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A PHONOLOGICAL SKETCH OF ISU

by

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This article concerns the Isu language, spoken in Fungom Subdivision, Menchum Division, in the North West Region of Cameroon

ISO 639-3 language code: isu

Abbreviations

Alv	Alveloar	N	Homorganic nasal
BiL	Bilabial	Pal	Palatal
C	Consonant	(pl.)	Plural
E	English	Ret	Retroflexed
Glot	Glottal	S	Semi-vowel
IDEO	Ideophone	(sp.)	Species of …
(k.)	Kind of …	Uvl	Uvular
L-D	Labio-dental	V	Vowel
L-V	Labio-velar	Vel	Velar

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1. Introduction

This sketch phonology of Isu[1] is meant to be a companion and supporting document to the recent Isu Orthography Guide (Anderson, 2012). This document is based on a database[2] of 2,246 basic words, where "basic" is defined as words with only one root that are neither ideophones nor borrowed from other languages. Since our database contains 267 imperfective verb forms (and most of these also have separate entries for the perfective) and many singular and plural forms for the same noun root, it is possible that the database may have as few as 1,500 unique roots, but it is probably more.

2. Morpheme Types

1.1 Roots

Isu roots consist of the following CV patters: $(N_1)C_1(S_1)V_1(C_2)(V_2)$, i.e. an optional homorganic nasal onset to the initial consonant; an obligatory root-initial consonant, an optional semivowel, an obligatory vowel, and optional final consonants and vowels (the final root vowel is very lax and is described in section 4.4 on "echo vowels" further below).

1.2 Affixes and Pronouns

Isu noun prefixes and most grammatical markers are usually just an obligatory vowel preceded by an optional consonant: $(C_1) V_1$. Two Isu vowels are the only suffixes: /-ə/ or /-i/ (these produce long vowels following vowel-final roots or "echo vowels" following consonant-final roots). In addition to the non-syllabic homorganic nasals mentioned above, there are a few syllabic nasal consonants that function either as prefixes or pronouns.

3. Consonants

1.3 Underlying consonants

Isu has 24 underlying consonants[3] (all but one of which can fill the C_1 position mentioned above), as shown in the following chart:

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[1] Isu (ISO 639-3 language code: isu) is a West Ring language spoken by more than 10,300 people in the Fungom Subdivision, Menchum Division of the North West Region of Cameroon. It's complete classification from the Ethnologue is: Niger-Congo, Atlantic-Congo, Volta-Congo, Benue-Congo, Bantoid, Southern, Wide Grassfields, Narrow Grassfields, Ring, West.

[2] A database of some 2,700 entries was first culled from a Toolbox project of Roland Kiessling and his graduate students. It was then transformed into a FLEx database by Robert Hedinger. We separated out the "basic" one-root entries from the other entries and focused our efforts on controlling the phonetics of these basic entries, adding additional entries to get to the 2,246.

[3] The consonants /p/ and /pf/ are shown in parentheses because they are extremely marginal, each of them occuring in only a handful of roots out of the 1,500 or so in our database.

		Labials	Coronals	Velars	Labio-velars
Stops:	Voiceless	(p)	t	k	kp
	Voiced	b	d	g	gb
Affricates:	Voiceless	(pf)	ts		
	Voiced	bv	dz		
Fricatives:	Voiceless	f	s		
	Voiced	v[4]	z	ɣ	
Liquids:			l		
Nasals:		m	n	ŋ	
Semivowels:			j	ɥ[5]	w

Contrasts between certain of these consonants can be found in Appendix A below.

1.4   Consonant variation by position in the root

The five consonants below change their phonetic realization when they appear in various root positions: root-initial; root-medial between two vowels (i.e. before a lax "echo vowel"); and root-final at the end of an utterance, as seen in the chart below:

Underlying Consonant	Root-initial variant	Between root vowels	Utterance-final variant
/k/	k	ʔ	ʔ
/b/	b	b	p˺
/d/	d	l~ɾ[6]	t˺
/g/	g	ʁ	q˺
/l/	l	l~ɾ[7]	(none)

1.5   Lengthened fricatives

"Aspiration" is a frequent phenomena in Grassfields languages. In Isu, it may be the historical source of the present contrast between long and short fricatives in C_1 position. In Ngiemboon, aspiration is shown to be a <u>voiceless</u> fricative offglide which produces contrastive consonant length for voiceless fricatives (Anderson: 1982:62, 2001:40 & 2008:3). Slightly differently in Isu, this same process seems to surface as contrastive consonant length for any fricative, <u>regardless of whether the fricative is voiced or voiceless</u>, as in the following chart:

		Labial	Coronal
Fricatives:	Voiceless	f:	s:
	Voiced	v:	z:

This contrastive fricative length can be seen in the following minimal pairs:

| [úf:ú] "friendship" | [s:áj] "discuss(PERF)" | [z:ɔʔɔ]"teach(IMP)" |
| [ífú] "chewing" | [sáj] "split wood(PERF)" | [zɔʔɔ] "lean(IMP)" |

1.6   Homorganic nasal prefix remnants

Unlike many Grassfields Bantu languages, Isu does not have productive noun class prefixes consisting of nasal consonants. However, Isu does have what appear to be archaic reflexes of

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[4] No simple, short [v] consonants have been found in our data, however the long [v:] variants are not rare.

[5] The semivowel /ɥ/ never occurs in C_1 position but only in S position (see section 3.8 below).

[6] The intervocallic /d/ is realized as [l] in careful speech, [ɾ] in slightly faster speech. The contrast between /d/ and /l/ in this position is neutralized. The underlying consonant can be discovered for many verbs because you can remove the imperfective suffix /-ə/ to see the consonant-final perfective form.

[7] As above, the intervocallic /l/ is also realized as [l] in careful speech, [ɾ] in slightly faster speech.

earlier nasal prefixes in some class 6 noun roots (which we label "6a") or class 9; or in class 19 and other classes where a homorganic nasal occurs after the regular prefix. As in most Grassfields Bantu languages, these nasals (/N/) are always homorganic to the following consonant, producing the following surface nasals:

	Bil	L-D	Alv	Vel	L-V
Homorganic Nasals:	m	ɱ	n	ŋ	ŋm

Though these nasals probably came from earlier class prefixes, we treat the modern homorganic nasal reflexes as being part of the root, as below:

Class 9 or 6a Nouns

/Nbɔ̀ŋ/ [mbɔ̀ŋ] "cow"
/Nbvʊ̀/ [mbvʊ̀] "hen; fowl"
/Nfàd/ [ɱfàtˀ] "joint"
(none found)
/Ntɔ̀k/ [ntɔ̀ʔ] "palace"
/Ntsàk/ [ntsàʔ] "trap"
/Ndàw/ [ndàw] "house"
/Ndzàŋ/ [ndzàŋ] "castor oil"
/Nsə̀m/ [nsʌ̀m] "thorn"
(none found)
(none found)
/Nkà̀k/ [ŋkàʔ] "trees, shrubs"
/Ngì/ [ŋgì] "giraffe"
(none found)

Class 19, 5, 6 or 7 Nouns

/fə́Nbú/ [fə́mbú] "poison, venom"
/mə̀Nbvʊ̀/ [mə̀mbvʊ̀] "oils"
/ìNfwæ̀m/ [ìɱfwæ̀m] "hippopotamus"
/mə̀Nv:ə̀m/ [mə̀ɱv:ʌ̀m] "tens"
/kə̀Ntàŋ/ [kə̀ntàŋ] "vagina"
/kə̀Ntsɔ̀ŋ/ [kə̀ntsɔ̀ŋ] "spade; digger"
/fə̀Ndàw/ [fə̀ndàw] "small house, hut"
/fə̀Ndzɔ̀̀/ [fə̀ndzɔ̀̀] "mouse"
/fə̀nsàk/ [fə̀nsàʔ] "needle"
/mə̀nzʊ̀/ [mə̀nzʊ̀] "tiny things"
/mə̀nlʊ̀/ [mə̀nlʊ̀] "palmwine"
/kə̀Nkæ̀m/ [kə̀ŋkæ̀m] "frog"
/fə̀Ngùmì/ [fə̀ŋgùmì] "bedbug"
/fə̀Ngbʊ̀/ [fə̀ŋmgbʊ̀] "small tapping tool"

While the preceding nasals do not appear to be syllabic, the following ones appear to be:

Class 9 or 6a Nouns

/Nfʌb/ [m̩fʌpˀ] "entrances"
/Ndàɲì/ [n̩dàɲì] "gown (k.)"
/Nnæ̀ŋ/ [n̩nǽŋ] "scorpion"
/Nsʊ̀:/ [n̩sʊ̀:] "hare (sp.)"
/Ntsʊ̀/ [n̩tsʊ̀] "traditional council"
/Ndzàŋì/ [n̩dzàŋì] "birds (sp.)"
/Nkæ̀j/ [ŋ̩kæ̀j] "beds"
/Nɣæ̀m/ [ŋ̩ɣæ̀m] "mats"

Note that all these nasal reflexes (whether syllabic or not) occur almost exclusively on words with a low or low-falling tone. It would be helpful if someone could do an instrumental analysis of these nasals to verify the presence or absence of their syllabicity. The important thing is that, so far, we have not found any convincing contrast between syllabic and non-syllabic nasals, nor have we found any phonological way to predict their syllabicity.

1.7 Alveo-palatal nasal [ɲ]

The underlying units beneath the surface alveo-palatal nasal [ɲ] are ambiguous, as it is in most Grassfields Bantu languages. We have chosen to treat this surface consonant as coming from /Nj/ (a homorganic nasal preceding a palatal /j/), as below:

/Njæ̀m / [ɲæ̀m] "divine"
/fə́Njí / [fə́ɲí] "cutlass, matchet"

1.8 Alveo-palatal consonants [ʃ], [tʃ] and [dʒ] and glottal [h]

Isu seems to have two separate sources for alveo-palatal consonants. The source for invariant alveo-palatals is loan words from English, as below:

/ʃə̀d/ [ʃʌ̀tˀ] "shirt(E)"
/tʃàlí/ [tʃàlí] "Charlie(E)"
/kábédʒ/ [kábétʃˀ] "cabbage(E)"

The non-loan word situation that gives rise to Isu alveo-palatals is free variation that occurs only with palatalized velar consonants, as below:

/kjàkɨ̀/ [kjàʔɨ̀]~[tʃàʔɨ̀] "four"

/gjɛ́lí/ [gjɛ́lí]~[dʒɛ́lí] "to wrap up; to fold"

Finally, the glottal [h] is found in many loan words from English, as below:

/hɔ̂l/ [hɔ̂l] "hall(E)"

/hêj/ [hêj] "Hey!(E)"

1.9 Unusual retroflexed allophones: [ɖ] and [ɳ]

Kiessling (personal communication) noted the presence of a retroflexed [ɖ] in the Isu word for "cry". To date, we have only found two retroflexed allophones, as below:

/dì/ [dì] "cry; complain"   /í-dî/ [íɖî] "cry; complaint"

/ní/ [ní] "marry"   /í-nî/ [íɳî] "marriage"

In the following word, the /n/ is not retroflexed when between two /i/ vowels but in C_2 position, as below:

/fíní/ [fíní] "divine"

Thus in Isu, it appears that it is only C_1 central consonants that retroflex between two high /i/ vowels (or, only in stressed syllables since the first syllable of a root is always stressed). For more varied and frequent retroflexed allophones in a different Grassfields language, see Anderson on Ngiemboon (2001:37 & 2008:2).

1.10 Semivowel Consonants: [j], [ɥ], [ɰ] and [w]

As in many Grassfields Bantu languages, only the two frequent semivowels /j/ and /w/ can occur in root-initial (C_1) position but four phonetic semivowels can occur between the C_1 and the following vowel (and these four are labeled "S" to show their status as a class).

In Isu, the "S" /j/ becomes [ɥ] before rounded vowels, as below:

/kjɛ́lə́/ [kjɛ́lə́] "bury"   /kjɔ̀kɔ̀/ [kɥɔ̀ʔɔ̀] "preserve"

/tjàŋə̀/ [tjàŋə̀] "sew"   /tjɔ́ŋɔ́/ [tɥɔ́ŋɔ́] "call; read"

This change is a very logical low-level assimilation as the lips are usually rounded even before the root-initial consonant whenever the root contains rounded vowels.

More complicated is the contrastive "S" /ɰ/ which varies from the unrounded semivowel [ɰ] to a heavily aspirated semivowel [ɰh] to pure aspiration [h] of the preceding consonant. This "S" occurs mostly after a velar consonant and before the vowel /i/ where it contrasts with the rounded "S" /w/ as below:

/kɰí/ [kɰí]~[khí] "ask to pay a debt"   /kwí/ [kwí] "hold; catch"

There are however three cases where this /ɰ/ occurs in other environments, as below:

/mbɰí/ [mbɰí]~[mbhí] "world"

/kɰú/ [kɰú]~[khú] "have; belong; must; know; continue"

/bvɰɔ̀/ [bvɰɔ̀]~[bvhɔ̀] "fall (v)"

The important thing is that, while the [j] and [ɥ] semivowels have a very logical reason for their complementary distribution; the similar pair /ɰ/ and /w/ are in contrast with each other. This lack of parallelism between these two pair of semivowels is very similar to what is found in many Grassfields Bantu languages. The relationship between high back vowels or semivowels and aspiration is also found in nearby Noni (Radich, 2005:8).

1.11 Resulting phonetic consonant chart

One therefore finds the following phonetic consonants in Isu:

		BiL	L-D	Alv	Ret	Pal	Vel	L-V	Uvl	Glot
Stops:	Voiceless	p		t			k	kp		ʔ
	Voiced	b		d	ɖ		g	gb		
	Unreleased	p˺		t˺		(tʃ˺)			q˺	
Affricates: Voiceless			pf	ts		(tʃ)				
	Voiced		bv	dz		(dʒ)				
Fricatives:	Voiceless		f, f:	s, s:		(ʃ)				
	Voiced		v:	z, z:			ɣ		ʁ	h
Nasals:		m	ɱ	n	ɳ	ɲ	ŋ	ŋm		
Liquids:				l, ɾ						
Semivowels:		ɥ				j	ɰ	w		

4.   Vowels

1.12   Underlying vowels

Isu has seven underlying vowels, each of which can be long, as below:

Underlying Vowels	Short	Long
/i/	i	i:
/e/	e	e:
/ə/	ə	ə:
/a/	a	a:
/ɔ/	ɔ	ɔ:
/ʊ/	ʊ	ʊ:
/u/	u	u:

Note: For contrast between different vowels, see Appendix B; for contrast between long and short vowels, see examples in Section 4.3 below.

4.1.1 Vowel lowering before C_2 consonants

Isu has three variations of vowel lowering before C_2 consonants (i.e. either before a root-final consonant or before an intervocalic consonant followed by a lax echo vowel). All three cases of vowel lowering are similar to each other in that they are triggered by the same phenomenon: preceding a C_2 in a root. On the other hand, each of these cases of vowel lowering (one front, one mid, one back) shows significant differences from each other, as shown in the following sections.

4.1.2 Vowel lowering of the front vowel /e/

The front mid vowel /e/ is always lowered to [ɛ] before C_2 consonants (mainly /m/ and /b/, but also with an occasional, exceptional /n/ in proper names or loan words), as below:

/bè/	[bè]	"two"	/bèm/	[bèm]	"to tilt"
/bé/	[bé]	"seriously"	/bémə́/	[bémə́]	"to agree, accept"
/fːè/	[fːè]	"to sell"	/fèb/	[fɛ̀p˺]	"to become blind"
/té/	[té]	"completely"	/tébə́/	[tébə́]	"to be small"
/mè/	[mè]	"COMP"	/mèn/	[mɛ̀n]	"Men (village)"
/njè/	[ɲè]	"be colorful"	/kjèmì/	[kjèmì]	"mix"

4.1.3 Vowel lowering of the back vowel /ʊ/ (and its relation to /u/)

First, the contrastive vowel /ʊ/ varies freely from [ʊ] (a slightly more open high rounded vowel than [u]) to [ɵ] (a rounded schwa). The important thing is that /ʊ/ is always rounded and happens to occur in a position slightly higher or more central than the more frequent Grassfields [o] (which is completely absent in Isu), i.e. between rounded /u/ and /ɔ/.

Second, there exists a very curious case of contrast AND complementary distribution between /ʊ/ and /u/. The first important fact is that the vowel /u/ follows all consonants but the vowel /ʊ/ occurs only after a class of root-initial "fricative consonants" (namely: f, s, v, z, pf, bv, ts, dz and even the rare pf). After such "fricatives", minimal pairs between /ʊ/ and /u/ are easily found, but only in open syllables, as below:

/zʊ́/	[zʊ́]	"to be clean"	/zú/	[zú]	"to plant"
/tsʊ̀/	[tsʊ̀]	"to teach"	/tsù/	[tsù]	"Tsu (male name)"
/Ndzʊ̀/	[ndzʊ̀]	"cloth"	/Ndzù/	[ndzù]	"sheep"
/ídzʊ́/	[ídzʊ́]	"jealousy"	/ídzû/	[ídzû]	"termite"

Note: These open-syllable /ʊ/ vowels are the same ones that might be realized with heavy friction when pronounced by some older adults (See Section 4.4 below).

On the other hand, when a C_2 is present in the root, these same two vowels never contrast. Instead, the lower /ʊ/ vowel occurs after all root-initial "fricatives" and the higher /u/ vowel after all other root-initial consonants, as below:

/zʊ́k/	[zʊ́ʔ]	"to listen"	/túk/	[túʔ]	"to fetch"
/tsʊ́b/	[tsʊ́p˺]	"to snatch"	(no /ub/ words in data)		
/Ntsʊd/	[ntsʊt˺]	"sudden lifting (IDEO)"	/búd/	[bút˺]	"cat"
/fʊ̀g/	[fʊ̀q˺]	"to forage"	/mùg/	[mùq˺]	"to eat powder"
/bvʊ̀lì/	[bvʊ̀lì]	"to make wet"	/bùlì/	[bùlì]	"to become expert"
/ísʊ́m/	[ísʊ́m]	"farms"	/lúm/	[lúm]	"to become rich"
/dzʊ̀n/	[dzʊ̀n]	"to become old"	/úlún/	[úlún]	"shame; disgrace"
/kə́bvʊ̃́ŋ/	[kə́bvʊ̃́ŋ]	"anus"	/kə́kûŋ/	[kə́kûŋ]	"fufu stirring stick"

As shown above, I have treated this pair of vowels as two contrastive phonemes, each with a restricted distribution before C_2 consonants. What is really interesting is that these two restrictions are in complementary distribution with each other, thereby neutralizing their contrast in this specific environment. This complicated state of affairs would seem to indicate that Isu is in the midst of a historical change affecting these two vowels, either towards or away from complete complementary distribution.

4.1.4 Vowel lowering of the central vowel /ə/

The third case of vowel lowering also seems to be the result of being in the midst of a historical change, however it is more similar to the case of our front vowel than the two back vowels. Like the front vowel /e/, the central vowel /ə/ is lowered before C_2 consonants, but with three differences in the case of /ə/: only certain C_2 consonants trigger this lowering, the lowering is different for different classes of C_2 consonants and, finally, the lowering is optional (i.e. the same Isu speaker can vary his speech and different Isu speakers can have different amounts of lowering). The result is that there is a lot of variation here but all of the variants are seen to be realizations of the same underlying /ə/. Our data shows this variation:

a. vowel lowering to [ʌ] is the greatest and most frequent before central C$_2$ consonants, being the greatest and most frequent before root-final /d/, as below:

/bə̀d/   [bʌ̀t˺]   "to split, to cut"   /ísə́d/   [ísʌ́t˺]   "waist, family"

/bə́n/   [bʌ́n]   "to dance"   /fə̀n/   [fʌ̀n]   "to roar, to rumble"

/íbə́lì/   [íbʌ́lì]   "answer, response"   /kə̀lə̀/   [kʌ̀lə̀]   "condolence visit"

b. vowel lowering towards [ʌ] is less noticeable and less frequent before labial C$_2$ consonants, as below:

/zə̀b/   [zə̀p˺]~[ízʌ́p˺]   "to uproot"   /ífə̀b/   [ífə́p˺]~[ífʌ́p˺]   "he-goat"

/gə́m/   [gə́m]~[gʌ́m]   "to bend over"   /lə̀m/   [lə̀m]]~[lʌ̀m]   "to smell"

c. vowel lowering to [ʌ] does not take place before velar C$_2$ consonants, as below:

/sə̀gì/   [sə̀ʁ̀ì]   "to shake, to shiver"   /f:ə́gə́/   [f:ə́ʁə́]   "medicinal shrub"

/lə́ŋ/   [lə́ŋ]   "to be or become black"   /íjə̄ŋī/   [íjə̄ŋī]   "women, females"

d. finally, we have not yet discovered any cases of /ə/ before glottal stop, but if we do come across one, it will likely not be lowered (as with other back consonants).

1.13 "Echo vowels" from imperfective suffixes

Imperfective suffixes consisting of a vowel are common throughout Grassfields Bantu and related languages; in Isu, this vowel suffix is the most common way to derive imperfective forms of verbs. When this Isu suffix gets added to roots lacking a C$_2$ consonant, the vowel of the suffix merges with the vowel of the root producing a phonetically long vowel. When a C$_2$ consonant is present in the root, this merger is blocked. Because the root syllable is always the stressed syllable in Isu, the suffix vowel is therefore unstressed. While this unstressed vowel is often a central schwa, it often takes on the character of the root vowel (thus the "echo vowel" characterization as the suffix vowel sounds like a weak echo of the main root vowel). While most of these echo vowels are still easily derived from the imperfective suffix, some of them have become lexicalized. Below is a look at such parallel schwa suffixes and echo vowel suffixes:

	PERFECTIVE	IMPERFECTIVE	GLOSS
/i/	[dì]	[dì:]	"to cry"
	(same[8])	[kìŋì]	"to guard"
/e/	[bè]	[bè:]	"to trap"
	[bɛ́p˺]	[bɛ́bə́]	"to spoil"
/ə/	[bvə̀]	[bvə̀:]	"to fall"
	[f:ʌn]	[f:ʌ́nə́]	"to return from the bush"
/a/	[lá]	[lá:]	"to be poor, to lack"
	[táʔ]	[táʔá]	"to take sides"
/u/	[kú]	[kú:]	"to find, to search for"
	[kúm]	[kúmə́]	"to bend"
/ʊ/	[dzʊ́]	[dzʊ́:]	"to be jealous"
	[zʊ́m]	[zʊ́mə́]	"to be or become dry"
/ɔ/	[pfɔ́]	[pfɔ́:]	"to die"
	[sɔ̀ŋ]	[sɔ̀ŋɔ̀]	"to be true"

1.14 "Fricative Vowels"

There has been increasing discussion about the phonetic nature and distribution of "fricative vowels" (also called "obstruent vowels" or "syllabic fricatives") in Grassfields and other languages (Connell, 2007; Faytak, 2013). In Isu, one of the two men on our team initially pronounced his /ʊ/ vowels with very heavy friction whenever they occurred after a fricative or affricate and in an open syllable, as in the words below:

/z:ʊ́/   [z:ʊ́]   "to be clean or bright"

/tsʊ̀/   [tsʊ̀]   "to teach, to learn"

When asked if he could say the same words with the same vowels but without the friction (as he pronounced these vowels in similar roots that had additional C2 consonants), he

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[8] Verbs with /i/ before a C$_2$ always have a following echo vowel.

stated that many of the older generation pronounce these open-syllable words with heavy friction but younger speakers usually do not and he himself felt free to pronounce these words with or without the friction. The important phonological point for this fricative vowel in Isu is that it is never in contrast with its non-fricative counterpart but always in free variation with that variant within the limited context of word-final open syllables. This same lack of contrast between fricative and non-fricative vowel phones is also true of nearby Aghem (Thormoset, 2007:113), a sister language in the same West Ring sub-family. Thus, while both Isu and Aghem only have allophonic fricative vowel phones; relatively nearby Kom (from the neighboring Central Ring sub-family) has two (syllabic) fricative vowels labeled /v̩/ and /z̩/ that are phonologically contrastive with all the other vowels (though most similar phonetically to other high vowels) (Faytak, 2013:23).

It should be noted that the exact phonetic nature of these vowels is not yet clear, receiving renderings like [ʉ̯], [z̩ɨ], [v̄ɯ̄], [v], [z̩], etc. This is all the more unclear in Isu where, because of their allophonic status, we did not focus on their phonetic characteristics. It is my hope that someone soon can devote some attention to the exact phonetic nature of these vowels in Isu and see how they might compare to other fricative vowels in related languages.

1.15 Vowel diphthongs

As in most Grassfields languages, only a small set of vowels can be adjacent to each other. In Isu, there are only four such options: /iə/, /ia/, /uɔ/ and /ʊɔ/ (See Appendix C for a distribution chart contrasting vowel vs. semivowel in the post-C_1 pre-V_1 slot). Since the first vowel of these diphthongs is usually a high vowel, one must ask if there is indeed a contrast between these diphthongs and similar combinations of semivowel plus vowel. The two options are very close phonetically with the diphthongs sounding like two syllables and the semivowel-vowel combination like a single syllable (i.e. just a bit more length on the semivowel turns it into a full vowel). Though these diphthongs are fairly frequent, the following are the best examples so far of contrast between /ia/ vs. /ja/:

/nìàʔà/	[nìàʔà]	"to rain, to pour"	/Njáʔá/	[ɲáʔá]	"to kneel"
/kíáj/	[kíáj]	"to cook"	/ljáj/	[ljáj]	"to look, to watch"
/kìàbì/	[kìàbì]	"scratch repeatedly"	/kjábí/	[kjábí]	"about, around"

This contrast should be examined again once the inventory of words becomes larger. It is interesting that these diphthongs are not limited to open syllables, as they are in some Grassfields languages, but also occur in roots with C_2 consonants in Isu.

1.16 Resulting phonetic vowel chart

As a result of the variations shown above, one finds the following phonetic oral vowels in Isu:

[+front] [-back] [-round]	[+front] [-back] [+round]	[-front] [-back] [-round]	[-front] [-back] [+round]	[-front] [+back] [-round]	[-front] [+back] [+round]
i					u
					ʊ
e		ə	ɵ		o[9]
		ʌ			
ɛ		a			ɔ

5.   Tone

Grassfields Bantu languages are known for the complexity of their tonal systems, especially the tonal perturbations that happen when putting words together into phrases and sentences.

1.17 Surface tonal patterns

Since Roland Kiessling and others are working on figuring out the complex relationships between surface and underlying tone in Isu, this paper will limit itself to summarizing the surface pitch patterns found in our revised lexical database. As with other Grassfields Bantu languages, verbs are quite simple with just a two-way contrast between high and low. Tone in verbs does carry a high functional load since so many verbs are differentiated solely by pitch. From the many such verb pairs in our database, a couple of pairs are the following:

/bá/   [bá]   "to hit, to nail"   /bà/   [bà]   "to hate"
/kúm/ [kúm] "to bend"   /kùm/ [kùm] "to arrive"

These two verb tone classes undergo tonal perturbation when conjugated, the tones changing according to verbal categories such as changes in TAM, polarity, etc.

The lexical surface tone of nouns (and other non-verbs) is much more complex with a total of seven contrasting surface patterns (often Grassfields languages have four contrasting noun tone patterns because they came from two tones over two root syllables). The Isu system seems to be more complicated because of the prefixes: noun roots may have a H tone prefix, a L tone prefix or no observable prefix at all (when we looked closely at 812 basic nouns, we found that 496 or 61% had H tone prefixes; 182 or 23% had L tone prefixes and 134 or 16% had no observable prefix). The tone of these prefixes usually affects the pitch on the following root: the H tone prefixes by spreading onto the root, the L tone prefixes by lowering following H tones.

The frequency of the pitch patterns on the same 812 noun roots (whether realized on one syllable or spread over two) is shown below from the most frequent to the least frequent:

H level:	296	35%
L falling:	149	18%
HL falling:	145	18%
L level:	111	14%
HM falling:	81	10%
M level:	17	2%
LM rising:	13	2%

All of these seven noun root tones are in clear contrast with each other (the vast majority with minimal tone pairs), as shown below:

H/M   /áwɔ́/   [áwɔ́]   "hands"   /áwɔ̄/   [áwɔ̄]   "there"

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[9] The phonetic vowel [o] only occurs in Isu as a rapid variant of [wa].

H/L	/bá/	[bá]	"to hit"	/bà/	[bà]	"to hate"
H/HM	/ífú:/	[ífú:]	"axe"	/ífū:/	[ífū:]	"plantain leaf"
H/HL	/íbí/	[íbí]	"kola-nut"	/íbî/	[íbî]	"laps"
H/LF	/dzɔ́ŋ/	[dzɔ́ŋ]	"hunger"	/dzɔ̌ŋ/	[dzɔ̌ŋ]	"cricket"
H/LM	/ɣá/	[ɣá]	"to look proud"	/ɣǎ/	[ɣǎ]	"you(pl.)"
M/L	/fə̄Nbwɔ̄k/	[fə̄mbwɔ̄ʔ]	"banana"	/fə̄Nbwɔ̀k/	[fə̄mbwɔ̀ʔ]	"adze"
M/HM	/ánə̄/	[ánə̄]	"to; at"	/ánə̄/	[ánə̄]	"maybe someday"
M/HL	/fə̄Ntʌ̄m/	[fə̄ntʌ̄m]	"jigger"	/kə̄Nfʌ̂n/	[kə̄ɱfʌ̂n]	"slingshot"
M/LF	/mə̀Ntsə̄/	[mə̀ntsə̄]	"former village"	/mə̀Ntsə̌/	[mə̀ntsə̌]	"antelopes"
M/LM	/kə̀Nsɔ̄ŋɔ̄/	[kə̀nsɔ̄ŋɔ̄]	"small basket"	/kə̀Ngɔ̀ŋɔ̄/	[kə̀ŋgɔ̀ŋɔ̄]	"size"
L/HM	/íbàm/	[íbàm]	"former times"	/íbâm/	[íbâm]	"forgetfulness"
L/HL	/mwà/	[mwà]	"to shine"	/mwâ/	[mwâ]	"master; owner"
L/LF	/kɥì/	[kɥì]	"raffia bush"	/kɥǐ/	[kɥǐ]	"floor"
L/LM	/djàŋì/	[djàŋì]	"to pass through"	/djàŋī/	[djàŋī]	"also; even"
HM/HL	/ídzâw/	[ídzâw]	"slice of meat"	/ídzâw/	[ídzâw]	"act of sharing"
HM/LF	/fə̂/	[fə̂]	"here"	/fə̌/	[fə̌]	"then"
HM/LM	/ɣâ:/	[ɣâ:]	"which?"	/ɣǎ/	[ɣǎ]	"you(pl.)"
HL/LF	/sə̂/	[sə̂]	"small"	/tsə̌/	[tsə̌]	"sun"
HL/LM	/ɣî/	[ɣî]	"Gih(male name)"	/ɣǎ/	[ɣǎ]	"you(pl.)"
LF/LM	/fə̀Nkɥǐ/	[fə̀ŋkɥǐ]	"dance(k.)"	/fə̀Nkɥǐ/	[fə̀ŋkɥǐ]	"small basket"

1.18 Pitch changes in the Tense-Aspect-Mood (TAM) System

As mentioned above, most of the Isu tonal complexity lies in the tonal changes that happen to conjugated verbs. This is most likely due to the presence of a lot of tonal morphemes (i.e. floating tones that are present to indicate morphemes of TAM, polarity, etc. but which show their presence only by the tone changes they cause to adjacent tones). The extent and variety of these tonal perturbations will be better understood when Kiessling and his team are ready to publish their grammar of Isu.

6.   Conclusion

In addition to analyzing the same data that was used to propose a writing system for Isu (Anderson, 2012), it is hoped that this paper will be a help to other Isu researchers and even a help to the forthcoming Isu Grammar (Kiessling: in preparation). I also hope that someday someone will be able to look at several of the phonetic phenomena and verify their exact nature with acoustic instruments.

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Appendix A: Contrast between Underlying Consonants

(p)/b:	/pìə/	[pìə]	*burn*	/íbî/	[íbî]	*laps*
t/d:	/tà/	[tà]	*jump*	/dà/	[dà]	*set on fire*
	/tàŋ/	[tàŋ]	*be tough*	/dàŋ/	[dàŋ]	*cross*
	/tə̀m/	[tə̀m]	*press*	/də̀m/	[də̀m]	*struggle*
	/tí/	[tí]	*whip off*	/dí/	[dí]	*all the time*
k/g:	/kák/	[ká?]	*start*	/gák/	[gá?]	*shoot*
	/kə̀m/	[kə̀m]	*silence*	/gə́m/	[gə́m]	*bend over*
	/kàŋi/	[kàŋì]	*fry*	/gáŋi/	[gáŋí]	*become bent*
	/kúŋi/	[kúŋí]	*instead*	/gùŋi/	[gùŋì]	*pray*
	/kə́kə̂ŋ/	[kə́kə̂ŋ]	*heel*	/kə́gə̂ŋ/	[kə́gə̂ŋ]	*spot*
	/kǜɔ/	[kùɔ̌]	*palm-nut*	/gùɔ/	[gùɔ̌]	*grind*
	/bvʊ́ki/	[bvʊ́?í]	*shout repeatedly*	/bvʊ́gi/	[bvʊ́ʁí]	*sit*
	/zʊ́ki/	[zʊ́?í]	*do for first time*	/zʊ́gi/	[zʊ́ʁí]	*sweat*
	/zʊ́k/	[zʊ́?]	*hear; listen*	/zʊ́g/	[zʊ́q̚]	*dry over fire*
kp/gb:	/kpì/	[kpì]	*harvest*	/gbù/	[gbù]	*cut off*
	/kpé/	[kpé]	*be sufficient*	/gbè:/	[gbè:]	*be cutting*
(pf)/bv:	/pfɔ́/	[pfɔ́]	*die*	/bvɔ̂/	[bvɔ̂]	Bvo (name)
	/ìNpfù/	[ìmpfù]	*crocodile*	/íNbvɔ̀/	[ímbvɔ̀]	local carrot
g/ɣ:	/gák/	[gá?]	*shoot*	/ɣák/	[ɣá?]	*become large*
	/gúk/	[gú?]	*tell a lie*	/ɣú/	[ɣú]	*they (S:3pl)*
	/gáŋi/	[gáŋí]	*become bent*	/ɣáŋi/	[ɣáŋí]	*become dry*
	/Ngù/	[ŋgù]	*small calabash*	/màNɣù/	[màŋɣù]	*little people*
	/kə́gálə́/	[kə́gálə́]	*tall, healthy person*	/kə́ɣád/	[kə́ɣát̚]	bad food
d/l:	/dà/	[dà]	*set on fire*	/là/	[là]	*roam*
	/dàk/	[dà?]	*try to move*	/làk/	[là?]	*lack*
	/dàŋ/	[dàŋ]	*cross over*	/làŋ/	[làŋ]	*ostracize*
	/də̀m/	[də̀m]	*struggle*	/lə̀m/	[lə̀m]	*smell*
	/dém/	[dém]	*grind*	/àlɛ̀m/	[àlɛ̀m]	*sesame seed*
	/dì/	[dì]	*cry*	/lì/	[lì]	*other*
	/dúki/	[dú?í]	*be happy*	/lúkí/	[lú?í]	*to waste time*
	/údɔ́ŋ/	[údɔ́ŋ]	*hill*	/úlɔ̀ŋ/	[úlɔ̀ŋ]	*raffia palm*
	/dɔ̀kɔ̀/	[dɔ̀?ɔ̀]	*sit down*	/lɔ́kɔ́/	[lɔ́?ɔ́]	*far, distant*
ts/dz:	/tsə̀/	[tsə̀]	*sun*	/dzə̀/	[dzə̀]	*bundle*
	/tsə́ŋə́/	[tsə́ŋə́]	*be afraid*	/dzə́ŋə́/	[dzə́ŋə́]	*meet*
	/tsɔ́ŋ/	[tsɔ́ŋ]	*steal*	/dzɔ́ŋ/	[dzɔ́ŋ]	*hunger*
	/kátsə́gə̀/	[kátsə́ʁə̀]	*main stem*	/kádzə́gə̀/	[kádzə́ʁə̀]	*dense grass*
	/tsə̀lì/	[tsʌ̀lì]	*mark, brand*	/dzʌ́lí/	[dzʌ́lí]	*make dirty*
	/tsì/	[tsì]	*pass*	/dzì/	[dzì]	*say, tell*
	/tsùki/	[tsù?ì]	*prepare for planting*	/dzùki/	[dzù?ì]	*be loose*
	/tsù/	[tsù]	*teach*	/dzò/	[dzò]	*blow*
	/tsàk/	[tsà?]	*search*	/dzák/	[dzá?]	*give way*
	/tsàŋ/	[tsàŋ]	*separate*	/dzàŋ/	[dzàŋ]	*cry*
	/tswàb/	[tswàp̚]	*hit, knock*	/dzwàb/	[dzwàp̚]	*be good*
	/tsə́d/	[tsʌ́t̚]	*tap a tree*	/dzə́d/	[dzʌ́t̚]	*road, path*

	/tsʋ̀/	[tsʋ̀]	*teach*	/dzʋ̀/	[dzʋ̀]	*blow*
f/v:	/úf:ú/	[úf:ú]	*friendship*	/ív:ú/	[ív:ú]	*death*
	/f:ə́d/	[f:ʌ́t˺]	*turn, change*	/v:ə́d/	[v:ʌ́t˺]	*bend, fold*
	/f:ə́n/	[f:ʌ́n]	*return from bush*	/ív:ə́n/	[ív:ʌ́n]	*week*
	/f:ə́m/	[f:ʌ́m]	*suffer*	/ív:ə́m/	[ív:ʌ́m]	*ridge*
	/f:ə̀lə̀/	[f:ʌ̀lə̀]	*turn, change*	/v:ə̀lə̀/	[v:ʌ̀lə̀]	*hoe, till*

s/z:	/sá/	[sá]	*split wood*	/zá/	[zá]	*dry out*
	/sák/	[sáʔ]	*rule, judge*	/zák/	[záʔ]	*hit*
	/swé/	[swé]	*suck out*	/zwé/	[zwé]	*buy*
	/sàŋə̀/	[sàŋə̀]	*clear away grass*	/zàŋə̀/	[zàŋə̀]	*be fast*
	/sə́/	[sə́]	*send off*	/zə́/	[zə́]	*fly*
	/sə́ŋ/	[sə́ŋ]	*whip*	/zə́ŋ/	[zə́ŋ]	*dangle*
	/sún/	[sún]	*groan*	/zún/	[zún]	*bargain*
	/sɔ́ŋ/	[sɔ́ŋ]	*shift*	/zɔ́ŋ/	[zɔ́ŋ]	*give way*
	/sɔ̀k/	[sɔ̀ʔ]	*be selfish*	/zɔ̀k/	[zɔ̀ʔ]	*bend, lean*

n/ŋ:	/bánə́/	[bánə́]	*not enough*	/bàŋə̀/	[bàŋə̀]	*turn around*
	/nù/	[nù]	*hide*	/íŋû/	[íŋû]	*lake*
	/lúnə́/	[lúnə́]	*shame*	/lúŋə́/	[lúŋə́]	*go far*
	/kúní/	[kúní]	*exchange*	/kúŋí/	[kúŋí]	*instead of*
	/dzʋ̀n/	[dzʋ̀n]	*lift, uproot*	/màndʋ̀ŋ/	[màndʋ̀ŋ]	*whistles*
	/bvʉ́nə́/	[bvʉ́nə́]	*sleep*	/Nbvʋ̀ŋə̀/	[mbvʋ̀ŋə̀]	*long for*
	/kə́z:úní/	[kə́z:úní]	*bribe*	/kə́tsúŋī/	[kə́tsúŋī]	*ear*
	/nə́m/	[nʌ́m]	*extinguish*	/ŋə́m/	[ŋʌ́mə́]	*bite, sting*
	/kə́nə́m/	[kə́nʌ́m]	*voluminous object*	/kə́ŋə̂m/	[kə́ŋʌ̂m]	*year*

Appendix B: Contrast between Underlying Vowels

/bì/	[bì]	*goat*	/sí/	[sí]	*skip*
/bè/	[bè]	*two*	/sé:/	[sé:]	*slaughtering*
/bə́/	[bə́]	*if*	/sə́/	[sə́]	*accompany*
/bà/	[bà]	*hate*	/sá/	[sá]	*split wood*
/bù/	[bù]	*come*	/sú:/	[sú:]	*slaughter*
/bvú/	[bvú]	*very white*	/sʋ̀g/	[sʋ̀q˺]	*wash*
/bɔ́k/	[bɔ́ʔ]	*earlier*	/sɔ̀k/	[sɔ̀ʔ]	*bottle*

Appendix C: Distribution of Semivowel-Vowel vs. Vowel-Vowel

Underlying Root Vowel	Cj<u>V</u>	Ci<u>V</u>	Cɥ<u>V</u>	Cʊ<u>V</u>	Cw<u>V</u>	Cu<u>V</u>
/i/	7		23		47	
/e/	13				28	
/ə/	4	60			7	
/a/	35	15			116	
/ɔ/	1		1	6	86	21
/ʊ/					3	
/u/			1		8	