A PRELIMINARY PHONOLOGICAL AND ACOUSTIC ANALYSIS OF VOWELS IN DOMUNG

LS PNG Conference 2021
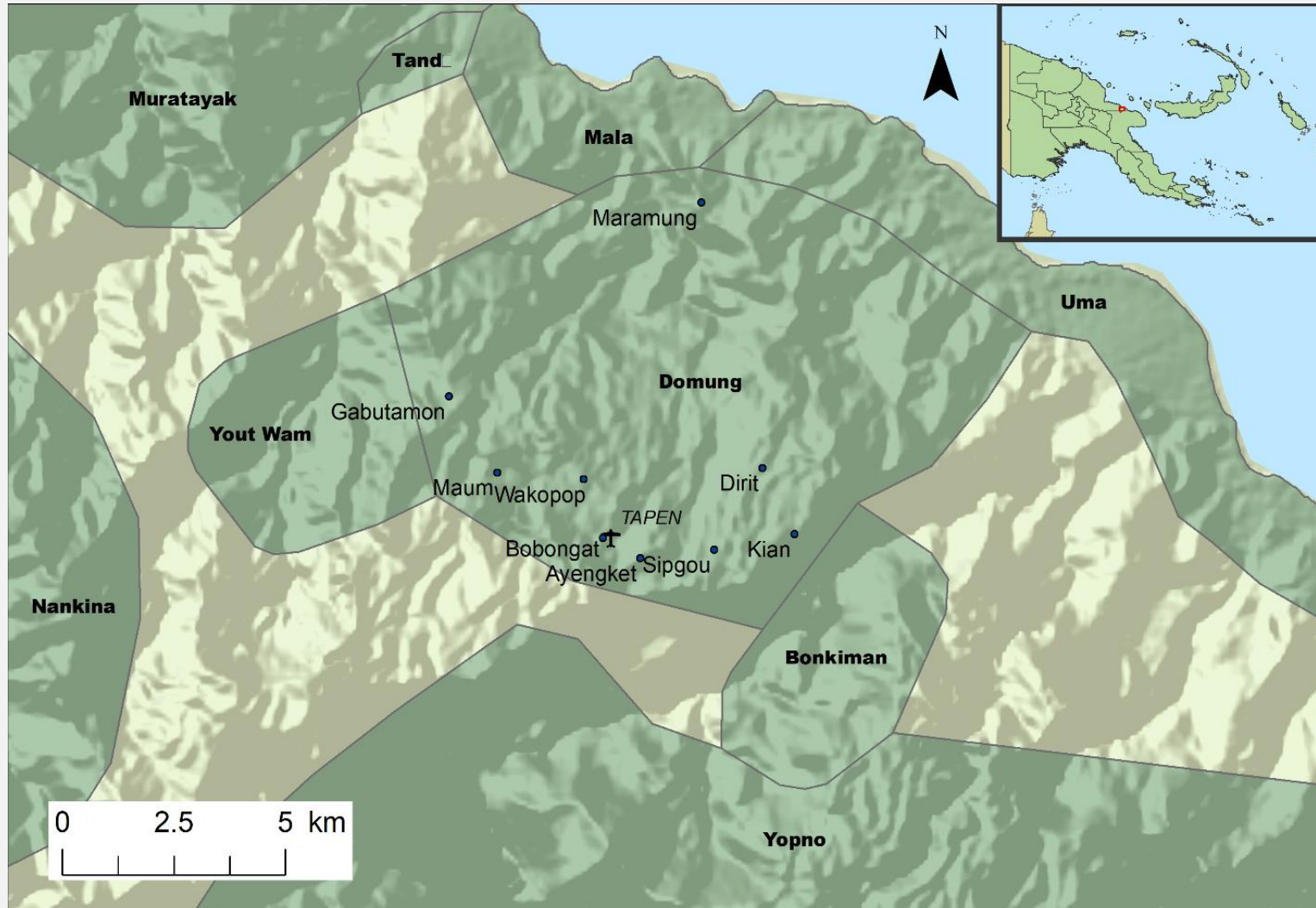
Presented by Jonathan Moe (SIL-PNG)

OVERVIEW

- Background
- Argument:
  - Phoneme Inventory
  - Vowel Quality (with Acoustic Analysis)
  - Vowel Length (with Acoustic Analysis)
- Significance:
  - Typological Comparisons
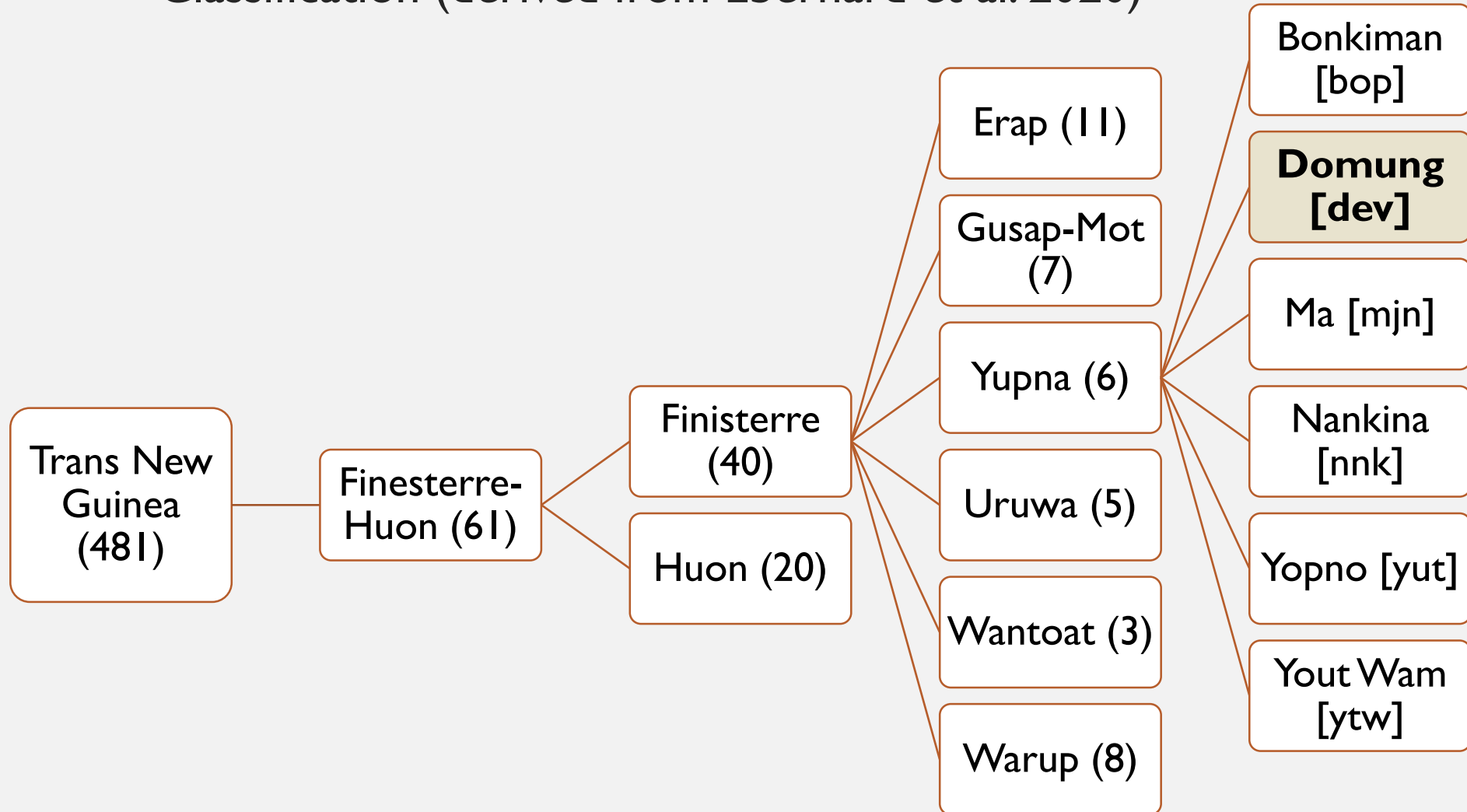 - Acoustic Analyis Tools
- Further Research

BACKGROUND

- Location: Finisterre Mountains, Rai Coast, Madang Province

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They do not reflect nor should they be used to make land claims.

BACKGROUND

- Classification (derived from Eberhard et al. 2020)

Trans New Guinea (481) — Finesterre-Huon (61) — Finisterre (40) — Huon (20)

Finisterre (40):
- Erap (11)
- Gusap-Mot (7)
- Yupna (6)
- Uruwa (5)
- Wantoat (3)
- Warup (8)

Yupna (6):
- Bonkiman [bop]
- **Domung [dev]**
- Ma [mjn]
- Nankina [nnk]
- Yopno [yut]
- Yout Wam [ytw]

BACKGROUND

- Dialects:
  - 3 Major Dialects
  - Dialect Chain Present
- Sources:
  - Survey (Gray 2007)
  - Dialect Mapping Study (2019)
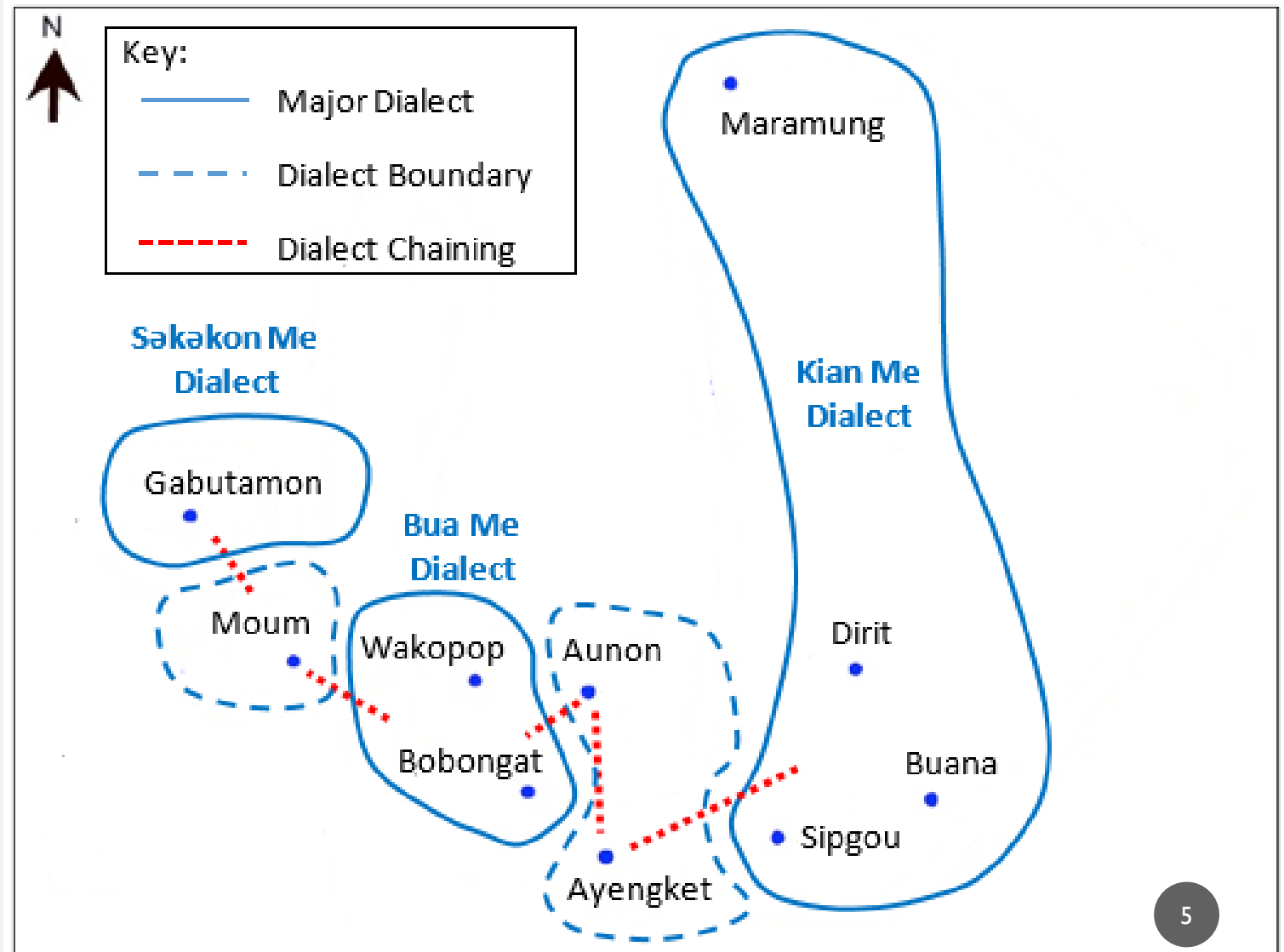
BACKGROUND

- Previous Works:
  - Trans New Guinea: McElhanon (1973), Foley (1986), Pawley (2008), and Pawley & Hammerström (2018)
  - Finisterre-Huon: Claasen & McElhanon (1970), McElhanon (1973, 1975), Suter (2012)
  - Finisterre: Nothing?
    - Phonology descriptions/sketches exist for 16/40 individual languages
  - Domung:
    - Sociolinguistics Survey (Gray 2007)
    - Two very tentative grammar sketches (King 2015, Kwasɨk 2017)

BACKGROUND

- Analysis of core phonological database with 1,673 entries

  - Three male speakers of the central Bua Me dialect

  - A mix of nouns, verbs (including paradigms), and other word types

- Dekereke (www.casali.canil.ca) used for analysis

- Acoustic Analysis conducted using PRAAT (Ver 6.0.37)

	M01	M02	M03	Sub Total
Nouns	182	369	295	846
Verbs	155	282	154	591
Other	25	110	101	236
Sub Total	362	761	550	**1673**

PHONEME INVENTORY: CONSONANTS

	Bilabial		Alveolar/ Palatal		Uvular	
	vl	vd	vl	vd	vl	vd
Plosive	p	b	t	d	q	ɢ
Affricate				d͡ʒ		
Fricative			s			
Nasal		m		n		ɴ
Tap/Flap				ɾ		
Glide		w		j		

PHONEME INVENTORY: VOWELS

- Six Phonemic vowels + one prominent allophone
- Phonemic Lengthening of five vowels (not /ə/)

	Front	Central	Back
High / Close	/i/		/u/
Mid	/e/ [ɛ]	/ə/	/o/
Low / Open		/a/	

PHONEME INVENTORY: VOWELS

|				
/i/	[idit̚]	/idit/	'sit down'	0150
	[wip̚]	/wip/	'bow'	0780
	[ɢwi]	/ɢwi/	'tobacco/smoke'	0904
/e/	[emat̚]	/emat/	'make.1DU.PRES'	1458
	[pʰɛn]	/pen/	'rain'	1335
	[qʰuwe]	/quwe/	'dry'	1548
/u/	[uɾop̚]	/uɾop/	'shade'	1350
	[but̚]	/but/	'tree (sp)'	1158.9
	[du]	/du/	'dream'	0129
/o/	[opma]	/opma/	'yesterday'	1371
	[woɴ]	/woɴ/	'fence'	0676
	[saso]	/saso/	'chinese taro'	1228
/ə/	[əɴ]	/əɴ/	'make.2SG.PRES'	1458
	[bət̚]	/bət/	'pig'	0987
	[mebə]	/mebə/	'last'	1626
/a/	[adat̚]	/adat/	'stand up'	0169.2
	[tʰamo]	/tamo/	'field'	0743
	[maɾa]	/maɾa/	'gorge'	---

PHONEME INVENTORY: VOWELS

- Six phonemic vowels: /i e ə a u o/ + Phonemic Lengthening

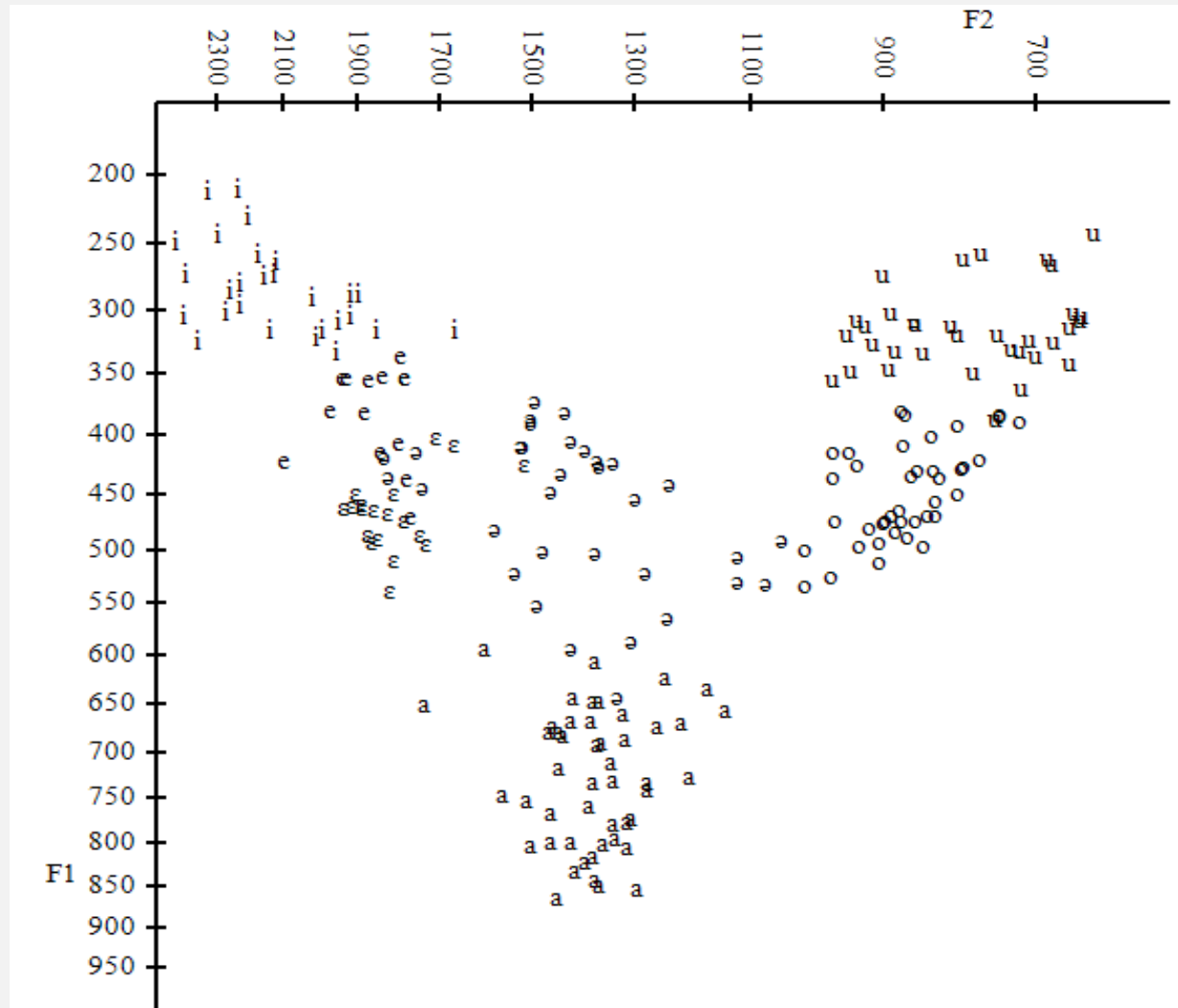- How does this compare to 16 other analyzed Finisterre languages?

	5 Vowel	6 Vowel	7 Vowel
Phonemic Length	3	2	1
No Phonemic Length	2	6	3

■ Phonemic Length   ■ No Phonemic Length
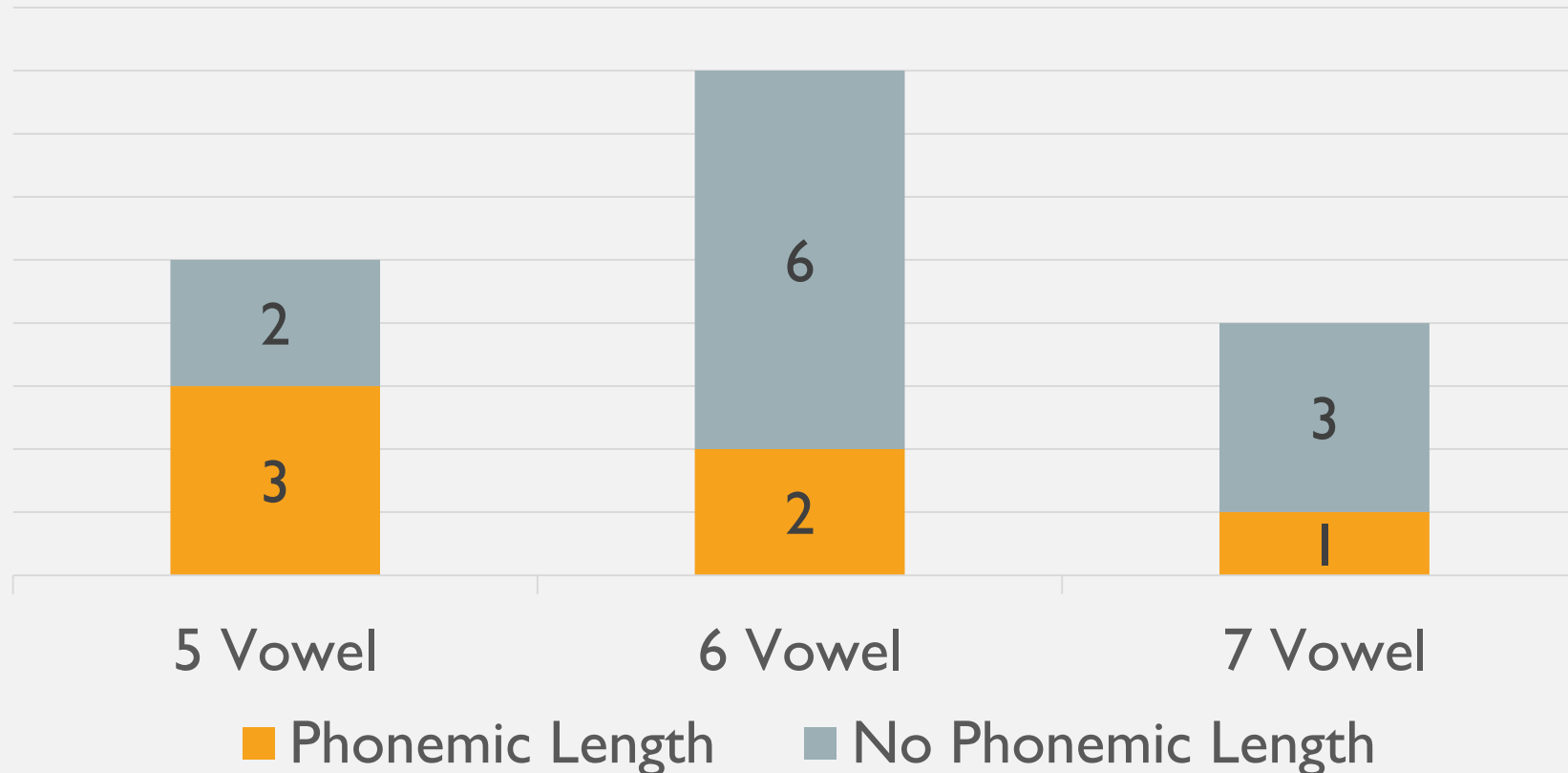
VOWEL QUALITY: ACOUSTIC ANALYSIS

- Measured formant frequencies of 216 vowel tokens via PRAAT
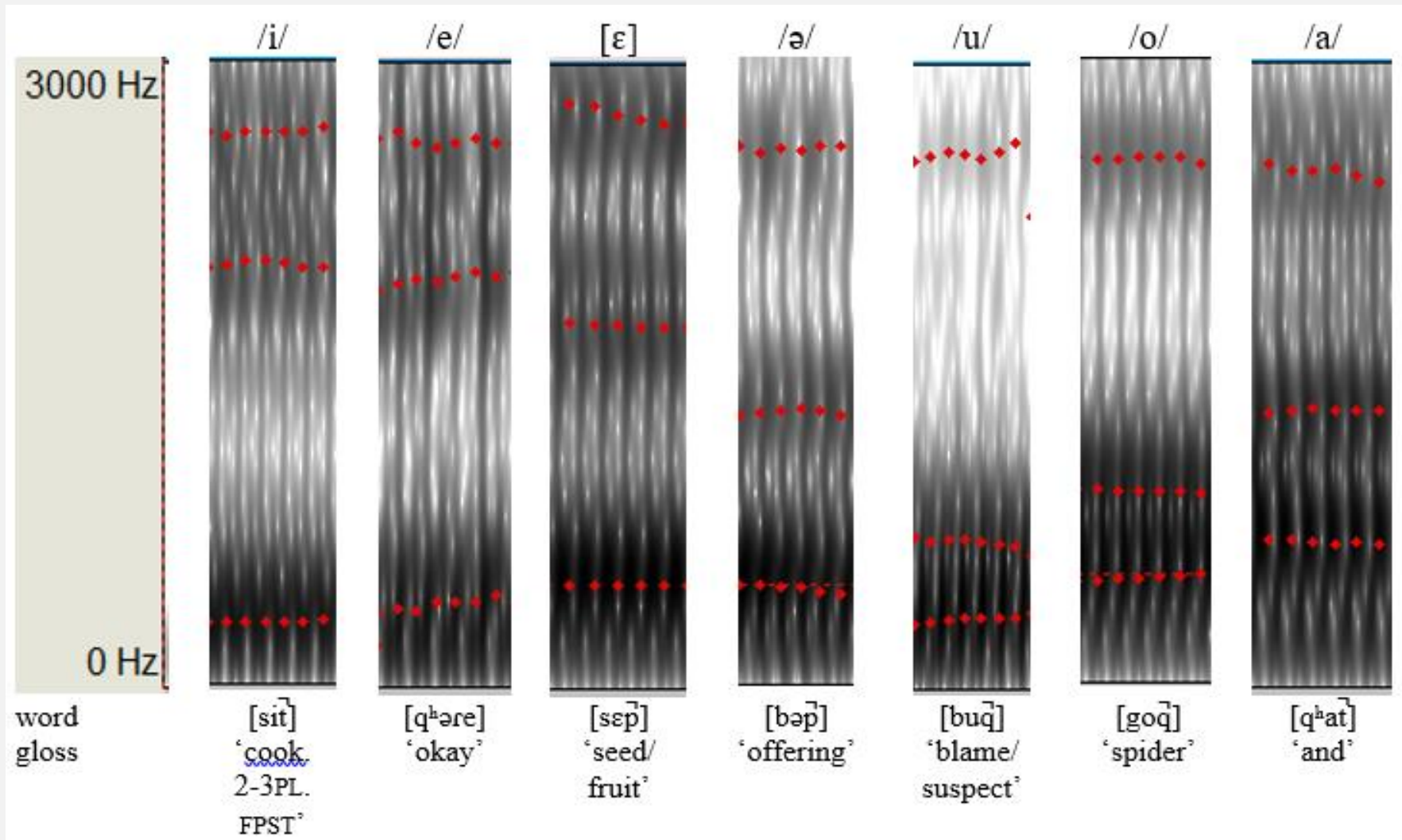
VOWEL QUALITY: ACOUSTIC ANALYSIS

- Plotted Formants via FPlot software (http://casali.canil.ca/)

VOWEL QUALITY: ACOUSTIC ANALYSIS

- Plotted Formants via R with 2σ Ellipses around means

**Individual vowel formant values
non-normalized**
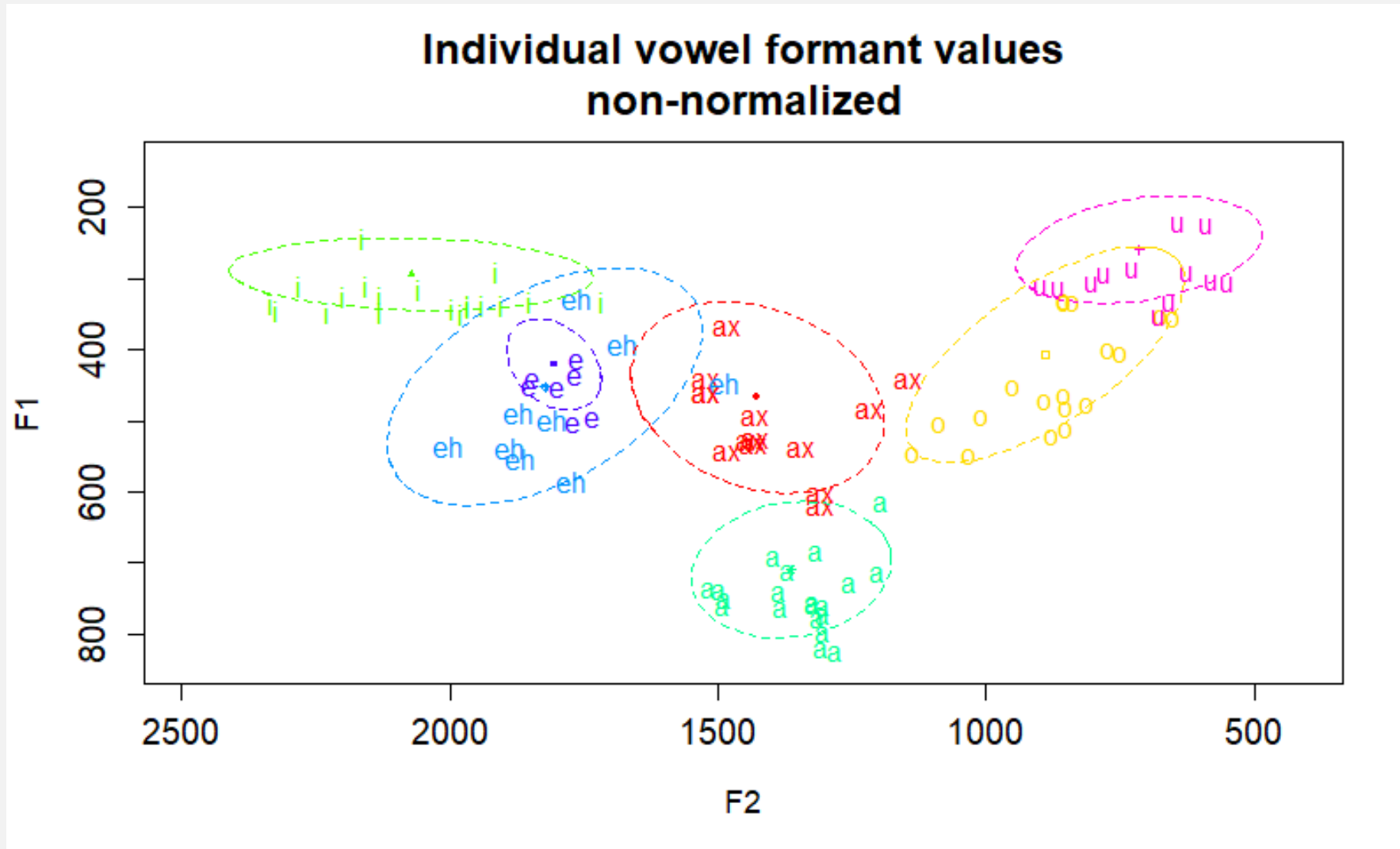
VOWEL LENGTH

- Several cases of contrastive vowel length in analagous environments

a.	[tʰaap̚]	/taap/	'ant (sp)'	1123.1
	[tʰap̚]	/tap/	'ocean'	1285
b.	[qʰoot̚]	/qoot/	'go.3SG.FPST'	0005
	[qʰot̚]	/qot/	'look.2PL.PRES'	0003
c.	[qʰaaN]	/qaaN/	'look.3SG.NPST'	0133
	[qʰaN]	/qaN/	'look.2SG.PRES'	0133
d.	[tʰuuq̚]	/tuuq/	'vine (sp)'	---
	[duq̚]	/duq/	'point/tip'	1394
e.	[man]	/man/	'name'	0359
	[maan]	/maan/	'wrap-around skirt'	0546

VOWEL LENGTH

- PRAAT was used to measure vowel durations of 344 vowel tokens. Summary statistics for short vs long vowels...
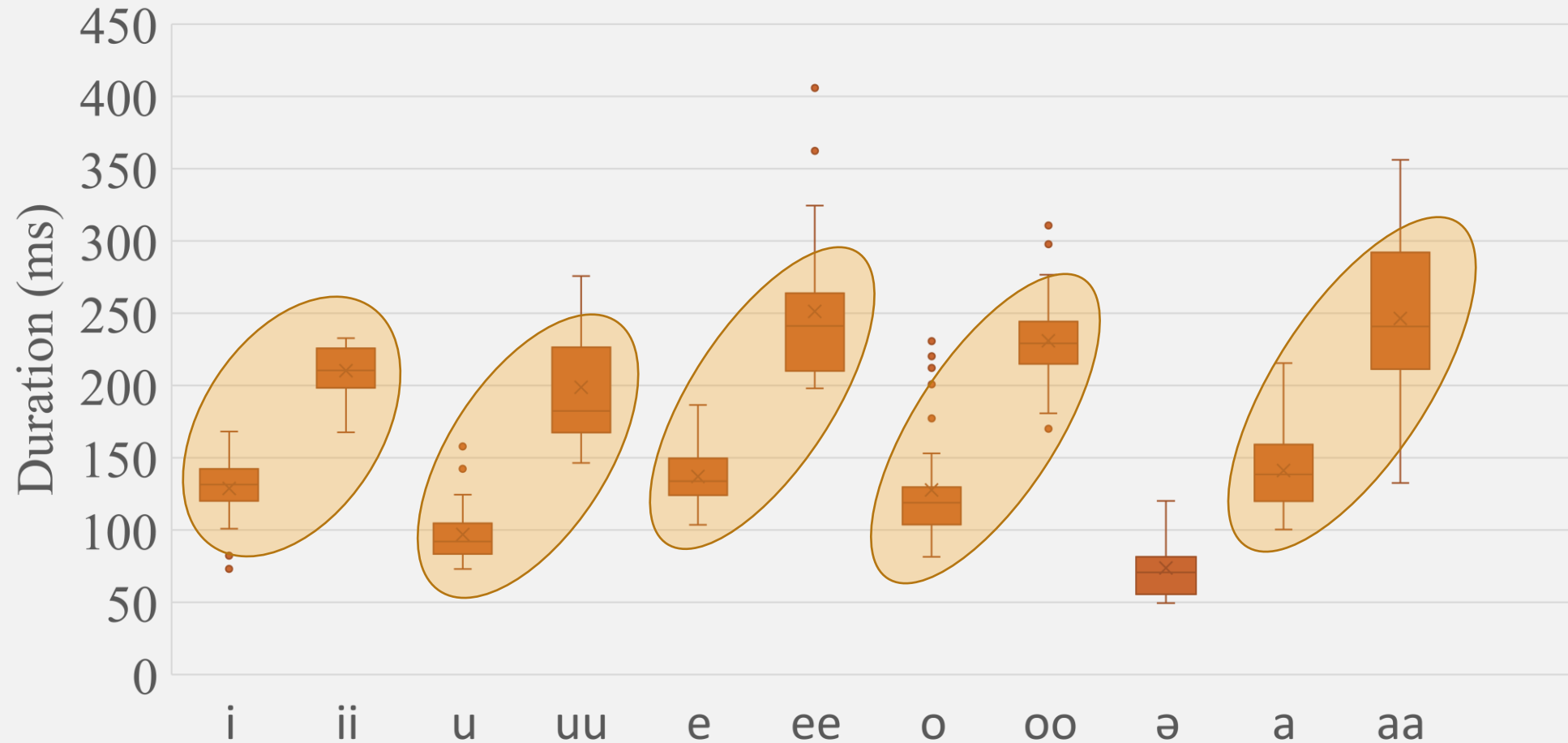
	Mean (ms)	Std Dev (ms)	Sample Size
i	129	22	28
ii	210	18	15
u	97	19	36
uu	199	40	21
e	137	21	31
ee	251	52	23
o	128	37	36
oo	231	33	24
ə	74	21	16
a	142	25	67
aa	246	57	47
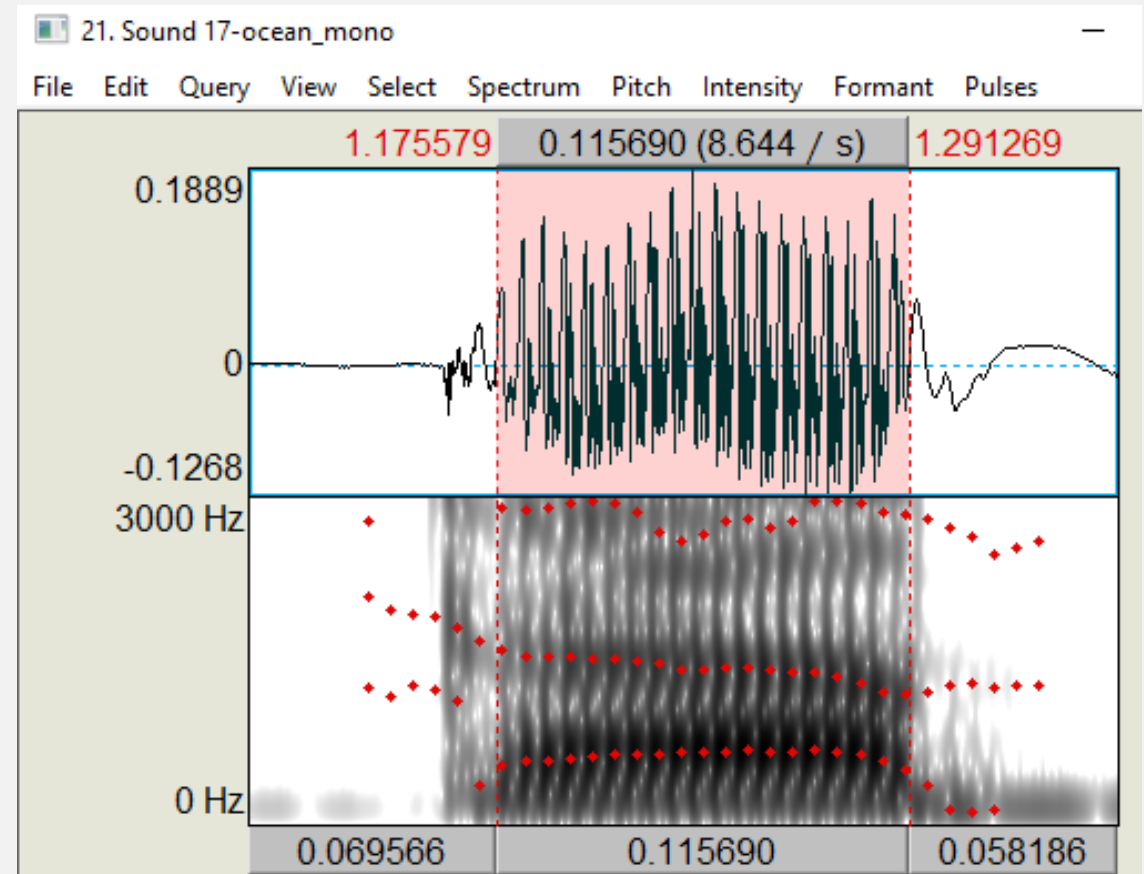
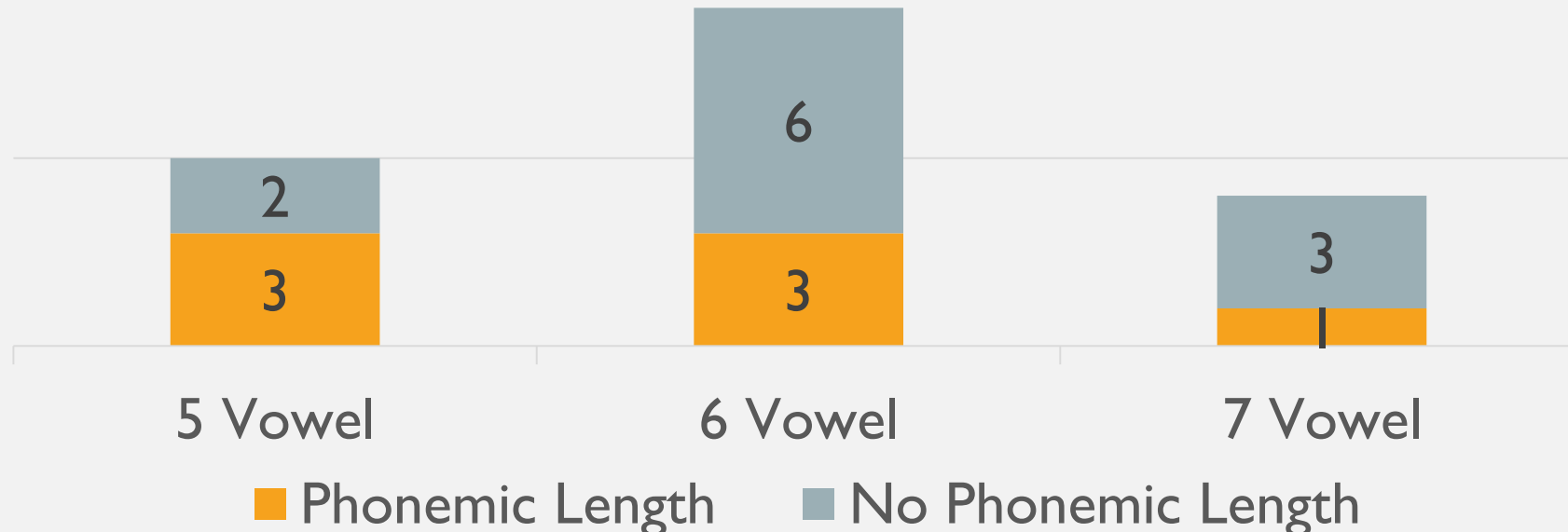Example of duration msmt for [tap] 'ocean'

VOWEL LENGTH: ACOUSTIC ANALYSIS

- Box and Whisker plot of vowel duration measurements

SIGNIFICANCE: TYPOLOGICAL

- McElhanon (1973: 5) stated "vowel length is not a common feature" when he analyzed 10 representative Finisterre-Huon languages.

- This analysis of more recently available data shows that phonemic vowel length is rather common in the larger Finisterre branch, occurring in 7/17 (41%) of analyzed languages.

	5 Vowel	6 Vowel	7 Vowel
No Phonemic Length	2	6	3
Phonemic Length	3	3	

■ Phonemic Length   ■ No Phonemic Length

SIGNIFICANCE: TYPOLOGICAL

- Vowel Inventories of 17 analyzed Finisterre languages.

- All languages attest high vowels /i u/, mid vowels /e/ or /ɛ/ and /o/ or /ɔ/, and low vowels /a/ or /ɑ/.

- At least one more central vowel is also common (10/17 = 59%).

	Front		Central		Back	
	unr.	rd.	unr.	rd.	unr.	rd.
Close/High	/i/ 17		/ɨ/ 2			/u/ 17
						/ɤ/ 1
Mid	/e/ 13					/o/ 15
			/ə/ 6			
	/ɛ/ 4		/ɜ/ 1		/ʌ/ 3	/ɔ/ 3
	/æ/ 1		/ai/ 1			
Open/Low			/a/ 7		/ɑ/ 10	

SIGNIFICANCE: ACOUSTIC ANALYSIS

- Acoustic Analysis is an underutilized tool that can assist with quantitatively describing and analyzing under documented languages.

- It can help:

  - Resolve questions regarding vowel quality

  - Resolve questions regarding vowel duration/lengthening

  - Promote accurate transcription (especially of vowels)

  - Assist with 'training' your ears to pick out different sounds

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FURTHER RESEARCH

- Analysis of the Domung language is ongoing and next steps include:

  - Analysis of VV sequences

  - Analysis of stress

  - Analysis of syllable structure

  - Statistical testing

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