Constraints on prosodic constituent structure: uncovering areal tendencies in Northern Sub-Saharan Africa

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Goals of the ALFA Project at Berkeley

- "Areal Linguistic Features in Africa"
- Identify areal phenomena in Africa, particularly in N. Sub-Saharan Africa
  - cf. Güldemann's *Macro-Sudan Belt*
- Understand these at the finest possible geographic granularity
- Distinguish contact-induced vs. inherited traits
  - Contribute to our understanding of African linguistic history

Goals for our research program

- Main questions:
  - To what extent do the languages of N. Sub-Saharan Africa cluster with respect to segmental distribution in:
    - syllable structure
    - metrical structure (foot)
    - stem and word structure (minimal/maximal size, distribution and contrast asymmetries etc.)

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Goals for our research program

- Main questions:
  - If they do cluster, where and how?
  - Is any given cluster the result of contact or inheritance?

A word of caution

- Our proposed topic is a huge one, and will likely take years to make reliable progress.
- Results are preliminary and subject to a great deal of enrichment and modification going forward:
  - Current sample is ca. 50 languages
  - Still working on structuring our database

Goals for this talk

- Lay the conceptual foundations for our project
  - Present a preliminary typology of syllable structure / onset-coda asymmetries
  - Illustrate systems where metrical structure has been claimed to be a crucial component of the morphology / phonology of African languages

- Present our preliminary results.
- Get suggestions on where and what to look at

1. SYLLABLE STRUCTURE

1. Syllable structure

- Basic phonotactic requirements, e.g. does a language allow coda consonants, complex onsets, etc.?

1. Syllable structure

- Distributional asymmetries:
  - In a lg. with codas, are all the consonants permitted, or only a subset?
  - If so, what subset? Are there contrast neutralizations?
  - Are there particular onset gaps?

1. Syllabic "Position Classes"

- We need more than just the onset-coda distinction to capture the interesting patterns, though:
  - Word- or stem-initial onset: #__
  - Intervocalic onset: V.__V
  - Post-consonantal onset: VC.__V
  - Word-internal coda: V__.CV
  - Word-final coda: C#

1. Syllable Typology I

Classification	*Examples*
• Type 0: no codas (CV only)	Hawaiian; Fongbe; most of Bantu

1. Syllable Typology I: only sonorants

Classification	*Examples*
• Type 1a: CVN only nasal codas	Tuu, Kx'a, some Khoe Jeli (Mande)
• Type 1b: CV{N/L} only nasal & liquid codas	Kisi (Atlantic); Kanembu (Saharan)
• Type 1c: CV{N/L/G} only nasal, liquid, & glide codas	Mandarin Jamsay (Dogon)

1. Syllable Typology II: no-stops

Classification	*Examples*
• Type 2a: CV{N/L/G/F} only sonorant and fricative codas	??
• Type 2b: CV{N/L/G/F} only sonorant or fricative codas + odd stops	Konni (Gur); Dagaare (Gur)

1. Syllable Typology III: stops with neutralization

Classification *Examples*

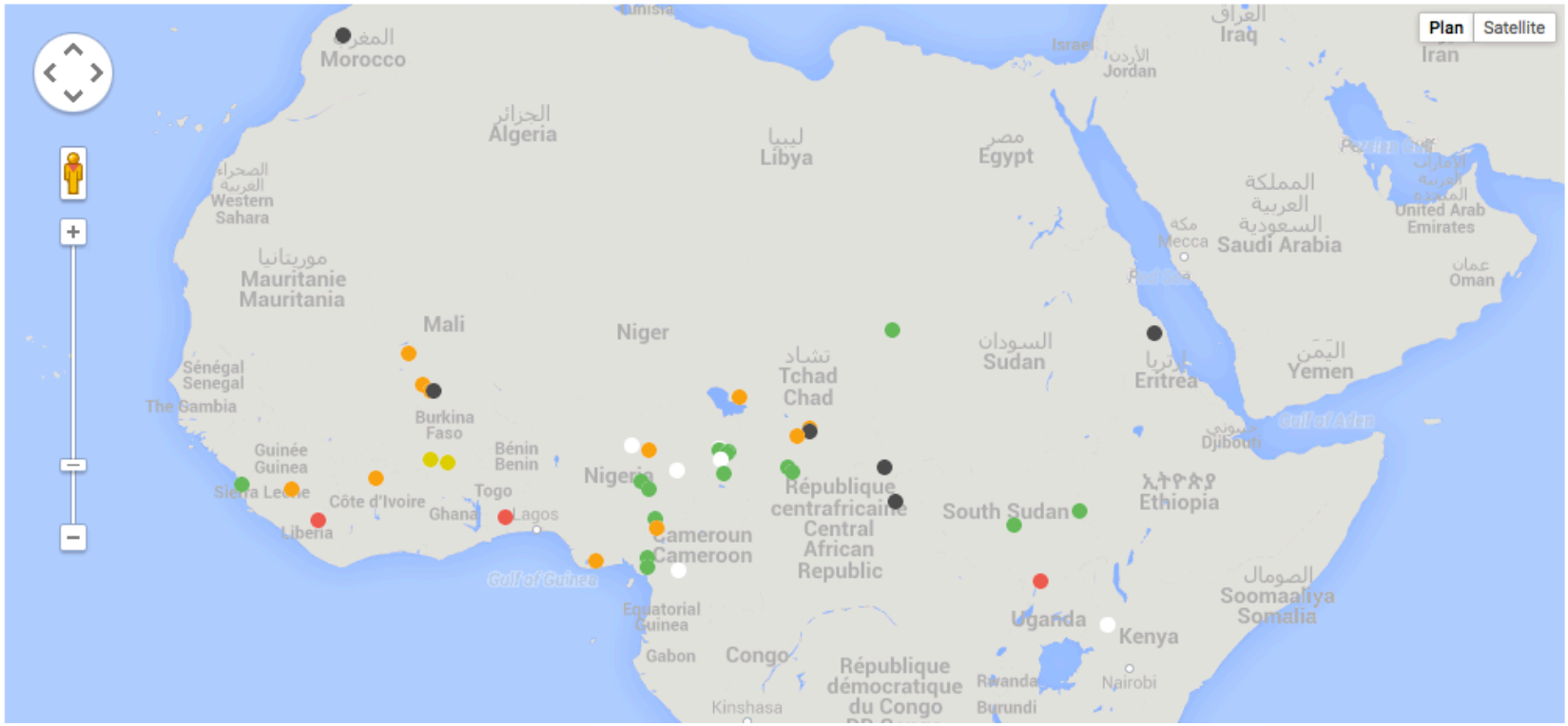
- Type 3a: stop codas with contextual neutralization of laryngeal contrasts — German; ??
- Type 3b: stop codas with total neutralization of laryngeal contrasts — Anywa (W Nilotic)

1. Syllable Typology IV

Classification	*Examples*
• Type 4: No restrictions on (simplex) codas	Bidiya (E Chadic); Fer, Yulu (C Sudanic)

1. Map by Coda Consonant Types

- No codas
- Only sonorants
- All except stops
- All / neutralized stops
- No restrictions
- other



1. A Tentative Hypothesis

- Restriction on codas is an areal feature of a Mande-Kwa-Kru area
  - This dovetails with findings by the ALFA tone group (Emily Clem & Hannah Sande, p.c.)

2. METRICAL STRUCTURE

2. Metrical Structure in Africa

- Lack of obvious “stress”, but plenty of prosody:

“…stress prominence is of course not the only symptom of foot-hood… segmental and quantitative factors can also be in play, showing up in the asymmetric distribution of contrast and weight between head and dependent syllables” (Harris 2004[1990]: 26).

2. Metrical Structure in Africa

- Accent is a "prominence asymmetry that makes one syllable more salient than its neighbors by enhancing some combination of phonetic properties: pitch, duration, intensity, and/or *contrastive segmental features*" (Downing 2010: 382, cf. van der Hulst 1999, 2002, 2006; emphasis ours).

2. Metrical Structure in Africa

- "…it is this diversity of prominence asymmetries that in fact make African languages particularly interesting for research on the range of phonological properties that can define prominence or provide evidence of metrical constituency" (Downing 2010: 385).

2. Metrical Structure in Africa

- Properties of accent (Downing 2010, and ref. therein):
  - **culminative**, i.e. there is at most one (main) prominence peak per relevant domain, and
  - **demarcative**, i.e. prominence peaks are defined with reference to a particular morpheme edge (stem or word).
  - Stress is thus only one form of accent… [A]symmetries independent of stress should be considered forms of accent, as long as they have the two properties defined above".

2. Metrical Structure: Motivating Examples I

- Kukuya (Bantu B77; Paulian 1985; Hyman 1987)
  - Stems have up to 3 syllables
  - Stem-initial prominence:

$$C_1V \ . \ C_2V \ . \ C_3V$$

All Cs in the inventory

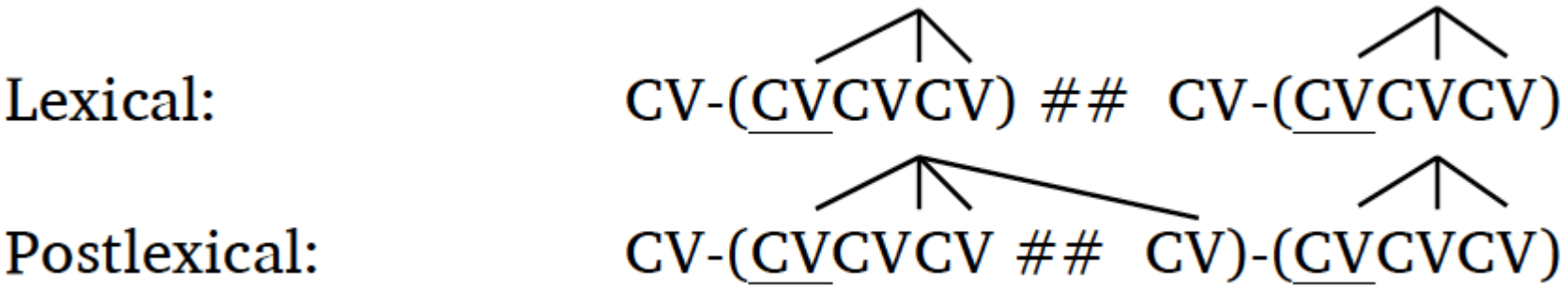
- P, T, K, l, m ,n
- C2-C3 combinations: only 6
  - Cor. C_2+ non-cor. C_3
  - or vel. C_2 + lab. C_3
  - C_2 and C_3 must agree in nasality

2. Metrical Structure: Motivating Examples I

- Kukuya (Bantu B77; Paulian 1985; Hyman 1987)
  - Left-edge of stem is "accented":
    - Pause before C_1
    - C_1 nasal or /l/ is geminated /Pu-nɔnɔ/ = [bʊ-nnɔnɔ]
  - Stem = prosodic domain
    - Prefixes form a prosodic domain with preceding material

2. Metrical Structure: Motivating Examples I

- Kukuya (Bantu B77; Paulian 1985; Hyman 1987)
  - Hyman's (1987) analysis: maximally ternary left-headed "stress-foot"



2. Metrical Structure: Motivating Examples II

- Jamsay (Dogon; Heath 2008):
  - "an **embryonic metrical structure** is manifested in various phonological rules, particularly those applying to verb stems and their suffixal derivatives (including Verbal Nouns). The core sequence involved is a **stem-initial bisyllabic [σσ] foot** behaving metrically as a **trochee [sw]**…"
  - "There is no clear evidence for metrical structure in the third, fourth, and fifth syllables of long, uncompounded stems or words."

2. Metrical Structure: Motivating Examples II

- Jamsay (Dogon; Heath 2008:26-7):
  - g-spirantization: /Caga…, Cɔgɔ…/ → Caɣa…, Cɔɣɔ…
    - /dɔ̀gɔ̀/ → (dɔ̀ɣɔ̀) ‘Dogon’
    - /dɔ̀rɔ̀gɔ́/ → (dɔ̀rɔ̀)gɔ́ ‘ransom (verb)’
  - Post-sonorant syncope (verbs)
    - (péré-) ‘clap’ → pét-tĭ ‘clap:PFV’
  - Suffixal u-apocope (verbal nouns)
    - (sáŋá-) ‘adorn’ → (sàŋ-ú) ~ sǎŋ
    - (dànà)ŋá ‘arrange’ → (dànù)ŋ-ú (*dànǔŋ)

2. Metrical Structure: Motivating Examples II

- Jamsay (Dogon; Heath 2008:26-7):
  - Inter-word u-apocope
    - (tɔ̀gú) kâːⁿ ~ tɔ̌g kâːⁿ ‘each kind’
    - (yùrù)gù kâːⁿ (*yùrùg kâːⁿ) ‘each fox’
  - V_2-reduction (verbal nouns)
    - léréwé- → lèrɪ̀w-ú ~ lèrə̀w-ú ‘trim’
    - gɔ̀lɔ̀rɔ̀-wɔ̀- → gɔ̀lù̲rù̲-w-ú ~ gɔ̀lə̀rə̀-w-ú ‘cause to

2. Metrical Structure: Motivating Examples II

- Jamsay (Dogon; Heath 2008:26-7):
  - Pre-suffixal V2 raising
    - (píté-) ‘be inflated’ → (pít̰i̱)-wé- ‘inflate’
    - (jùgɔ́-) ‘know’ → (jugù̱)-wɔ́- ‘inform’
    - only with dissyllabic verb stems

2. Metrical Structure: Motivating Examples III

- Ibibio (Akinlabi & Urua 2002, a.o.):
  - "…the prosodic target of the inflectional stem is a bisyllabic trochaic foot" (127).
  - Effects of this are seen in lengthening, lenition, and vowel assimilation.

/dép + ke/	→	[(dép.pé)]
/dó + ke/	→	[(dóo.ɣó)]
/kɔ́ɔŋ + ke_1/	→	[(kɔ́ɔ.ŋɔ́)]
/kɔ́ɔŋ + ke_2/	→	[(kɔ́ŋ.ŋɔ́)]
/dáppá + ke/	→	[(dáp.pá)ké]

2. Metrical Structure: Motivating Examples IV

- Kera (Pearce 2007):
  - Like other Chadic languages, Kera lacks “stress” as such.
  - Evidence for iambicity comes from (i) word shape, (ii) vowel inventory asymmetries, (iii) vowel harmony domains, and (iv) tone-spreading domains.

2. Metrical Structure: Motivating Examples IV (cont'd)

- Kera (Pearce 2007):

(i) Word / Stem Shape: *[CVCV]

/CVCV/ → [CVC] / phrase-medial

/CVCV/ → [CVCV:] / phrase-final

(ii) Vowel Distribution

[ɛ], [a], [ɔ] only surface in head position

[e], [ə], [o] only in non-head

2. Metrical Structure: Motivating Examples IV (cont'd)

- Kera (Pearce 2007):

(iii) Vowel Harmony

"Front suffixes cause central vowels in the same foot to front. But between feet, fronting does not take place" (p. 73).

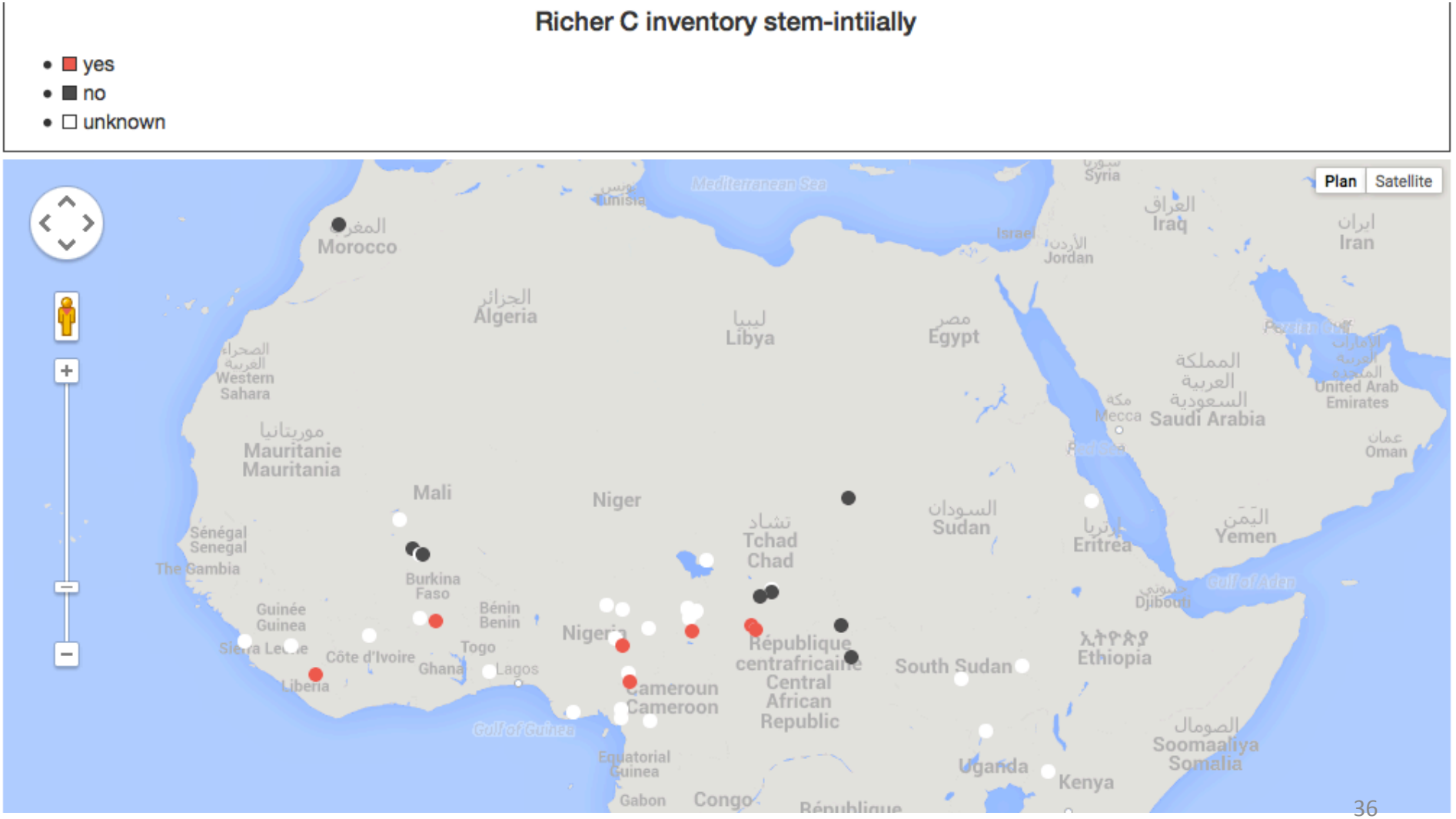
(iv) Tone Spreading

"In three syllable words with two tones, the domain of the first tone is a foot."

2. Metrical Structure: Motivating Examples V

- Nilotic
  - See Dimmendaal (2012) for foot-based analyses for Nilotic languages
  - Metrical structure may have played a major role in the emergence of process morphology in W Nilotic
    - This is a topic we'd eventually like to examine for areal effects

2. Metrical Structure: Very tentative maps



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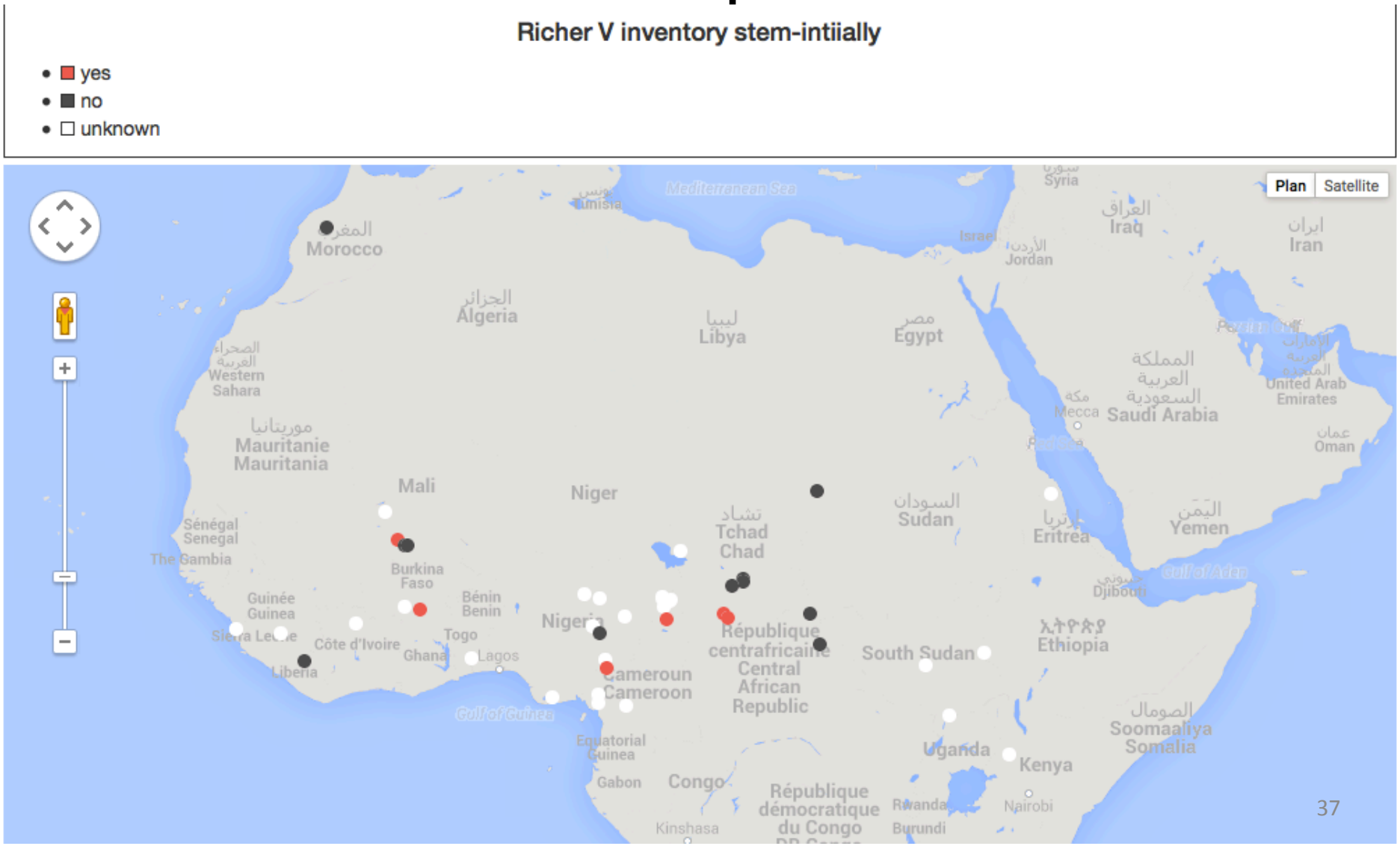

2. Metrical Structure: Very tentative maps

- TRO
- IAM
- FT
- no
- unknown

Signs of metrical structure