

Multiple uncommon word-prosodic changes in
the Austronesian languages of Raja Ampat

Laura Arnold

University of Edinburgh

ICHL26, University of Heidelberg, 8 Sept 2023

Workshop: The diachrony of tone—connecting the field

Background

○○○○○
○○○○

Word prosody

○○○○

Vowel height

○○○○○
○○○

Apocope

○○○○○
○

Discussion

○○○

Background

Background

●○○○○
○○○○

Word prosody

○○○○

Vowel height

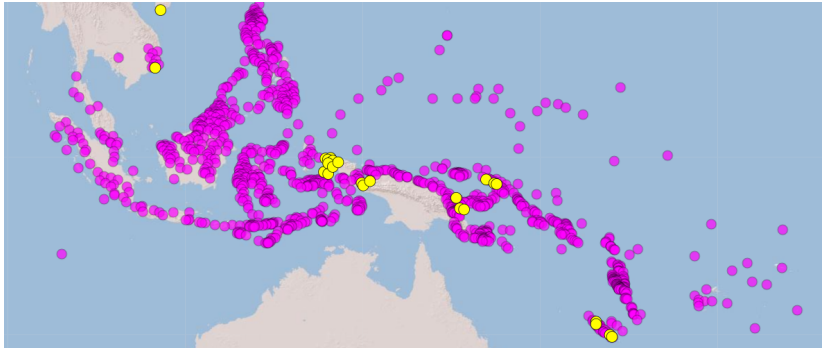
○○○○○
○○○

Apocope

○○○○○
○

Discussion

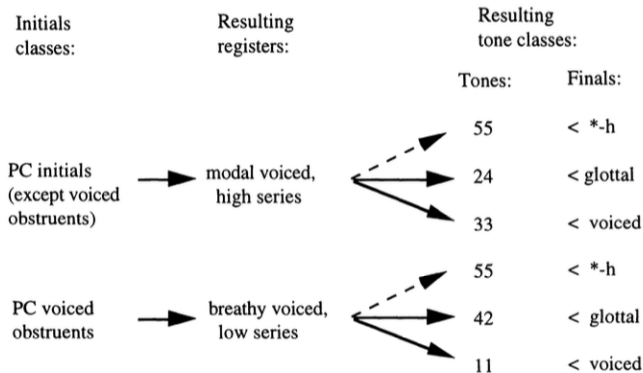
○○○



Adapted from Hammarström et al. (2023)

Diachrony of tone in Austronesian: Knowns

► Tsat (Chamic):



Thurgood (1999)

Diachrony of tone in Austronesian: Knowns

- ▶ **Yabem, Bukawa** (Oceanic): Low < voiced obstruents (Ross 1993)
- ▶ **Cèmuhî, Paicî, Drubea, Numèè, Kwenyii** (Oceanic): High < aspirated stops (Rivierre 1993, 2001)
- ▶ **Yerisiam** (SHWNG): Pattern 2 (HL) < *-a (Kamholz 2014)
- ▶ **Moor** (SHWNG): Tone 3 (L*RM) < penultimate stress (Kamholz 2014)
- ▶ **Roon** (SHWNG): High < intonation (Gil 2023)

Diachrony of tone in Austronesian: Unknowns

- ▶ **Awad Bing** (Oceanic; Cahill 2011)
- ▶ **Kara, Barok, Patpatar** (Oceanic; Hajek 1995)
- ▶ **Yaur** (SHWNG; Kamholz 2014)

This talk

▶ **Raja Ampat (SHWNG)**

- ▶ Top-down search for segmental correlates of tone has not been fruitful (Kamholz 2014, Remijsen 2001)
- ▶ Bottom-up reconstruction provides evidence for multiple instances of
 1. Tone changes conditioned by vowel height
 2. Word-prosodic changes conditioned by apocope

Background



Word prosody



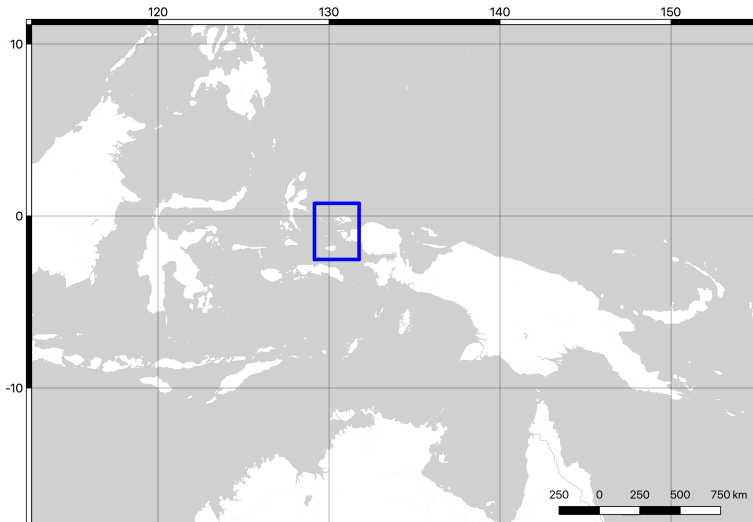
Vowel height



Apocope



Discussion



Background



Word prosody



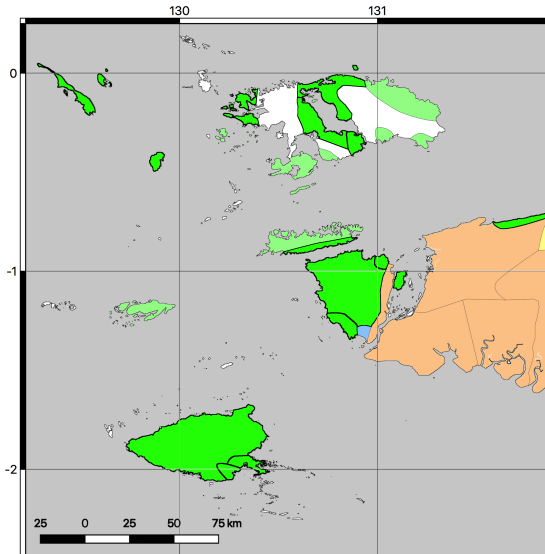
Vowel height



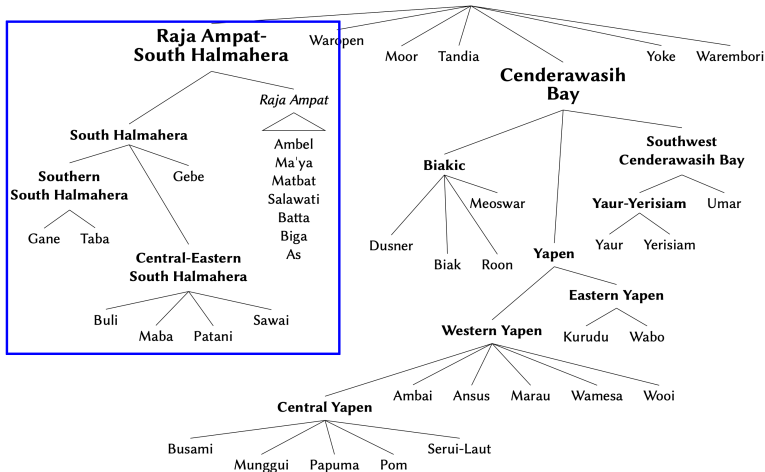
Apocope



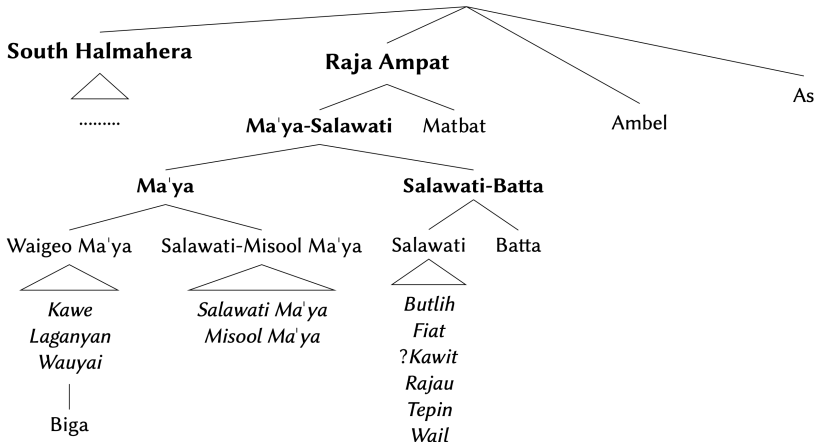
Discussion



South Halmahera- West New Guinea



Raja Ampat- South Halmahera



Raja Ampat languages: Word prosody

Ambel

▶ Mono-/disyllabic

▶ One tone: High /³/

e.g. Metnyo /tu³n/ ‘moon’ /tun/ ‘thorn’

▶ No evidence for contrastive or predictable stress

Arnold (2018a,b)

Ma¹ya (including Biga)

▶ Mono-/disyllabic

▶ Two tones, typically High /³/ and Rise /¹²/

e.g. Kawe /nu³/ ‘village’ /nu¹²/ ‘coconut’
 /su³/ ‘breast’ /su/ ‘flower.3sg’

▶ Contrastive lexical stress

e.g. Kawe /ma¹na³/ ‘grease’ /¹mana³/ ‘light (weight)’

Arnold (submitted), van der Leeden 1993, Remijsen 2001

Salawati-Batta

▶ Mono-/sesquisyllabic

▶ Salawati: High /³/ vs Rise /¹²/

e.g.	Tepin	/la ³ p/	‘fire’	/la ¹² p/	‘pumpkin’
		/yi ¹² n/	‘fish’	/yin/	‘1sc’

▶ Batta: High /³/ vs Rise /¹²/ vs Low /¹/

▶ Predictable final stress

▶ Contrastive stress reconstructed to proto-Salawati-Batta

Matbat

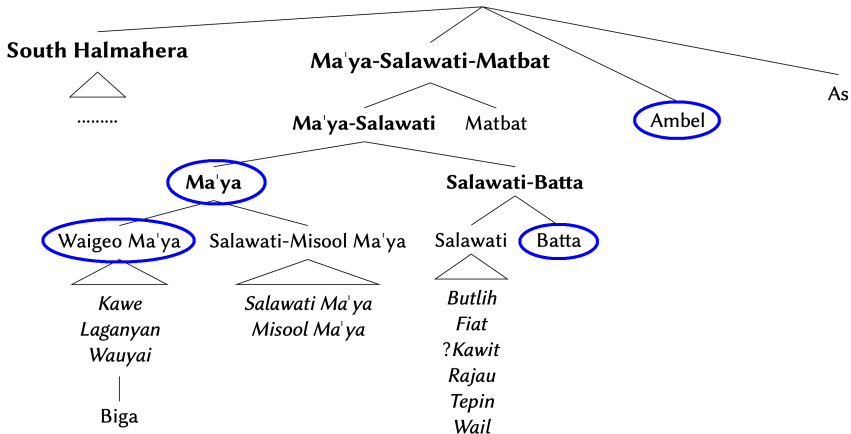
- ▶ Heavily monosyllabic
- ▶ Six tones: Extra High Fall /⁴¹/, High /³/, Low Rise /¹²/, Low /¹/, Rise-Fall /¹²¹/, Low Fall /²¹/

e.g.	Magey	/ba ⁴¹ /	‘to hit’	/ba ¹² p/	‘father’
		/ba ¹²¹ /	‘stiff’	/ba ³ /	‘grandfather’
		/ba ¹ /	‘to remain’	/ba ²¹ /	‘to flow’

- ▶ No evidence for contrastive or predictable stress

Tone changes conditioned by vowel height

Raja Ampat- South Halmahera



pSB * σ^3 > Batta σ^{12} / V[+high], σ^1 / V[-high]

	pSB	Batta	Salawati
‘big’	*pə ¹ le ³ y	pəle ¹ y	pəle ³ y
‘blue’	*mə ¹ la ³ w	məlla ¹ w	məla ³ w
‘bone’	*qə ¹ bo ³ m	qəbo ¹ m	əbo ³ m
‘canoe’	*wa ³ g	wa ¹ g	wa ³ ʔ
‘cassowary’	*qə ¹ lo ³ w	qəlo ¹ w	əlo ³ w
‘to die’	*-ma ³ t	-ma ¹ t	-ma ³ t
‘fly (n.)’	*bə ¹ nye ³ w	bənye ¹ w	bənye ³ w
‘food’	*pən ¹ po ³ n	pənpo ¹ n	pəmpo ³ n
‘island’	*e ³ f	e ¹ f	e ³ f
‘to swallow’	*-ta ³ f	-ta ¹ f	-ta ³ h

- Batta σ^1 :: Salawati σ^3 —52/59 items reconstructed with *e *a *o

pSB * σ^3 > Batta σ^{12} / V[+high], σ^1 / V[-high]

	pSB	Batta	Salawati
‘baked sago’	*qə ¹ ni ³ y	qəni ¹² y	əni ³ y
‘breast’	*su ³ h	su ¹² h	su ³ h
‘chicken’	*tə ¹ ku ³	təqu ¹²	təku ³
‘deaf’	*(tə ¹)pu ³ t	pu ¹² t	təpu ³ t
‘earthquake’	*su ³ y	su ¹² y	su ³ y
‘five’	*li ³ m	li ¹² m	li ³ m
‘hair’	*pəya ³	pəya ¹²	p(ə)ya ³
‘to kill’	*-bu ³ n	-bu ¹² n	-bu ³ n
‘sea turtle’	*fi ³ n	fi ¹² n	fi ³ n
‘sugarcane’	*tu ³ p	tu ¹² p	tu ³ p

- Batta σ^{12} :: Salawati σ^3 —36/43 items reconstructed with *i *u

pSB *¹σ³ > Batta σ¹²/ V[+high], σ¹/ V[-high]

	*i, *u	*e, *a, *o	Total
Batta σ ¹ :: Salawati σ ³	7	52	59
Batta σ ¹² :: Salawati σ ³	36	7	43
Total	43	59	102

► χ^2 : 52.6663, $p < 0.00001$

pSB * σ^3 > Batta σ^{12} / V[+high], σ^1 / V[-high]

	pSB	Batta	Salawati
‘blood’	* lomo^3s	$\text{ləmo}^3\text{h}$	$\text{ləmo}^3\text{h}$
‘to cry’	* $\text{-}^1\text{tini}^3\text{s}$	$\text{-təni}^3\text{h}$	$\text{-təni}^3\text{h}$
‘dry’	* mete^3n	$\text{məte}^3\text{n}$	$\text{məte}^3\text{n}$
‘name’	* nasa^3n	$\text{nəha}^3\text{n}$	$\text{nəha}^3\text{n}$
‘rain’	* goli^3m	$\text{gəlu}^3\text{m}$	$\text{jəlu}^3\text{m}$
‘raw’	* bulu^3f	$\text{bəlu}^3\text{f}$	$\text{bəlu}^3\text{h}$
‘to be replete’	* $\text{-}^1\text{boto}^3\text{n}$	$\text{-bəto}^3\text{n}$	$\text{-bəto}^3\text{n}$
‘six’	* wono^3m	$\text{wəno}^3\text{m}$	$\text{wəno}^3\text{m}$
‘to sleep’	* $\text{-}^1\text{ene}^3\text{f}$	$\text{-ne}^3\text{h}$	$\text{-ne}^3\text{h}$
‘thread’	* kapa^3h	$\text{qəpa}^3\text{h}$	$\text{kəba}^3\text{h}$

Tone changes conditioned by vowel height

1. Proto-Salawati-Batta *'σ³ > Batta σ¹²/ V[+high], σ¹/ V[-high]
2. Proto-Ma'ya-Salawati *'σ³ > proto-Ma'ya *'σ¹²/ V[-high]
3. Proto-Ma'ya *'σ³ > proto-Waigeo Ma'ya *'σ¹²/ *I, *U
4. Tonogenesis in Ambel?: proto-Ambel *'σ > *σ³/ V[-high]

(*pace* Arnold 2020)

Discussion

- ▶ Diachronic relationship between tone and vowel quality rare worldwide (Hyslop 2022, Kingston 2011, Köhnlein & van Oostendorp 2017)
- ▶ But:
 - ▶ Yerisiam (SHWNG): Pattern 2 (HL) < *-a (Kamholz 2014)
 - ▶ Cèmuhî (Oceanic): Low < *aqa, *ao, *oa (Rivierre 2001)
- ▶ Eastern Austronesian languages
 - ≈ 0.5% tone languages of the world
 - ≈ 50% tone changes conditioned by vowel height!

Discussion

- ▶ Intrinsic fundamental frequency (IF0; Ting et al. 2023, Whalen & Levitt 1995)
 - ▶ A near-universal phenomenon: high vowels have higher F0 than low vowels
 - ▶ Mean crosslinguistic difference in F0 of /i, u/ vs /a/ = 1.65 ST
- ▶ IF0 in Raja Ampat (Arnold et al. 2023):
 - ▶ Butlih Salawati: 2.65 ST (High tone), 2.33 ST (Rise tone)
 - ▶ Biga: 2.51 (Extra-High tone), 1.76 ST (High tone)
- ▶ **Larger than average IF0 differences > phonologised as tone**

*Word-prosodic changes conditioned by
apocope*

Synchronic apocope in Waigeo Ma'ya (Kawe, Laganyan, Wauyai)

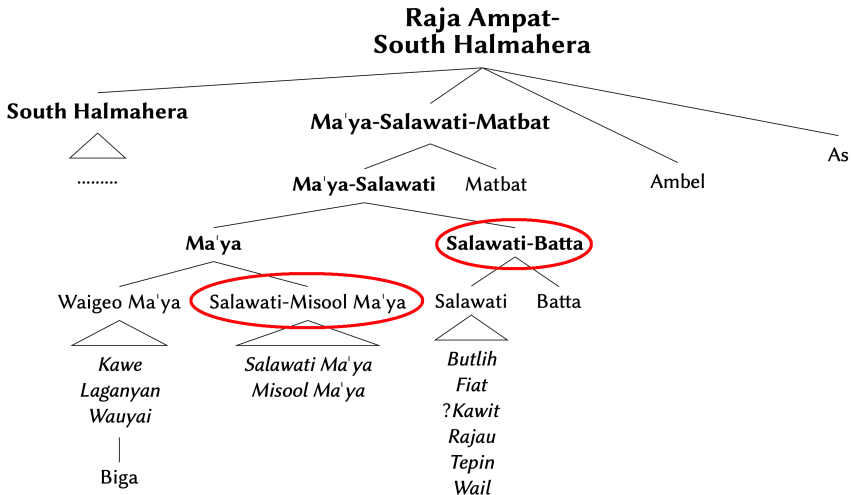
- Final V apocopated in phrase-medial position iff
1. Word has penultimate stress
 2. Final syllable is open
 3. Penultimate and final vowels are identical

e.g. Laganyan 'yene 'y-ele³
1SG 1SG-descend
'I descend.'

'yene 'y-el 'hapo
1SG 1SG-descend NEG
'I don't descend.'

Synchronic apocope in Waigeo Ma'ya (Kawe, Laganyan, Wauyai)

	Laganyan Ma'ya	Salawati Ma'ya
‘banana’	'tal[a ³]	'tala ³
‘thunder’	'lol[o ³]	'lolo ³
‘bird’	'min[i ³]	'mini ³
‘to descend’	-'el[e ³]	-'ele ³
‘lime’	'lufi ³	'lufi ³
‘salt’	'gasi ³	'gasi ³
‘to sleep’	-'ene ³ f	-'ene ³ f
‘six’	'wono ³ m	'wono ³ m



Proto-Ma¹ya-Salawati 'αV.C₁αV³# >
 proto-Salawati-Batta 'V¹²C₁#

	pMS	pSB	proto-Ma ¹ ya
'blood'	*'lomo ³ s	*'lomo ³ h	*'lomo ³ s
'cockroach'	*ka'liti ³ f	*qə'liti ³ f	*ka'liti ³ f
'to cry'	*-'tini ³ s	*-'tini ³ h	*-'tini ³ s
'drum'	*'sili ³ p	*'sili ³ p	*'sili ³ p
'to exit'	*-'sapa ³ n	*-'sapa ³ n	*-'sapa ³ n
'rain'	*'goli ³ m	*'gulu ³ m	*'goli ³ m
'raw'	*'bulu ³ f	*'bulu ³ f	*'bulu ³ f
'to sleep'	*-'ene ³ f	*-'ene ³ h	*-'ene ³ f
'wound'	*'laba ³ t	*'laba ³ t	*'laba ³ t

Proto-Ma'ya-Salawati 'αV.C₁αV³# >
 proto-Salawati-Batta 'V¹²C₁#

	pMS	pSB	proto-Ma'ya
'fish'	*'yini ³	*'yi ¹² n	*'ini ³
'to hear'	*-'dono ³	*-do ¹² n	*-'dono ³
'ladder'	*'lɔnɔ ³	*'lu ¹² n	*'lɔnɔ ³
'oar, paddle'	*'pɔsɔ ³	*'pu ¹² h	*'pɔsɔ ³
'to play'	*-'byaya ³	*-bya ¹² y	*-'byaya ³
'taro'	*ka'lene ³	*qə'le ¹² n	*ka'lene ³
'bird'	*'mani ³	*'mi ¹² n	*'mani ³
'cold'	*ka'bluti ³	*qə'blu ¹² t	*ka'bluti ³
'to run'	*-'tati ³	*-ti ¹² t	*-'tati ³
'ten'	*'lafe ³	*'la ¹² f	*'lafe ³

Apocope and tone: Discussion

- ▶ 7/73 tonogenetic events in Hyslop (2022) caused by syllabic restructuring
 - ▶ Typically, final syllable loss > low/falling pitch
- ▶ Ma¹ya-Salawati:
 - ▶ Retiming of the high pitch target > Rise
e.g. pMS *-'dono³ > pSB *-do¹²n 'to hear'

Background

○○○○○
○○○○○

Word prosody

○○○○

Vowel height

○○○○○
○○○

Apocope

○○○○○
○

Discussion

○○○

Discussion

Diachrony of tone in Raja Ampat

- ▶ Tonogenesis in Raja Ampat occurred at least twice:
 - ▶ Stress placement, syllable structure, vowel height—account for word-prosodic reflexes of 163/184 proto-Ma'ya-Salawati items ($\approx 90\%$)
 - ▶ Possible tonogenesis conditioned by former stress and vowel height in proto-Ambel

Diachrony of tone in Raja Ampat

- ▶ Attested tone changes are phonetically well-motivated:
 - ▶ Vowel height: Phonologisation of large F_0 differences
 - ▶ Apocope: Loss of unstressed final syllable, retiming of former
*High targets to preceding syllable

Diachrony of tone in Raja Ampat

- ▶ Further points for discussion:
 - ▶ How did orthogonal systems of stress and tone develop in proto-Ma^ʼya-Salawati?
 - ▶ What is the relationship between syllabic profile and tonal complexification in Raja Ampat?
 - ▶ Did contact play a role in tonogenesis?

Data

- ▶ Ambel: Fieldwork 2014-17, Arnold (2018a)
- ▶ As: Fieldwork 2020
- ▶ Batta: Fieldwork 2019
- ▶ Biga: Fieldwork 2019-20
- ▶ Matbat: Remijsen (2010)
- ▶ Ma'ya: van der Leeden (n.d.), Remijsen 2001, fieldwork 2023
- ▶ Salawati: Fieldwork 2019, 2023

References I

- Arnold, Laura. 2018a. *A description of Ambel, an Austronesian language of Raja Ampat, west New Guinea*. The University of Edinburgh dissertation.
- Arnold, Laura. 2018b. Lexical tone in Metnyo Ambel. *Oceanic Linguistics* 57(1). 199–220.
- Arnold, Laura. 2020. Highs and lows: Towards reconstructing the word-prosodic system of proto-Ambel. *Transactions of the Philological Society* 118. 141–158.
- Arnold, Laura. Submitted. The diachrony of word prosody in the Maya-Salawati languages of Raja Ampat.
- Arnold, Laura, Jiayin Gao & James Kirby. 2023. Intrinsic fundamental frequency in two tonal Austronesian languages. In *Proceedings of the International Congress of Phonetic Sciences 2023*.
- Cahill, Michael. 2011. *Tonal diversity in languages of Papua New Guinea*. SIL Electronic Working Papers 2011-008, <https://www.sil.org/resources/archives/42109> (accessed 2023-07-24).
- Gil, David. 2023. The grammaticalization and dissolution of High Extended Intonation: An inalienable possessive paradigm in Roon. *STUF: Language Typology and Universals special edition: Possession in the languages of Wallacea* 76(3).
- Hajek, John. 1995. A mystery solved: the forgotten tone languages of New Ireland. *University of Melbourne Working Papers in Linguistics* 14. 9–14.
- Hammarström, Harald, Robert Forkel, Martin Haspelmath & Sebastian Bank. 2023. *Glottolog* 4.8. Leipzig: Max Planck Institute for Evolutionary Anthropology. <https://doi.org/10.5281/zenodo.4761960>. Available online at <http://glottolog.org> (accessed 2021-09-30).

References II

- Hyslop, Gwendolyn. 2022. Towards a typology of tonogenesis: Revising the model. *Australian Journal of Linguistics* 42(3-4). 275–299.
- Kamholz, David. 2014. *Austronesians in Papua: Diversification and change in South Halmahera–West New Guinea*. University of California, Berkeley dissertation.
- Kingston, John. 2011. Tonogenesis. In M. van Oostendorp, C. J. Ewen, E. Hume & K. Rice (eds.), *Blackwell Companion to Phonology*, 2304–2333. Oxford: Blackwell publishing.
- Köhnlein, Björn & Marc van Oostendorp. 2017. Introduction. In Wolfgang Kehrein, Björn Köhnlein, Paul Boersma & Marc van Oostendorp (eds.), *Segmental structure and tone*, 1–10. de Gruyter.
- van der Leeden, A. C. 1993. *Maya: A language study. A: Phonology*. Jakarta: Lipi-Rul.
- van der Leeden, A. C. n.d. *Maya dictionary, morphology, and syntax*. Unfinished manuscript.
- Remijsen, Bert. 2001. *Word-prosodic systems of Raja Ampat languages*. Utrecht: LOT.
- Remijsen, Bert. 2007. Lexical tone in Magey Matbat. In Vincent J. van Heuven & Ellen van Zenten (eds.), *Prosody in Indonesian languages*, 9–34. Utrecht: LOT.
- Remijsen, Bert. 2010. Nouns and verbs in Magey Matbat. In Michael Ewing & Marian Klamer (eds.), *East Nusantara: Typological and areal analyses*, 281–311. Canberra: Pacific Linguistics.
- Rivierre, Jean-Claude. 1993. Tonogenesis in New Caledonia. In Jerold A. Edmonson & Kenneth J. Gregerson (eds.), *In austronesian languages. oceanic linguistics special publication 24*. Vol. 24, 155–173.

References III

- Rivierre, Jean-Claude. 2001. Tonogenesis and evolution of tonal systems in New Caledonia, the example of Cèmuhi. In Shigeki Kaji (ed.), *Proceedings of the symposium Cross-linguistics studies of tonal phenomena*, 23–42. Tokyo: Institute for the Study of Languages/Cultures of Asia/Africa.
- Ross, Malcolm. 1993. Tonogenesis in the North Huon Gulf chain. In Jerold A. Edmonson & Kenneth J. Gregerson (eds.), *In austronesian languages. oceanic linguistics special publication 24*. 133–154.
- Thurgood, Graham. 1999. *From Ancient Cham to Modern Dialects: Two Thousand Years of Language Contact and Change*. (*Oceanic Linguistics Special Publications*). University of Hawai'i Press.
- Ting, Connie, Meghan Clayards, Morgan Sonderegger & Michael McAuliffe. 2023. *The cross-linguistic distribution of vowel and consonant intrinsic F0 effects*. PsyArXiv. March 24, 2023.
- Whalen, D. H. & Andrea G. Levitt. 1995. The universality of intrinsic F₀ of vowels. *Journal of Phonetics* 23. 349–366.

Background

○○○○○
○○○○○

Word prosody

○○○○

Vowel height

○○○○○
○○○

Apocope

○○○○○
○

Discussion

○○○









Thanks for listening!

