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Discrete level narrative, terraced music: insights from underdocumented Ivorian languages

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This contribution explores a quantitative phonetic model that compares vocal music and post-lexical prosodic typology in two phonetically underdocumented Ivory Coast languages, Sanvi Anyi (Kwa, ISO 639.3 any) and Gagnoa Bete (Kru, ISO 639.3: btg), respectively.

The universality of declination in unmarked prosody at postlexical levels is widely, though not unanimously, recognised (Hirst & di Cristo 1998). The opposite, 'inclination', may be observed in attitudinally and illocutionarily marked (e.g. indignant or querying) utterances. The tendency seems to be supported by automatic downstep in Niger-Congo register tone languages, leading to a well-known global terracing effect. However, closer investigation shows that this is not so simple. First, Baule (Kwa, ISO 639.3: bci) shows terracing, but high tone sequences show 'upsweep' (Ahoua 1988). Second, a classification into 'terraced' vs. 'discrete level' non-declining tone languages exists but is also not so simple (Connell 2002): the former may apply essentially to languages with two register tones, and the latter to those with more than two, especially in formal speech, but there are overlaps. With this background, we develop a quantitative model of narrative prosody in Gagnoa Bete, a linguistically quite well documented but phonetically underdocumented language with four register tones, on the hypothesis that Bete will show discrete level pitch realisation of tone sequences.

A default expectation from music is that a form of discrete level pitch realisation will be found. The expectation is based on instrumentally accompanied or influenced music, and may or may not apply to traditional song: many instruments have fixed tuning, constraining a wide range of discrete levels but permitting many kinds of directional variation. Declination in the phonetic sense is commonly observed in non-professional unaccompanied singing, but the issue here is whether unaccompanied traditional singing by speakers of a terraced tone language is not declination of this kind, but a terrace-controlled downtrend, following the tonal sequencing of the language itself. Starting with this hypothesis, we investigate traditional unaccompanied singing in Sanvi Anyi from a quantitative phonetic perspective.

Our methodology embraces the strongly overlapping standard best practices for spoken language resource discovery in two disciplines: documentary linguistics (Gippert & al. 2006) and speech technology (Gibbon & al. 1997), in what we term the 'ecological cycle' of problem clarification, theory development, interpretation with a quantitative model, evaluation of the model, and practical application. In the present case, practical application is implementation of the model in speech synthesis, not simply as a preliminary to developing technological aids for 'payback' in public communication systems for these languages, but as an essential component of the rigorous testing of the quantitative model using perception tests by native speakers.

Selected quantitative results are illustrated for Bete narrative in the table below, which shows rather clearly defined phonetic domains for the four Bete register tones, confirming a global discrete level hypothesis for Bete narrative. Detailed analyses, which will be presented in the full paper, show local automatic downstep however, which is accounted for in an extension of the model. The same method is applied to the analysis of traditional unaccompanied Anyi vocal music, confirming the terracing effect related to the Anyi language itself. The perceptual validity of the model is confirmed by re-synthesising both the narrative and the music. Further research suggested by these initial results is in progress on comparison of both vocal music and narrative in each language.

		Frequency (Hz)					
Tone	**N**	**min**	**max**	**mean**	**sd**	**offset**	**slope**
HH:	51	111	182	146	14	146	1.5e-05
H:	49	101	152	125	11	127	-5e-05
M:	41	94	152	117	13	107	0.0005
L:	62	77	152	107	14	105	0.0001

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