi <sup>M</sup>		(S)pa
Bai ( <i>ethnic group</i> )	a7.03						le˧by˧	ʔi.by <sup>M</sup>		Sla
linen	a7.04						p <sup>h</sup> e˧	p <sup>h</sup> i˧		(S)p <sup>h</sup> a
knife	a7.05	162		dha <sup>3</sup>			zu˧t <sup>h</sup> e˧	su˧.t <sup>h</sup> i˧		t <sup>h</sup> a
noble	a7.06							su˧.p <sup>h</sup> i˧	su˧.p <sup>h</sup> ie˧	p <sup>h</sup> a
soul <sup>28</sup>	a7.07	162	tu-rla	see footnote	bla/brla		o.lhe˧	æ.ʔi <sup>L+#H</sup>	ɛɔ.lʔie˧	ʔa
thin	a7.08	162	mba	pa <sup>3</sup>			mbe˧	bi˧	t <sup>h</sup> ɑ˧ bie˧	mba
snow	a7.09	172	ɬɣ-jpa				mbe˧	bi˧	vie˧	Smba

<sup>27</sup> This form is perhaps relatable to the second syllable of Lahu /mi<sup>21</sup>cha<sup>53</sup>/ 'earth' (JAM).

<sup>28</sup> Two competing Burmese etymologies exist for this etymon: *lip pra* 'soul' and *hla* 'beautiful' (Matisoff 2003:62).

village	a7.10						hi+mbet	fɤ.bi <sup>L</sup>	ɕu+bie <sup>L</sup>	mba
to do	a7.11		pa		byed		be <sup>L</sup>	i <sup>L</sup>	vie <sup>L</sup>	Cba
tea	a7.12	48					le <sup>L</sup>	li <sup>L</sup>	lie <sup>L</sup>	la
moon	a7.13	162-4	tu-sla	la <sup>1</sup>	zla-ba		le <sup>L</sup>	ʰi.mi <sup>M</sup>	ʰie+mie <sup>L</sup>	Sla
ear	a7.14	162-5	tu-rna	na <sup>3</sup>	rna		he <sup>L</sup> tsu <sup>L</sup>	ʰi.pi <sup>L#</sup>	ʰie+tu <sup>L</sup>	ʎa
trousers	a7.15	163-5				Tangut ljii <sup>1</sup> < *ljaa	le <sup>L</sup>	ʰi.q <sup>h</sup> wɣ <sup>L</sup>	ʰie <sup>L</sup> k <sup>h</sup> wɣ <sup>L</sup>	Sla
female	a7.16	175			ma (suffix)		me <sup>L</sup>	mi	mie	ma
ask for	a7.17						me <sup>L</sup>	mi <sup>L</sup>	mie <sup>L</sup>	ma
butterfly	a7.18		qambatula				p <sup>h</sup> e+le <sup>L</sup>	p <sup>h</sup> i.li <sup>L#</sup>	p <sup>h</sup> ie+lie <sup>L</sup>	p <sup>h</sup> a la
rabbit <sup>29</sup>	a7.19		qala				t <sup>h</sup> o+le <sup>L</sup>	t <sup>h</sup> u.li <sup>M</sup>	t <sup>h</sup> u+lie <sup>L</sup>	la
this year	a7.20		tu-xpa				tʂ <sup>h</sup> u+be <sup>L</sup>	ts <sup>h</sup> i.i <sup>(M)</sup>	ts <sup>h</sup> u+vie <sup>L</sup>	Cba
who	a7.21						ə+ne <sup>L</sup>	ni <sup>L</sup>		na

Table 23. Vowel \*-i

meaning	Ref	HTB	Rgyalrong	Burmese	Tibetan	Other languages	Naxi	Na	Laze	proto-Naish
goat	i1.01	315	ts <sup>h</sup> ɣt	chit			ts <sup>h</sup> u <sup>L</sup>	ts <sup>h</sup> u <sup>L</sup>	ts <sup>h</sup> u <sup>L</sup>	ts <sup>h</sup> i
oat <sup>30</sup>	i1.02	189					mu <sup>L</sup> zu <sup>L</sup>	mɤ.zu <sup>L</sup>	mɤ <sup>L</sup> zu <sup>L</sup>	zi
south	i1.03						i+ʂ <sup>h</sup> u+mu <sup>L</sup>	i.ʂ <sup>h</sup> u.mi <sup>MHL</sup>	i+ʂ <sup>h</sup> u <sup>L</sup> mie <sup>L</sup>	tɕ <sup>h</sup> i
grass	i1.04						zu <sup>L</sup>	zu <sup>L</sup>	zu <sup>L</sup>	zi
skin	i1.05	189	tu-ndzi	re <sup>2</sup>			u+ <sup>h</sup> i <sup>L</sup>	u <sup>L</sup>	zu+ky <sup>L</sup>	ri
yellow	i1.06	191						ʂu <sup>L</sup>	ʂu <sup>L</sup> kɔ <sup>L</sup> læ <sup>L</sup>	ɕi

<sup>29</sup> Similar names are found in other languages, for instance Lahu /t<sup>h</sup>ɔ<sup>53</sup>la<sup>21</sup>/ 'year of the rabbit' (JAM).

<sup>30</sup> Proto-Lolo-Burmese \*zəy<sup>2</sup> 'barley' (JAM).

to know	i1.07	206	sus	si <sup>1</sup>	ɕes		suɿ	suɿ	suɿ	si
to die <sup>31</sup>	i1.08	189	si	se <sup>2</sup>	ɕi		ʂuɿ	ʂuɿ	suɿ	rsi
to thread (beads)	i1.09					Lisu su <sup>33</sup>		suɿ	suɿ	si
new	i1.10	344	ɕɤɣ	sac			ʂuɿ	ʂuɿ	ʂuɿtsaɿ	ɕi
to tie	i1.11		ts <sup>h</sup> ik <sup>33</sup> (Situ)				tsuɿ	tsuɿ	tsuɿ	tsi
morning	i1.12						myɿsuɿtuɿ	my.su <sup>L+MH#</sup>		si
girl	i2.01	187	tu-me	min <sup>3</sup>			miɿ	myɿ	myɿ	mi
fire	i2.01	206	smi	mi <sup>3</sup>	me		miɿ	myɿ	myɿ	mi
to hear	i2.02					Pumi mē <sup>3</sup>	k <sup>h</sup> oɿmiɿ	myɿ	myɿ	mi
to forget	i2.03		jmuit	me <sup>1</sup>			leɿmiɿ	my.p <sup>h</sup> æ <sup>L+MH#</sup>	læɿmyɿ	mi
lower side	i2.04						muɿ-t <sup>h</sup> æɿ	my.t <sup>h</sup> æ <sup>M</sup>	ɣɿt <sup>h</sup> æɿ	mi
name	i2.05	296	ɿɣ-rmi	maɿ <sup>2</sup>	ming		miɿ	my.tʂæ <sup>MH#</sup>		mi
star <sup>32</sup>	i3.01	212	ʂŋgri	kraɿ <sup>2</sup>			kuɿ	kuɿ	tsiɿ	kri
gallbladder	i3.02	189	tu-ɕkruut	sap <sup>3</sup> khre <sup>2</sup>	mk <sup>h</sup> ris		kuɿ	kuɿ	tsiɿ	kri
medicine	i3.03	189		che <sup>3</sup>	rtsi		tʂ <sup>h</sup> əɿuɿ	tʂ <sup>h</sup> æ.u <sup>#H</sup>	ts <sup>h</sup> uɿfiɿ	rts <sup>h</sup> i Swri
tight	i3.04	305			grim-po			kuɿ	tsiɿ	kri
liver	i4.01	297	tu-mts <sup>h</sup> i	sap <sup>3</sup>	mtɕ <sup>h</sup> in		səɿ	siɿ	siɿ	siN
wood	i4.02	347	si	sac	ɕiŋ		səɿ	siɿ	siɿ	siN
to shave	i4.03							siɿ	siɿsiɿ	siN
hot	i4.04						ts <sup>h</sup> əɿ	ts <sup>h</sup> iɿ	ts <sup>h</sup> iɿ	ts <sup>h</sup> iN
to plane down	i5.01						t <sup>h</sup> iɿ	t <sup>h</sup> iɿ		t <sup>h</sup> i

<sup>31</sup> The reconstruction of the cluster \*rs for this word results from the application of the same principle as for other cases where a retroflex initial in Na and Naxi corresponds with a dental initial in Laze. This reconstruction is not supported by comparative evidence from the conservative languages. The cluster in \*rsi could be a trace of morphology that had developed in proto-Naish.

<sup>32</sup> Matisoff (1980) has proposed a detailed etymology for this etymon common to Naish, Lolo-Burmese and Qiangic languages.

water	i5.02		tu-ci				giɿ	dziɿ		gi
to flow	i5.03		jit				iɿ	ziɿ		ji
tongue	i5.04	215		lhya <sup>2</sup>	ltce		hiɿ	hi.mi <sup>L</sup>	ciɿmieɿ	hi
two	i5.05	434	ɰnɯs	hnac	gnis		ŋiɿ	ŋiɿ	ŋiɿgɯɿ	ŋi/a
sweet <sup>33</sup>	i5.06		c <sup>h</sup> i				k <sup>h</sup> iɿ	tɕ <sup>h</sup> iɿ	ts <sup>h</sup> iɿ	k <sup>h</sup> i
to sell	i5.07		ntsye					tɕ <sup>h</sup> iɿ	tɕ <sup>h</sup> iɿ	tɕ <sup>h</sup> i
thorn	i5.08						k <sup>h</sup> iɿ	tɕ <sup>h</sup> iɿ	tɕ <sup>h</sup> iɿtuɿ	tɕ <sup>h</sup> i
muntjac	i5.09	189		khye <sup>2</sup>			k <sup>h</sup> iɿ	tɕ <sup>h</sup> iɿ	ts <sup>h</sup> iɿ	k <sup>h</sup> i
saliva <sup>34</sup>	i5.10		tu mci				kiɿ	tɕiɿ	tɕiɿ	tɕi
saddle	i5.11					Pumi: stʃé tʃhó (LP), ci <sup>2</sup> (SL)	zɯaɿkiɿ k <sup>h</sup> oɿ	tɕiɿ	tɕiɿq <sup>h</sup> oɿ	tɕi
small	i5.12		xtɕi				kiɿ	tɕi <sup>L</sup>	tɕiɿ	tɕi
to sleep <sup>35</sup>	i5.13	500	nɯzɯw	'ip			iɿ	ziɿ	ziɿ	ji
to walk	i5.14		ŋke				ŋgiɿ			ŋgi
to lose	i5.15							ŋiɿ		ni
cloud	i5.16						kiɿ	tɕiɿ	tɕiɿstuɿ	tɕi
urine	i5.17		tu-rmbi			Pumi bɿ <sup>2</sup> (SL)	mbiɿ			mbi
pus	i6.01			praŋ <sup>2</sup>			mbæɿ	bæɿ	bæɿ	priN
short	i6.02						ndæɿ	dæɿ	dæɿ	rdiN
grain	i6.03						læɿ	ɿæɿ	læɿ	rliN

<sup>33</sup> This etymon is perhaps related to Burmese *khyui*<sup>2</sup> (cf. Matisoff 2003:182).

<sup>34</sup> This root could be related to 'water' (cf. Matisoff 2003:451).

<sup>35</sup> The correspondence of initials for this item is problematic. The reconstruction proposed here rests on the hypothesis that \*ji changed to /zi/ in Laze. Crucial evidence would come from other instances of the correspondence /i:zi:zi/.

neck <sup>36</sup>	i6.04				mgrin	Pumi kɛ̃ <sup>2</sup> (SL)	kjəpəɽ	ɛæ.ty <sup>H#</sup>	ɛætsuɽpaɽ	C-NkriN
resin	i6.05						thoŋgəɽ	t <sup>h</sup> o.ɛæ <sup>L</sup>	thuɽɛæɽ	C-ŋgriN
rope	i6.06		tu-mbri		mbreŋ			bæɽ		briN
guest	i6.07		tu-pi				bəɽ	hi.bæ <sup>#H</sup>		briN
long	i6.08	280-2	zri		riŋ	Pumi ʂɛ̃ <sup>1</sup> (SL)	ʂəɽ	ʂæɽ		ɕiN
hunt	i6.09						ʂəɽ	k <sup>h</sup> yɽʂæɽ		ɕiN
articulation	i7.01		tu-rtɕy	chac	ts <sup>h</sup> igs		ʈɕəɽ	ʈɕæɽ	tsuɽ	rtɕi
wash	i7.02		χtɕi (Situ rtɕi)				ʈɕ <sup>h</sup> əɽ	ʈɕ <sup>h</sup> æɽ	baɽlaɽ ts <sup>h</sup> uɽ	rtɕ <sup>h</sup> i
medecine	i7.03			che <sup>2</sup>	rtɕi		ʈɕ <sup>h</sup> əɽuɽ	ʈɕ <sup>h</sup> æ.u <sup>#H</sup>	ts <sup>h</sup> uɽ fiɽ	rtɕ <sup>h</sup> i
waist	i7.04							i.ʈɕæ <sup>L+MH#</sup>	iɽtsuɽ	rtɕi

Table 24. Vowel \*-o

meaning	Ref	HTB	Rgyalrong	Burmese	Tibetan	Other	Naxi	Na	Laze	proto-Naish
bright <sup>37</sup>	o1.01						mbuɽ	buɽ		mbo

<sup>36</sup> The rhyme in the Naxi dialect studied here is /æ/: /kjəpəɽ/; however, this is due to an innovation found in this dialect: the merger of /ə/ and /æ/ (to /æ/) after S-, TS- and Kj-, where S- stands for coronal fricatives, TS- for coronal affricates, and K for velar stops. The conservative form is /kjəpəɽ/, as found in the variety of Naxi spoken in the city of Lijiang (Fang Guoyu and He Zhiwu 1995:432), where the contrast between /ə/ and /æ/ is preserved in these contexts. Note that \*NkriN and \*ŋgriN do not follow the same phonetic evolution as \*kri, otherwise one would expect the correspondence ŋgu:kku:ndzi.

<sup>37</sup> Possibly related to Lahu /ba<sup>33</sup>/ "bright", though the vowel correspondences are problematic.

dike	o1.02						mbuɫ	bu <sup>ɫ</sup>	buɫtuɫ	mbo
home	o1.03						miɫuɫ	a.ɣu <sup>LM</sup>	aɫuɫ	o
younger sister	o1.04						guɫmeɫ	gu.mi <sup>M</sup>	guɫmieɫ	go
winnowing fan	o1.05						muɫ	p <sup>h</sup> i.mu <sup>L#</sup>	muɫ	mo
lunch	o1.06						zuɫ	zu.dzu <sup>L</sup>	zuɫ	Cro
cold (weather)	o1.07	262	ɣɻndzɔ		graŋ-mo			dzuɫ	dzuɫ	ndro
this morning	o1.08							[ʃ <sup>h</sup> u.ʃu <sup>(M)</sup>	ts <sup>h</sup> iɫʃuɫ	ɕo
to run away	o1.09	294	p <sup>h</sup> ɣo		mbros		p <sup>h</sup> uɫ	p <sup>h</sup> uɫ	p <sup>h</sup> uɫ	p <sup>h</sup> o
head <sup>38</sup>	o1.10		tu-ku		mgo		kuɫlyɫ	ɣu.q <sup>h</sup> wɣ <sup>L#</sup>	uɫtuɫ	SNko
corpse	o1.11	265				Tangut mjij <sup>2</sup>	ʃuɫmuɫ	hɪ.mu <sup>L#</sup>	hɪɫmuɫ	mo
to spread	o1.12		ɕk <sup>h</sup> o	khaŋ <sup>3</sup>			k <sup>h</sup> uɫ	k <sup>h</sup> oɫ	k <sup>h</sup> uɫ	k <sup>h</sup> o
tomorrow <sup>39</sup>	o1.13		fso		saŋ jin		soɫŋiɫ	so.ŋi <sup>H#</sup>	miɫsuɫ	so
pine	o1.14	264	tɣt <sup>h</sup> o	thaŋ <sup>3</sup>	t <sup>h</sup> aŋ		t <sup>h</sup> oɫndzæɫ	t <sup>h</sup> o.dzi <sup>L#</sup>	t <sup>h</sup> uɫsiɫ	t <sup>h</sup> o
be ill	o1.15		ngo				ŋguɫ	goɫ		ŋgo
mushroom	o1.16	183- 4	tɣ jmɣɣ	hmui <sup>2</sup>	mog ɕa		muɫ	muɫ	muɫ[ʃ <sup>h</sup> wɣɫ	mo

Table 25. Vowel \*u

meaning	Ref	HTB	Rgyalron g	Burmese	Tibetan	Other	Naxi	Na	Laze	proto- Naish
ring <sup>40</sup>	u1.01						laɫpəɫ	lo.py <sup>L+MH#</sup>	laɫt <sup>h</sup> uɫ	pru
comb <sup>41</sup>	u1.02						pəɫ	py.mi <sup>L</sup>		pru

<sup>38</sup> A comparison with Tibetan *dbu* 'head' and Burmese *u*<sup>2</sup> 'head' is tempting, but the vowels do not match.

<sup>39</sup> In Lolo-Burmese, one finds cognates that point to a rhyme \*-ak rather than \*-aŋ as do the Naish and Tibetan forms.

<sup>40</sup> Matisoff (2003:69, ft.101) cites Lahu and Pumi words that could be cognate to this root.

<sup>41</sup> This form is probably related to Burmese *phri*<sup>3</sup> and other comparanda cited in Matisoff (2003:25-6), though the vowel correspondence remains to be explained.



yak	u1.03		qambruu		mbri		bəɹ	bɣɹ	bɣɹ	bru
white <sup>42</sup>	u1.04		wyrum		mp <sup>h</sup> rum		p <sup>h</sup> əɹ	p <sup>h</sup> ɣɹ	p <sup>h</sup> ɣɹ	p <sup>h</sup> ru
to hoe up	u1.05						pəɹ	pɣɹ	pɣɹ	pru
vertical	u2.01						tsuɹ	gɣ.tsi <sup>LM</sup>		tsu
to sit	u2.02		mdzuu				ndzuɹ	dziɹ	dzyɹ	ndzu
winter	u2.03		qartsuu	choŋ <sup>3</sup>			muu+ts <sup>h</sup> uuɹ	ts <sup>h</sup> iɹ	mu+ts <sup>h</sup> yɹ+bieɹ	ts <sup>h</sup> u
to hide	u2.04		nɣtsuu				tsuɹ			tsu
bald	u3.01							ɤu.bɣ <sup>MH#</sup>	bɣɹ	bu
bug	u3.01			pui <sup>3</sup>	mbu		bi+diɹ	bɣɹ		bu
to lay eggs	u3.02	57				Pumi pə <sup>3</sup> (SL)	bɣɹ	bɣɹ		bu
pan	u3.03					Tangut .wju <sup>1</sup> < Cpo	bɣɹ	ɣɹ	ɣɹ+mieɹ	Cbu
maternal uncle	u3.04			u <sup>3</sup>	a-k <sup>h</sup> u		əɹgɣɹ	ə.ɣ <sup>MH#</sup>	æɹɣɹ	Cgu
to sew	u3.05	141	tʂuɸ	khyup	ndrub		zɣɹ	zɣɹ	zɣɹ	C-ru
creased, wrinkled	u3.06		akɣuɣu					lə.zɣ.zɣ <sup>H</sup>		C-ru
to pass (time)	u3.07						gɣɹ	gɣɹ	gɣɹ	gu
body	u3.08	198	tu-sk <sup>h</sup> ru	kuiy <sup>2</sup>	sku		gɣɹ	gɣ.mi <sup>M</sup>	ɹu+gɣɹ+ɹu+dzɹ	gu
plow	u3.09							æ.gɣ <sup>L</sup>	[ɹ]gɣɹ	gu
to fix <sup>43</sup>	u3.10			ku <sup>1</sup>				gɣɹ	gɣɹ	gu
nice	u3.11						gɣɹ	gɣɹ		gu
bent	u3.12	357	ŋgɣɣ		gug		gɣɹ	la.gɣ <sup>LM</sup>	laɹgɣɹ	gu
owl	u3.13		pɣɣ-k <sup>h</sup> uu				buɹfɣɹ		bu+lu+fyɹ	hu
year	u3.14		fsɣq <sup>h</sup> e			Pumi ko <sup>2</sup> (SL)	k <sup>h</sup> ɣɹ	k <sup>h</sup> ɣɹ	k <sup>h</sup> ɣɹ	k <sup>h</sup> u

<sup>42</sup> Another possible etymology for this etymon is Burmese *phru*<sup>2</sup> and its Lolo-Burmese cognates (JAM). However, the Naish data do not allow to choose between these two hypotheses.

<sup>43</sup> The corresponding Lolo-Burmese root means 'recover from illness' (JAM).

to steal	u3.15	182	murkuu	khui <sup>3</sup>	rku		k <sup>h</sup> ɣ̣]	k <sup>h</sup> ɣ̣†	k <sup>h</sup> ɣ̣†	k <sup>h</sup> u
classifier (men)	u3.16						kɣ	kɣ	kɣ	ku
Bai ethnic group	u3.17						le†bɣ†	fi.bɣ <sup>M</sup>		la bu
to bark <sup>44</sup>	u3.18							lɣ̣]	k <sup>h</sup> u̯l lɣ̣]	lu
enough	u3.19	357		lok			lɣ̣]	lɣ̣]	lɣ̣]	lu
to wind (thread) <sup>45</sup>	u3.20						ndɣ†	lɣ̣]		lu
larva	u3.21		qajuu				lɣ̣]		mu†k <sup>h</sup> ɣ̣]lɣ̣]	lu
to graze	u3.22		lɣ̣ɣ				lɣ̣]	lɣ̣†	lɣ̣]	lu
beard	u3.23						mɣ̣†tsu]	mɣ̣̄.tsu <sup>MH#</sup>	mɣ̣†tsu]	mu
to dig	u3.24	184		tu <sup>3</sup>			ndɣ†	dɣ̣]		ndu
poison	u3.25	357	tx-ndɣ̣ɣ		dug		ndɣ̣]	dɣ̣]	dɣ̣]	ndu
wing	u3.26	285				Pumi diō <sup>3</sup> (SL)	ndɣ̣†p <sup>h</sup> i]	dɣ̣]	dɣ̣]ts <sup>h</sup> u]	ndu
sickle	u3.27						ʃɣ̣]lkɣ̣†	ʃɣ̣̄.gɣ̣ <sup>L</sup>	hū†gɣ̣]	Nku
to steam	u3.28					Pumi bu <sup>3</sup> (SL)	pɣ̣]	bɣ̣]	bɣ̣†	Npu
saddlecloth	u3.29						ki]nɣ̣†	tɕi.nɣ̣ <sup>L+MH#</sup>		nu
thunder	u3.30						mu†ŋgɣ̣†	mɣ̣̄.gɣ̣ <sup>#H</sup>	mu†gɣ̣†	ŋgu
sinew	u3.31		tu-ŋgru				ŋgɣ̣†			ŋgu
nine	u3.32	182	kunguut	kui <sup>3</sup>	dgu		ŋgɣ̣†	gɣ̣(†)	gɣ̣]gɣ̣]	ŋgu
to cry	u3.33	182	ɣ̣ɣ̣wu	ŋui <sup>2</sup>	ŋu		ŋɣ̣]	ŋɣ̣]	ŋɣ̣†	ŋu
silver	u3.34	414- 5		ŋwe <sup>2</sup>	dŋul		ŋɣ̣]	ŋɣ̣]	ŋɣ̣†	ŋu
price	u3.35	183- 4	u p <sup>h</sup> u	phui <sup>3</sup>			ka-p <sup>h</sup> ɣ̣†	ka.p <sup>h</sup> ɣ̣ <sup>#H</sup>	ka-p <sup>h</sup> ɣ̣†	p <sup>h</sup> u

<sup>44</sup> A comparison with proto-Lolo-Burmese \*laŋ (Matisoff 2003:495) is tempting, but the vowels do not match, as proto-Naish \*lo would be expected.

<sup>45</sup> Plausibly related to Lahu /lɔ̯<sup>5</sup>/ 'spindle' (JAM).

male	u3.36				p <sup>h</sup> o		p <sup>h</sup> γ†			p <sup>h</sup> u
uncle's uncle	u3.37		tu-rpu				p <sup>h</sup> γ†	ə.p <sup>h</sup> γ <sup>M</sup>	æ.lp <sup>h</sup> γ↓	p <sup>h</sup> u
bladder	u3.38					Lisu si <sup>31</sup> p <sup>h</sup> u <sup>31</sup>	su↓pγ↓	su.pγ <sup>L#</sup>	su↓pγ↓	pu
amber	u3.39						pγ↓sɯ↓	pγ.sɯ <sup>L#</sup>	?	pu
rock	u3.40				rdo (?)			æ.tγ <sup>LML</sup>		rtu
intestine	u3.41	180	tu-pu	u <sup>2</sup>	p <sup>h</sup> o-ba			bγ†	γ†na↓	Sbu
garlic	u3.42		ɕku		sgog		kγ†	kγ↓	fγ†	Sku
kidneys	u3.43		tu- mbxtum				mby↓ly†	bγ.lw <sup>L</sup>	γ↓li↓	Smbu
dry	u3.44		spu				pγ↓	pγ†	læ↓fγ↓	Spu
to go out <sup>46</sup>	u3.45			thut			t <sup>h</sup> γ†	t <sup>h</sup> γ†	t <sup>h</sup> γ†	t <sup>h</sup> u
to contaminate	u3.46							tʂγ↓	tʂγ↓ > tʂγ↓tʂγ↓	tru
to plant	u3.47						tγ↓	tγ†	tγ†	Stu
straight	u3.48		astu				tγ↓	tγ.tγ <sup>L</sup>	tγ†tγ↓læ↓	Stu
thousand	u3.49	294		thon	ston			tγ†	tγ†	Stu
hole	u3.50			doŋ					pa↓ tγ↓	tu
sleeve	u4.01						la↓jɣ↓k <sup>h</sup> o†	i.q <sup>h</sup> γ <sup>L</sup>	ja↓q <sup>h</sup> o↓	q <sup>h</sup> U
swallow	u4.02		mqlaɕ				ko†	ɕγ↓	ɕo†	NqU
cave	u4.03	285					ŋgy↓k <sup>h</sup> o†	ɕwɣ.q <sup>h</sup> γ <sup>M</sup>	læ↓q <sup>h</sup> o↓	q <sup>h</sup> U
throat	u4.04		tu-rqo		lkog			qγ.tʂæ <sup>MH#</sup>	qo†tsu↓	qU
horn	u4.05	182	ta-ɛru	khyui <sup>2</sup>	ru		k <sup>h</sup> o†	q <sup>h</sup> γ†	q <sup>h</sup> o↓	q <sup>h</sup> U
fly	u5.01	255					mbə↓lə↓	bγ.ɿ <sup>#H</sup>	bə↓lɔ↓	bu r <sup>47</sup>
to hold	u6.01						tʂ <sup>hw</sup> ə↓	tʂ <sup>h</sup> ɿ↓	ts <sup>h</sup> γ↓	*rts <sup>h</sup> U
lungs	u6.02		tu-rts <sup>h</sup> ɣs	chut			tʂ <sup>h</sup> ɿ↓	tʂ <sup>h</sup> ɿ↓	ts <sup>h</sup> γ↓	*rts <sup>h</sup> U

<sup>46</sup> The Burmese form means 'to take out'.

<sup>47</sup> We suspect that the forms for 'fly' in Laze and Naxi result from right-to-left vowel harmony, a sporadic phenomenon in disyllables (the more frequent a word, the more propensity it has towards vowel harmony). Likewise for 'kidneys' in Naxi.

			< *rts <sup>h</sup> ʝs)							
to cough	u6.03						ʈʂ <sup>w</sup> əʈ	ʈʂɿ	tsɿʈ	*rtsU

Table 26. Rhymes \*aC<sub>1</sub> and \*aC<sub>2</sub>

meaning	Ref	HTB	Rgyalrong	Burmese	Tibetan	Other	Naxi	Na	Laze	proto-Naish
chest	C1.01					Tangut ɣar < *C-r- kaC	kaɿ	ɛaʈ (ɛa.py <sup>M</sup> )		Nka/aC <sub>1</sub>
to fell (a tree)	C1.02						ndaɿ	daʈ	daʈ	ndaC <sub>1</sub>
drum	C1.03						ndaʈk <sup>h</sup> ɣɿ	da.k <sup>h</sup> ɣ <sup>L</sup>	daɿk <sup>h</sup> ɣɿ	ndaC <sub>1</sub>
all	C1.04						taɿ	ta <sup>MH#</sup> (ɟu.ta <sup>MH#</sup> )	taɿ (ɟuʈ taɿ)	taC <sub>1</sub>
slanted	C1.05							la.ta <sup>LM</sup>	laʈtaɿ	laC <sub>1</sub> taC <sub>1</sub>
how much	C1.06							q <sup>h</sup> a.kɣ <sup>MH#</sup>	k <sup>h</sup> aʈ iɿ	k <sup>h</sup> a/aC <sub>1</sub>
in front of	C1.07							ɛu.da <sup>M</sup>	uɿdaɿ	daC <sub>1</sub>
to cover	C1.08		fkaβ		ŋgebs bkab	fkaβ	kaɿ	qaɿ	qaɿ	ka/aC <sub>1</sub>
to weave	C1.09	318	taɕ	rak	btags			daɿ	daɿ	daC <sub>1</sub>
black	C1.10	317	ɲaɕ	nak	nag po			naɿ	naʈ	naC <sub>1</sub>
sharp	C1.11	318- 9		thak			t <sup>h</sup> aɿ	t <sup>h</sup> aʈ	t <sup>h</sup> aʈ	t <sup>h</sup> aC <sub>1</sub>
to hit	C1.12		lɣt				laɿ	laʈ	laʈ	laC <sub>1</sub>
wolf <sup>48</sup>	C1.13		qapar		mp <sup>h</sup> ar		p <sup>h</sup> aɿk <sup>h</sup> uʈ		p <sup>h</sup> aɿ	p <sup>h</sup> aC <sub>1</sub>
vat, wooden basin	C2.01						loʈ	loʈ	luɿ	laC <sub>2</sub>
to be ashamed <sup>49</sup>	C2.01						ʂɣɿndoɿ	ʂɣ.do <sup>MH#</sup>	hæɿduɿ	ndaC <sub>2</sub>

<sup>48</sup> The Tibetan and Rgyalrong cognates actually mean 'dhole (Cyon alpinus)'.  
<sup>49</sup> A relation with the forms cited in Matisoff (2003:317) is possible but requires further research.

tasty	C2.02						so↓	so↓	su↓	saC <sub>2</sub>
to lean against	C2.03						t <sup>h</sup> o↓	t <sup>h</sup> o↓	t <sup>h</sup> u↓	t <sup>h</sup> aC <sub>2</sub>
slope	C2.04						to↓	to↓	tu↓bie↓	taC <sub>2</sub>
to hug	C2.05						to↓to↓	to.to <sup>M</sup>	tu↓	taC <sub>2</sub>
gruel	C2.06							ho↓	hu↓	haC <sub>2</sub>
to see	C2.07						do↓	do↓		daC <sub>2</sub>
valley	C2.08						lo↓	lo↓		laC <sub>2</sub>
to climb	C2.09						ndo↓	do↓	gɣ↓du↓	ndaC <sub>2</sub>
to jump	C2.10		mtsak				ts <sup>h</sup> o↓	ts <sup>h</sup> o↓	ts <sup>h</sup> u↓	ts <sup>h</sup> aC <sub>2</sub>
needle	C2.11	342	taqaβ	ap	k <sup>h</sup> ab		ko↓	ku↓	u↓	NkaC <sub>2</sub>
to study	C2.12						so↓	so↓	su↓	saC <sub>2</sub>
to work	C2.13			lup			lo↓be↓	lo.i <sup>M</sup>	lu↓vie↓	laC <sub>2</sub>
pig		318-9	paκ	wak	p <sup>h</sup> ag		bu↓	bu↓	wɣ↓	SbaC
hand		319	tu-jak	lak	lag		la↓o↓	lo.q <sup>h</sup> wɣ <sup>LM</sup>	la↓p <sup>h</sup> ie↓	laC <sub>1</sub> /laC <sub>2</sub>
breath		317		sak	srog		sa↓	so↓	sa↓	saC <sub>1</sub> /saC <sub>2</sub>
thick			jaκ				la↓	lo↓	a↓pɣ↓ lu↓	laC <sub>1</sub> /laC <sub>2</sub>
deep		317	raκ	nak			ho↓	to↓	ha↓	laC <sub>1</sub> / laC <sub>2</sub> /SnaC <sub>1</sub>
to kill								q <sup>h</sup> o↓	k <sup>h</sup> a↓	k <sup>h</sup> aC <sub>1</sub> /aC <sub>2</sub>