

A low-angle shot looking up at a clear blue sky, framed by the silhouettes and green leaves of tropical plants like palm trees and pandanus trees.

# Word prosody as a window into the prehistory of Northwest New Guinea

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Princeton Phonology Forum

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**Introduction**

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Synchrony

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Diachrony: Internal

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Diachrony: External

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# *Introduction*

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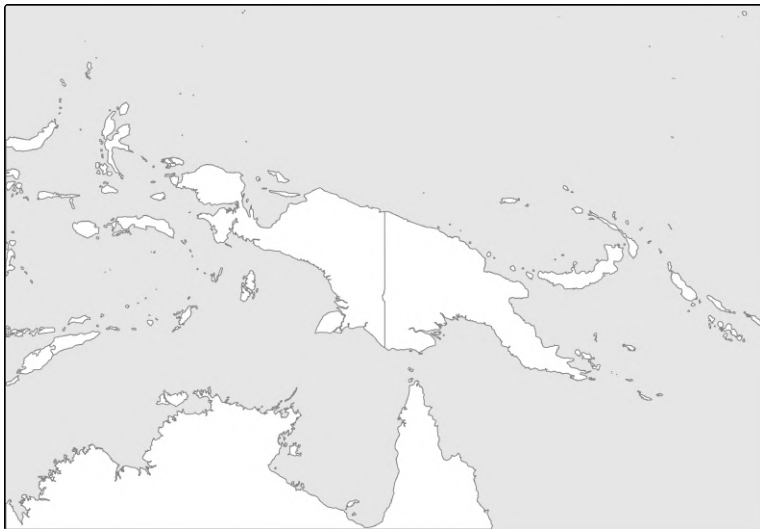
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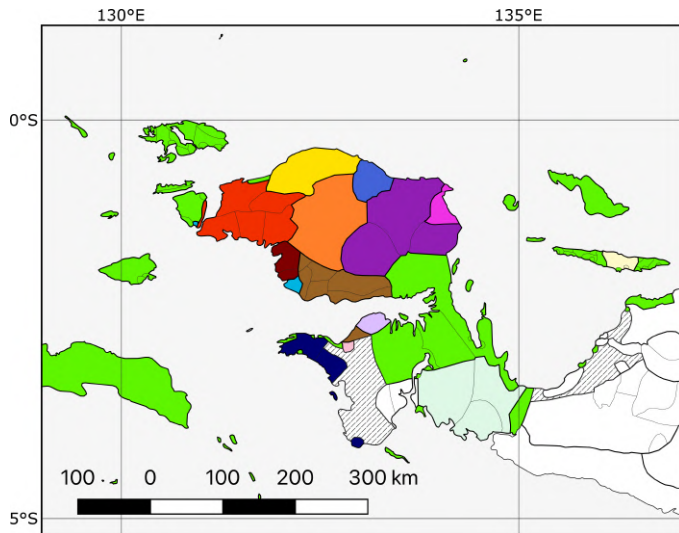
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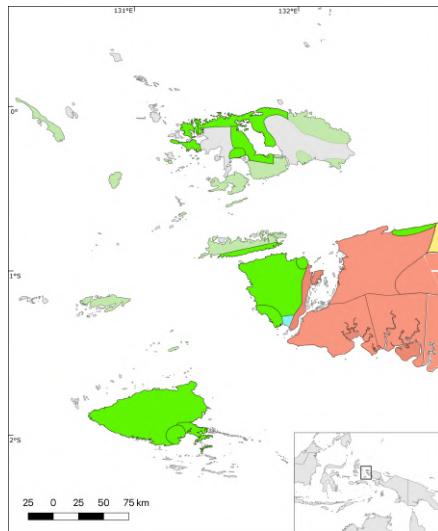
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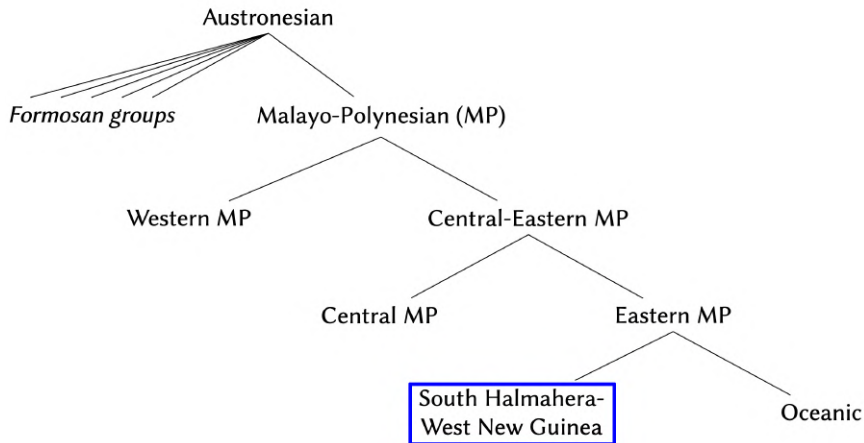
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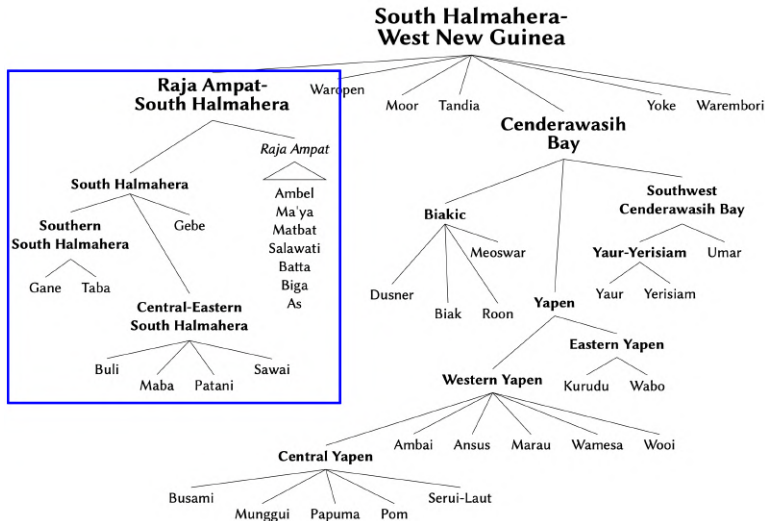
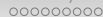
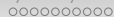
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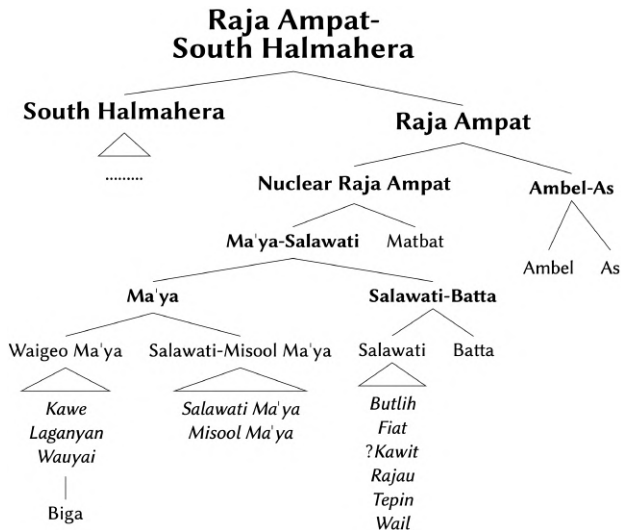
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- ▶ Word prosodic systems of Raja Ampat are unusual
  - ▶ All are tonal (rare in Austronesian)
  - ▶ Several combine tone with lexical stress (rare worldwide)

- ▶ Questions for today:
  - ▶ How did these systems develop? What was the role of inheritance, spontaneous innovation, substrate influence, areal convergence?
  - ▶ What can the linguistic developments tell us about the social history of Raja Ampat—and the wider Northwest New Guinea region?

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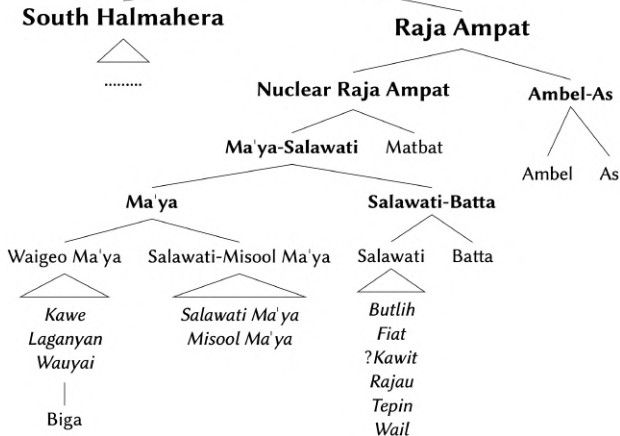
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# *Synchronic word prosody in Raja Ampat*

# Raja Ampat- South Halmahera



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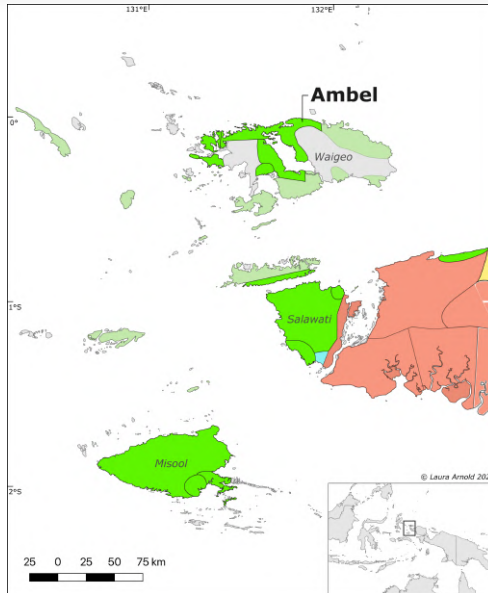
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# Ambel

- ▶ Mono-/disyllabic
- ▶ One tone: High /<sup>3</sup>/ (vs toneless)

e.g. Metnyo

/tu<sup>3</sup>n/      ‘moon’

/tun/      ‘thorn’

/ya<sup>3</sup>mtin/      ‘fasten.1sc’

/yamte<sup>3</sup>n/      ‘name.someone.1sc’

/yatin/      ‘point.1sc’

- ▶ No evidence for contrastive or predictable stress

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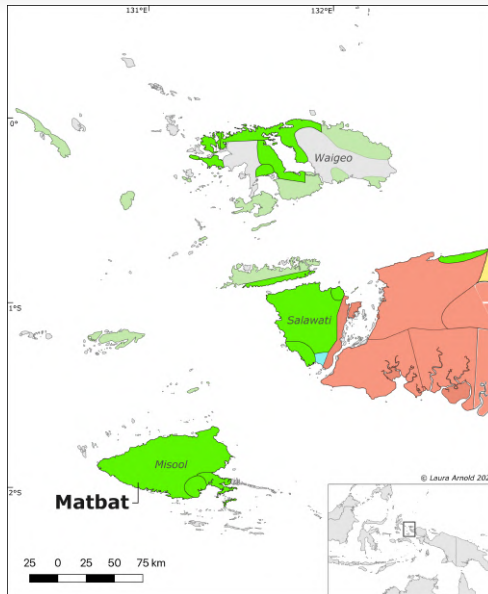
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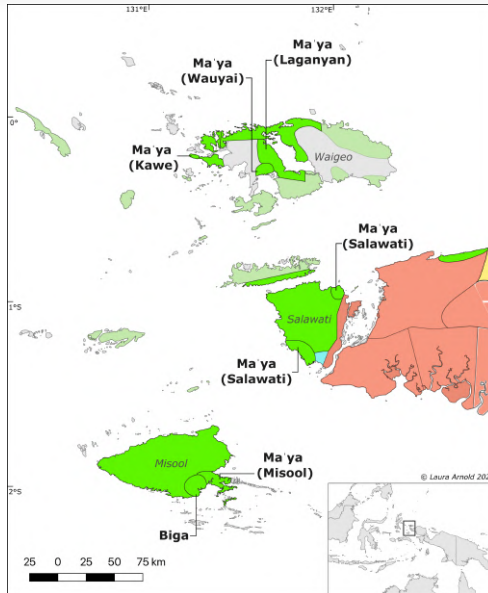
# Matbat

- Heavily monosyllabic
- Six tones: Extra High Fall /<sup>41</sup>/, High /<sup>3</sup>/, Low Rise /<sup>12</sup>/, Low /<sup>1</sup>/, Rise-Fall /<sup>121</sup>/, Low Fall /<sup>21</sup>/ (vs toneless)

|      |       |                                                      |          |                      |               |
|------|-------|------------------------------------------------------|----------|----------------------|---------------|
| e.g. | Magey | /ba <sup>41</sup> /                                  | ‘hit’    | /ba <sup>12</sup> p/ | ‘father’      |
|      |       | /ba <sup>121</sup> /                                 | ‘stiff’  | /ba <sup>3</sup> /   | ‘grandfather’ |
|      |       | /ba <sup>1</sup> /                                   | ‘remain’ | /ba <sup>21</sup> /  | ‘flow’        |
|      |       | /bi <sup>3</sup> mbɔ <sup>121</sup> mpu/ ‘butterfly’ |          |                      |               |
|      |       | /sapu <sup>41</sup> lu <sup>12</sup> y/ ‘round’      |          |                      |               |

- No evidence for contrastive or predictable stress





# Ma'ya

## ► Mono-/disyllabic

## ► Two tones, typically High /<sup>3</sup>/ and Rise /<sup>12</sup>/ (vs toneless)

|      |        |                     |           |                     |              |
|------|--------|---------------------|-----------|---------------------|--------------|
| e.g. | Wauyai | /nu <sup>3</sup> /  | ‘village’ | /nu <sup>12</sup> / | ‘coconut’    |
|      |        | /su <sup>3</sup> /  | ‘breast’  | /su/                | ‘flower.3sc’ |
|      |        | /po <sup>12</sup> / | ‘FZ’      | /pop/               | ‘top’        |

## ► Contrastive lexical stress

|      |        |                       |                  |
|------|--------|-----------------------|------------------|
| e.g. | Wauyai | /ma'na <sup>3</sup> / | ‘grease’         |
|      |        | /'mana <sup>3</sup> / | ‘light (weight)’ |

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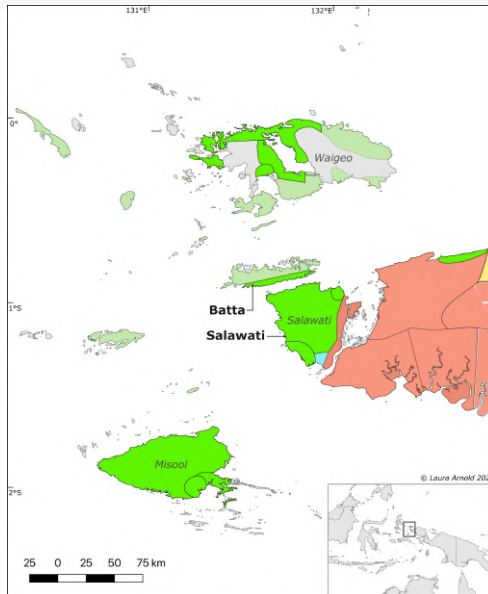
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# Salawati-Batta

- ▶ Mono-/sesqui-/disyllabic
- ▶ Salawati: High /<sup>3</sup>/ vs Rise /<sup>12</sup>/ (vs toneless)

|      |       |                      |         |                      |           |
|------|-------|----------------------|---------|----------------------|-----------|
| e.g. | Tepin | /la <sup>3</sup> p/  | ‘fire’  | /la <sup>12</sup> p/ | ‘pumpkin’ |
|      |       | /-su <sup>3</sup> n/ | ‘enter’ | /-un/                | ‘know’    |
|      |       | /yi <sup>12</sup> n/ | ‘fish’  | /yin/                | ‘1sg’     |

- ▶ Batta: High /<sup>3</sup>/ vs Rise /<sup>12</sup>/ vs Low /<sup>1</sup>/ (vs toneless)
- ▶ Predictable final stress
  - ▶ Contrastive stress reconstructed to proto-Salawati-Batta

# Word prosody: Summary

|                 | Ambel | Matbat                                                             | Ma'ya         | Salawati      | Batta                 |
|-----------------|-------|--------------------------------------------------------------------|---------------|---------------|-----------------------|
| No. of tones    | 1     | 6                                                                  | 2             | 2             | 3                     |
| Inventory       | High  | Extra-High Fall,<br>High, Low Rise,<br>Low, Rise-Fall,<br>Low Fall | High,<br>Rise | High,<br>Rise | High,<br>Rise,<br>Low |
| Obligatory?     | ✗     | ✓                                                                  | ✗             | ✗             | ✗                     |
| Culminative?    | ✓     | ✗                                                                  | ✓             | ✓             | ✓                     |
| Lexical stress? | ✗     | ✗                                                                  | ✓             | ✗             | ✗                     |

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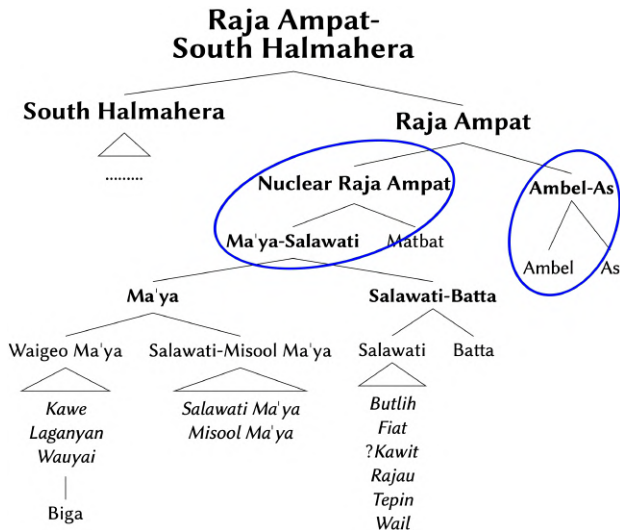
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# *Internal mechanisms for word-prosodic change*







# Tonogenesis in Ambel

## ► Penultimate stress > penultimate High tone

e.g. Ambel    \*<sup>1</sup>lomo ‘blood’ > *lo<sup>3</sup>mo*                      (cf. pMS \*<sup>1</sup>lomo<sup>3</sup>s)  
                   \*<sup>-1</sup>ale ‘to descend’ > *-a<sup>3</sup>le*                      (cf. pMS \*<sup>-1</sup>ale<sup>3</sup>)  
                   \*<sup>-1</sup>anum ‘to drink’ > *-a<sup>3</sup>num*                      (cf. pMS \*<sup>-1</sup>ini<sup>3</sup>m)

# Tonogenesis in Ambel

- Final stress > final High tone / \*<sub>I</sub>, \*e, \*a, \*o, \*u  
 > toneless / \*i, \*u

e.g. Ambel \*ka'bom 'bone' > *kabo<sup>3</sup>m* (cf. pMS \*ka'bo<sup>3</sup>m)  
 \*ta'kek 'chicken' > *take<sup>3</sup>k* (cf. pMS \*te'ke<sup>3</sup>k)  
 \*suy 'earthquake' > *suy* (cf. pMS \*su<sup>3</sup>y)  
 \*ga'si 'salt' > *gasi*

## Tonogenesis in Ma'ya-Salawati

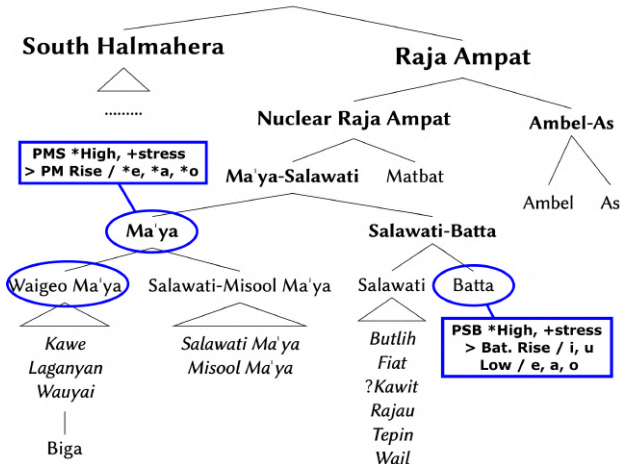
- ▶ > 85% (186/216) of the reconstructed PMS lexicon is High-toned
- ▶ Two small correspondence sets indicate PMS was tonal:
  - ▶ \*Rise-toned words (17/216)

|      |     |                                     |             |
|------|-----|-------------------------------------|-------------|
| e.g. | PMS | *wi <sup>12</sup> f                 | ‘crocodile’ |
|      |     | *nyu <sup>12</sup> w                | ‘coconut’   |
|      |     | *ma <sup>1</sup> la <sup>12</sup> s | ‘long’      |
|      |     | *ka <sup>1</sup> la <sup>12</sup> p | ‘ash’       |

- ▶ Toneless words (4/216)

|      |     |       |                   |
|------|-----|-------|-------------------|
| e.g. | PMS | *-a   | ‘to eat (tr.)’    |
|      |     | *-un  | ‘to know’         |
|      |     | *-ten | ‘to share (food)’ |
|      |     | *-bry | ‘to give’         |

# Raja Ampat- South Halmahera



# Internal mechanisms: Summary

- ▶ Contrastive stress in Ma'ya-Salawati:
  - ▶ Developed through inheritance, word-formation processes, borrowing
  - ▶ Retained after tonogenesis

## Internal mechanisms: Summary

- ▶ Tonogenesis occurred separately in Ambel and Ma'ya-Salawati
  - ▶ Ambel: Conditioned by stress + vowel height
  - ▶ Ma'ya-Salawati:
    - Internal tonogenetic mechanisms unknown
    - Subsequent tone changes provide strong subgrouping evidence

## Internal mechanisms: Summary

- ▶ Frequent conditioning by vowel height caused by unusually large intrinsic fundamental frequency (IF0) differences
  - ▶ IF0: Near-universal phenomenon in which higher vowels (e.g. /i, u/) realised with higher f0 than low vowels (e.g. /a/; Whalen & Levitt 1995)
  - ▶ Mean cross-linguistic difference: 1.65 ST
  - ▶ Butlih Salawati and Biga: 1.5–2.8 ST

# *External mechanisms for word-prosodic change*



## External mechanisms

- ▶ Internal mechanisms for tonogenesis do not rule out contact as an additional mechanism
  - ▶ e.g. Tsat (Austronesian > Chamic; Thurgood 1999)
    - Transphonologisation of co-intrinsic pitch associated with onset and coda Cs
    - Triggered by contact with Hainan Min (Sino-Tibetan) and Li (Tai-Kadai)

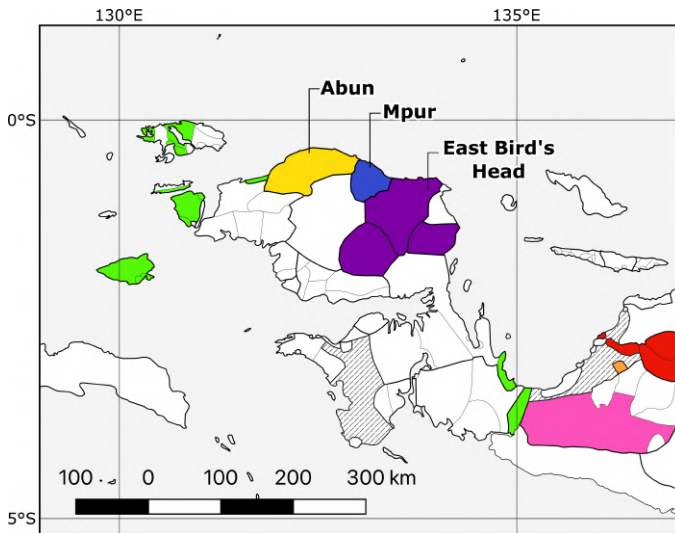
## External mechanisms

- ▶ Areal Sound Pattern Hypothesis and the “perceptual magnet effect” (Blevins 2017):
  - ▶ Speakers’ prior language experience creates phonetic prototypes, which “perceptually attracts surrounding stimuli” (Kuhl & Iverson 1995: 148)

# Contact and Raja Ampat tonogenesis

- ▶ Tone is rare in Austronesian languages
- ▶ Tone is common in Papuan languages
- ▶ Ergo, tone in Raja Ampat is due to contact

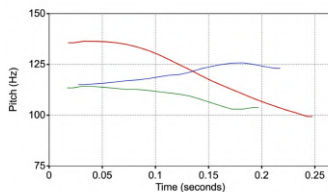
# Tone in Northwest New Guinea



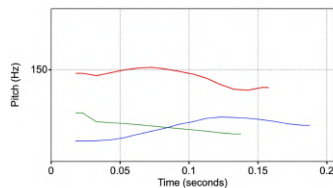
# Tone in Northwest New Guinea: Typology

| Language | Family  | Tonal inventory |       |     |                    | Culminative? | Obligatory? |
|----------|---------|-----------------|-------|-----|--------------------|--------------|-------------|
| PMS      | An      | High            | Rise  |     | toneless           | Y            | N           |
| PA       | An      | High            |       |     | toneless<br>[Rise] | Y            | N           |
| Meyah    | EBH     | High<br>[Rise]  |       |     | toneless           | N            | N           |
| Moskona  | EBH     | High            |       |     | toneless           | Y            | N           |
| Irides   | EBH     | High            | Rise  |     | toneless           | N            | N           |
| Sougb    | EBH     | High            |       |     | toneless           | Y?           | N           |
| Abun     | Isolate | High<br>(Rise)  |       | Low | Fall               | ?            | ?           |
| Mpur     | Isolate | High            | Rise? | Low | Mid                | ?            | ?           |

# Tone in Northwest New Guinea: Acoustics

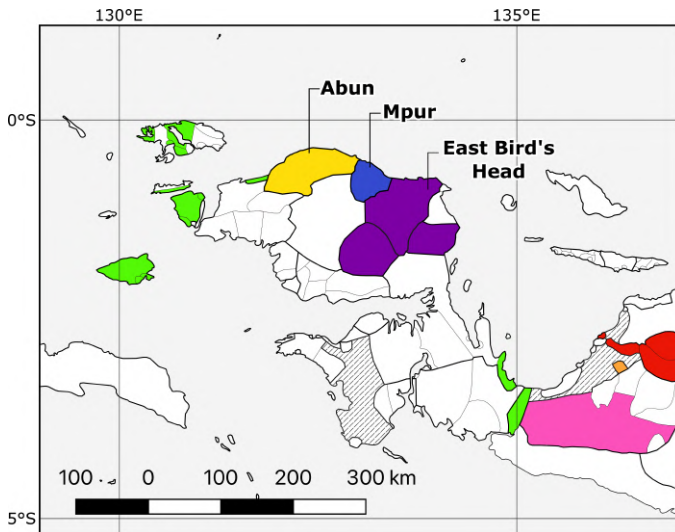


Tone in Irises (EBH)



Tone in Wauyai Ma'ya (RA)

# Tone in Northwest New Guinea



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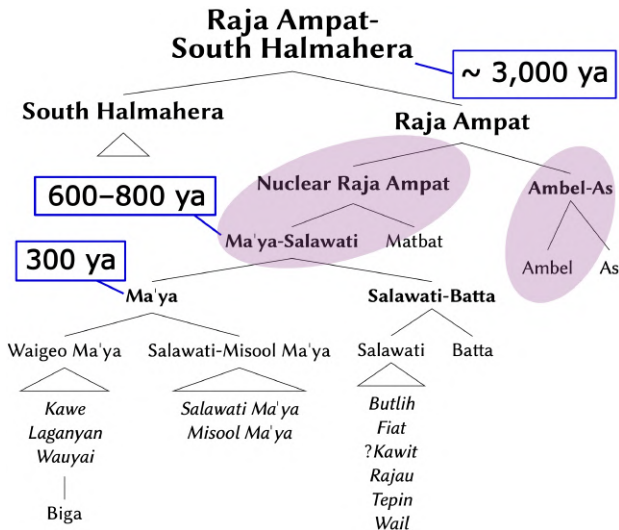
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*Towards a social history*



## Austronesians in Raja Ampat

- ▶ Earliest evidence for human occupation in RA: 49,000 ya
- ▶ Changes in the archaeological record—Austronesian arrivals?
  - ▶ 4,000–2,900 ya: Size of middens increases substantially, shift from forest-based to littoral-based subsistence
  - ▶ 3,500–3,100 ya: Presence of ceramics similar to those found in Maluku and the Bismarck archipelago
  - ▶ 6,000–3,000 ya: Red pigment rock art appears



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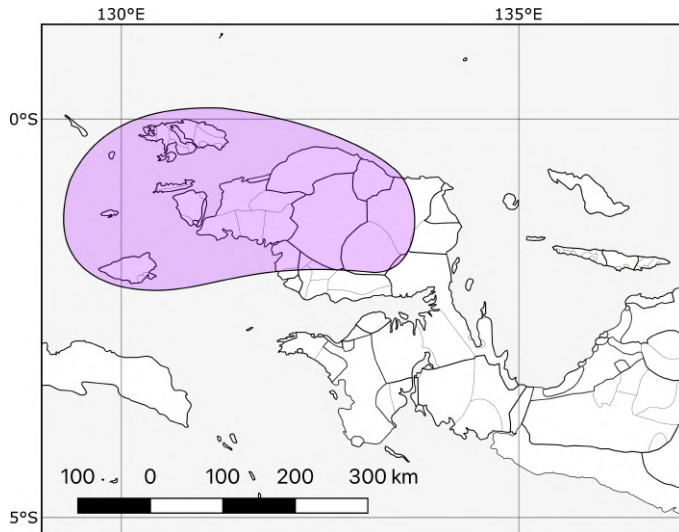
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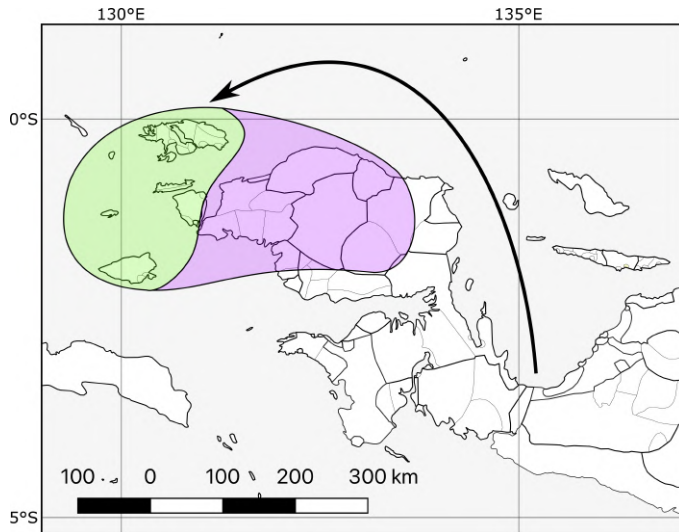
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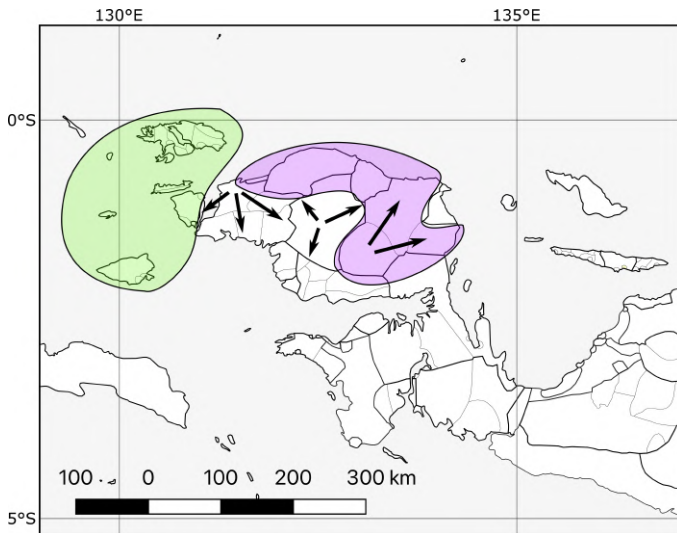
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# Towards a social history of NWNG

- ▶ Other linguistic correlates
  - ▶ Several shared traits by dint of the NWNG linguistic area (Klamer et al. 2008, Arnold & Gasser Forthc.)
  - ▶ No exclusively shared lexical items (but high levels of non-Austronesian vocab in RA; Remijsen 2001: 37)
  - ▶ One shared morphosyntactic trait: Split Inalienable Coding (Arnold 2023)

## Mechanisms for contact-induced tonogenesis in RA

- (1) Speakers of a tonal L1 (Papuan) imposed phonetic prototypes on L2 (Austronesian) F0 cues (e.g. vowel height, stress)
- (2) Phonetic prototypes functioned as perceptual magnets in the Austronesian L2—over generations, F0 was enhanced
- (3) Tone phonologised by
  - (i) weakening of primary vowel quality cues ( $F1 + F2$ ) > vowel mergers
  - (ii) loss of unstressed syllables

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# Conclusions

- ▶ In lieu of further positive evidence for contact, tonal convergence zone in NWNG hypothesis remains speculative
  - ▶ Linguistic data is the primary source for inferring patterns of population movement and historical contact in West New Guinea
  - ▶ Reconstructing social history requires cautious interpretation of typological similarities and non-linguistic correlates

# Conclusions

- ▶ If An-Pap contact were involved in RA tonogenesis, it was likely
  - (i) multi-generational
  - (ii) around 1,000–2,000 ya

# Conclusions

- ▶ Outstanding issues:
  - ▶ Were the agents of change simultaneous (L1-L1) or sequential (L1-L2) bilinguals?
  - ▶ Would further data from NWNG support the areal hypothesis proposed here?
  - ▶ Why did the WBH languages and Maybrat not participate in the tonal area? Linguistic, social, ideological reasons?

Thanks for listening!



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