

*JK 25 Workshop: Prosody and Prosodic Interfaces
in Japanese and Korean
W October 11, 2017—Center for Korean Studies,
University of Hawaii at Manoa*

Pitch accent and tonal alignment in Japanese

Junko Ito and Armin Mester
UC Santa Cruz & NINJAL (国立国語研究所)



Acknowledgments

- Part of the work reported on here was supported by the NINJAL collaborative research project *Cross-linguistic studies of Japanese prosody and grammar*.

2

Metrical vs. tonal constraints

- In an important series of papers, Haruo Kubozono has established the fact that the bimoraic foot plays an irreducible role in explaining the accent pattern of Japanese and its dialects.

References: Kubozono 1988, 1989, 1995, 2009, etc.

3

Metrical vs. tonal constraints

- Here we would like to make a complementary point:
 - Some features of pitch accent systems are irreducibly tonal in nature.
 - They follow from the constraints dealing with the alignment of tonal melodies with prosodic structure.

4

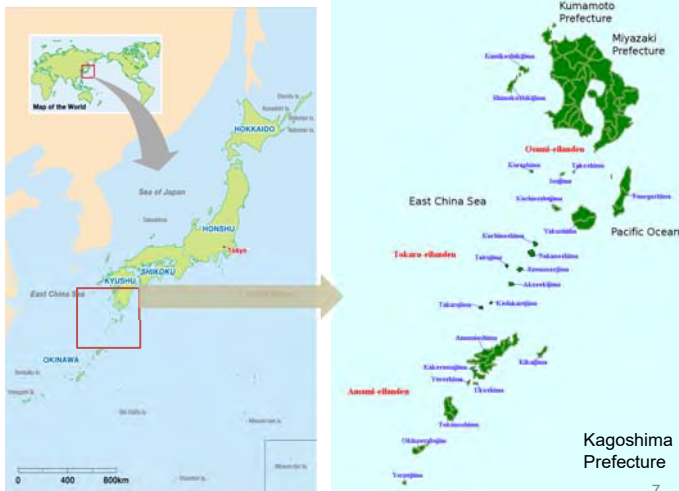
Microvariation in Kagoshima pitch accent systems

5

Kagoshima pitch accent systems

- Case Study: Dialects of Kagoshima Prefecture, Japan
- Data and generalizations after Kubozono 2012, 2016, etc.

6



Acknowledgments

- This work was done in collaboration with the UC Santa Cruz Accent Project team members **Nick Kalivoda** and **Jeff Adler**.



Two basic tonal patterns: HL & H

HL (Type A): L ₀ HL#	Gloss
mi.ya.ZA.ki	'Miyazaki'
mi.ya.za.KI.ken	'--- prefecture'
mi.ya.za.ki.KEN.min	'--- prefecture residents'
mi.ya.za.ki.KEN.mo	'also --- prefecture'
mi.ya.za.ki.ken.min.KA.ra	'from --- prefecture residents'
mi.ya.za.ki.ken.min.ka.RA.mo	'also from --- prefecture residents'

H (Type B): L ₀ H#	Gloss
na.ga.sa.KI	'Nagasaki'
na.ga.sa.ki.KEN	'--- prefecture'
na.ga.sa.ki.ken.MIN	'--- prefecture residents'
na.ga.sa.ki.ken.MO	'also --- prefecture'
na.ga.sa.ki.ken.min.ka.RA	'from --- prefecture residents'
na.ga.sa.ki.ken.min.ka.ra.MO	'also from --- prefecture residents'

9

Tonal patterns for short words:

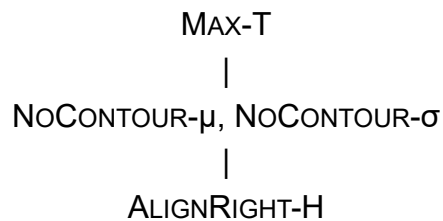
HL#	SAn	'three'	SANmo	'also three'
	Ki	'spirit'	KImo	'also spirit'
	(HL): falling on a single mora			

H#	SEN	'thousand'	senMO	'also thousand'
	KI	'tree'	kiMO	'also tree'

10

Basic Analysis of Kagoshima

Right-Alignment of tonal melody (HL, H):



11

Basic Analysis of Kagoshima

No CONTOUR- σ	* T _{α} T _{β} ▽ σ	A syllable σ is not associated with more than one tone. One violation for every additional tone associated with σ .
No CONTOUR- μ	* T _{α} T _{β} ✓ μ	A mora μ is not associated with more than one tone. One violation for every additional tone associated with μ .

12

Basic Analysis of Kagoshima

MAX-T	If T is part of the input, T is part of the output.
ALIGNRIGHT-H: ALIGN(H,R,ω,R,μ)	Align H tone to the right word edge. One violation for every μ intervening between the rightmost μ associated to H and the right edge of ω.

13

miyazaki

miyazaki, HL	Max-T	No Contour -μ	No Contour -σ	Align Right -H
▶ miyaZAKi 				*
miyazaKI 	*!			
miyazaKI 		*!	*!	
miYAZaki 				**!

14

nagasaki

nagasaki, H	Max-T	No Contour -μ	No Contour -σ	Align Right -H
▶ nagasaKI 				
nagaSAki 				*!

15

miyazaki-ken '__prefecture'

miyazaki-ken, HL	Max-T	NoCont our-μ	No Contour -σ	Align Right -H
▶ miyazaKIken 				**
miyazakikeN 	*!			
miyazakikeN 		*!	*!	
miyazakiKEN 			*!	*

16

miyazaki-ken-min '__prefecture residents'

miyazaki-ken-min, HL	Max-T	NoCont our-μ	No Contour -σ	Align Right -H
▶ miyazakiKENmin 				**
miyazakiken.miN 	*!		(*)	
miyazakiken.miN 		*!	*!	
miyazakiken.Min 			*!	

17

san '3'

san, HL	Max-T	NoCont our-μ	No Contour -σ	Align Right -H
▶ SAN 			*	*
SAN 	*!			

sen '1000'

sen, H	Max-T	NoCont our-μ	No Contour -σ	Align Right -H
▶ SEN 				
SEn 			(*)	*!

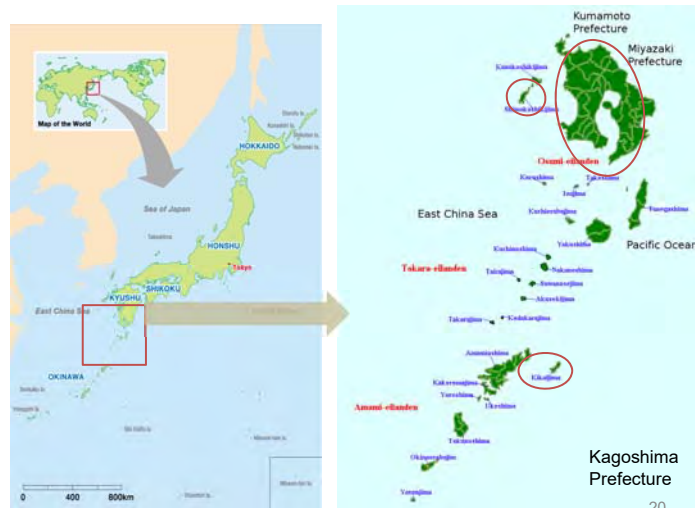
18

ki 'spirit'

ki, HL	Max-T	No Contour	-H	No Contour	-σ	Align Right	-H
▶ $\begin{matrix} H & L \\ & \\ \text{ki} \end{matrix}$		*		*			
▶ $\begin{matrix} H & \emptyset \\ & \\ \text{ki} \end{matrix}$	*!						

ki 'tree'

ki, H	Max-T	No Contour	-H	No Contour	-σ	Align Right	-H
▶ ki							
ki	*!						



Microvariation in three closely related dialects

blue= Sequence of initial High tones in Kikaijima and Koshikijima not analyzed here

HL# (Type A)

Kagoshima Dialect	Kikaijima Dialect	Koshikijima dialect
mi.ya.ZA.ki	MI.ya.ZA.ki	MI.ya.ZA.ki
mi.ya.za.KI.ken	MI.YA.ZA.ki.KEN	MI.YA.ZA.ki.KEN
mi.ya.za.ki.KEN.min	MI.YA.ZA.KI.KEN.MIn	MI.YA.ZA.ki.ken.MIn
mi.ya.za.ki.KEN.mo	MI.YA.ZA.ki.keN.mo	MI.YA.ZA.ki.KEN.mo

H# (Type B):

Kagoshima Dialect	Kikaijima Dialect	Koshikijima dialect
na.ga.sa.KI	NA.GA.sa.KI	NA.GA.sa.KI
na.ga.sa.ki.KEN	NA.GA.SA.ki.keN	NA.GA.SA.ki.keN
na.ga.sa.ki.ken.MIN	NA.GA.SA.KI.KEN.miN	NA.GA.SA.ki.ken.miN
na.ga.sa.ki.ken.min.MO	NA.GA.SA.KI.KEN.MIn.MO	NA.GA.SA.ki.ken.min.MO

Microvariation in three closely related dialects

Kagoshima dialect	Kikaijima dialect	Koshikijima dialect
mi.ya.ZA.ki	MI.ya.ZA.ki	MI.ya.za.ki
mi.ya.za.KI.ken	MI.YA.ZA.ki.KEN	MI.YA.ZA.ki.KEN
mi.ya.za.ki.KEN.min	MI.YA.ZA.KI.KEN.MIn	MI.YA.ZA.ki.ken.MIn
mi.ya.za.ki.KEN.mo	MI.YA.ZA.ki.keN.mo	MI.YA.ZA.ki.KEN.mo
Syllable-based system	Mora-based system	Mixed system

What does it mean for a language to be

- syllable-based?
 - Does it mean there are only syllables, and no moras?
- mora-based?
 - No syllables, only moras?
- mixed?
 - Both syllables and moras?

Tonal patterns for short words:

	Kagoshima dialect	Kikaijima dialect*	Koshikijima dialect	
HL#	SAn	SAN	SAn	'three'
	Ki (HL): falling on a single mora.	KI (H): no fall on single mora (to be checked)	KI (H): no fall on single mora	'spirit'
H#	SEN	seN	seN	'thousand'
	KI	KI	KI	'tree'
	Syllable-based?	Mora-based	Mixed	

* further sonority restrictions in Kikaijima, not dealt with here.

Microvariation in Kagoshima: the full analysis

25

Constraints seen so far

MAX-T,
NOCONTOUR- μ ,
NOCONTOUR- σ ,
ALIGNRIGHT-H

26

The remaining constraints

H-TO-HEAD	* H $\sigma[\mu.. \mu.]$	H is associated to a syllable head (1st μ). Violated if head-mora is not linked to H.
FINAL-T	* T ‡ $\mu]_{\omega}$	The word-final mora is marked by a tone. Violated if word-final mora is not linked to a tone.
NOMULTI LINK-H	*H $\mu \mu$	H is associated to no more than one μ . One violation for every additional μ associated to H.

27

OTWorkplace

- OT analysis of the Kagoshima microvariation researched in OTWorkplace (Prince, Tesar and Merchant 2015)
- to investigate the precise nature of the proposed constraints, and verify their crucial rankings and non-rankings.

28

OTWorkplace

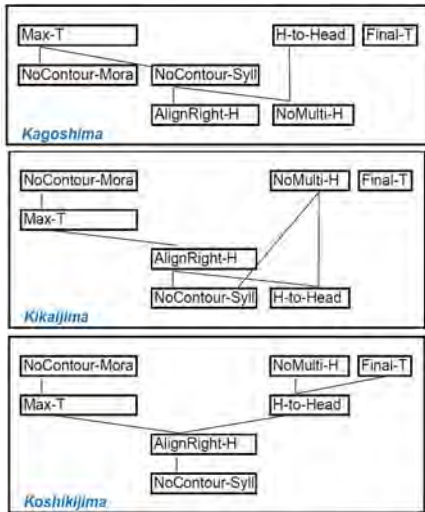
- OTWorkplace (OTW) is a software suite "using Excel as a platform for interactive research with the analytical tools of modern rigorous OT".
- The program is open-source and distributed without charge, downloadable from
- <https://sites.google.com/site/otworkplace/>

29

OTW factorial typology

- With the 7 tonal constraints (above), and relevant candidate sets of words of different prosodic profiles, OTW produces
- 56 distinct languages, 3 of which are Kagoshima, Kikaijima, and Koshikijima

30



31

No variation for the words:
/miyazaki/ and /nagasaki/

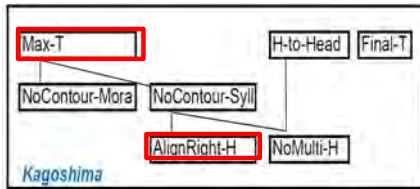
Kagoshima Dialect.	Kikaijima Dialect (Nakasato)	Koshikijima dialect
mi.ya.ZA.ki	MI.ya.ZA.ki	MI.ya.ZA.ki
na.ga.sa.KI	NA.GA.sa.KI	NA.GA.sa.KI

All three dialects have the ranking: Max-T >> AlignRight-H

32

Kagoshima Dialect

Max-T >> AlignRight-H

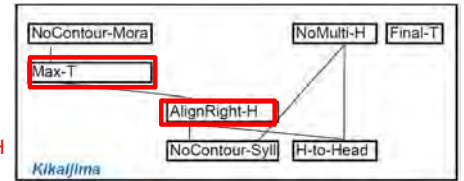


input	output	opt	Final-T	Max-T	NoContour-Mora	NoContour-Syll	AlignRight-H	H-to-Head	NoMulti-H
/miyazaki, HL/	miyaZAKi	WINS		*			*		
	miyaza KI		*!						
	mi Y Azaki		*!				**		
/nagasaki, H/	nagasaKI	WINS					*		
	naga SA Ki		*!						

33

Kikaijima

Max-T >> AlignRight-H

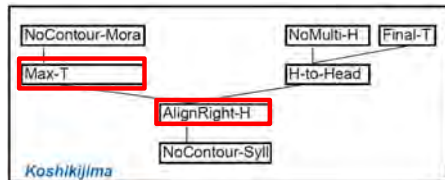


input	output	opt	NoMulti-H	Final-T	NoContour-Mora	Max-T	AlignRight-H	H-to-Head	NoContour-Syll
/miyazaki, HL/	miyaZAKi	WINS				*	*		
	miyaza KI					*!			
	mi Y Azaki			*!			**		
/nagasaki, H/	nagasaKI	WINS					*		
	naga SA Ki			*!			*		

34

Koshikijima

Max-T >> AlignRight-H



input	output	opt	NoMulti-H	Final-T	NoContour-Mora	Max-T	H-to-Head	AlignRight-H	NoContour-Syll
/miyazaki, HL/	miyaZAKi	WINS				*		*	
	miyaza KI			*!		*!			
	mi Y Azaki			*!				**	
/nagasaki, H/	nagasaKI	WINS						*	
	naga SA Ki			*!				*	

35

Kagoshima vs. Kikaijima/Koshikijima

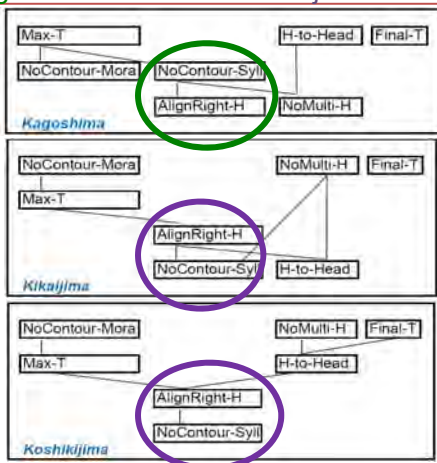
Kagoshima dialect.	Kikaijima dialect	Koshikijima dialect
mi.ya.za.KI.ken	MI.YA.ZA.ki.KEn	MI.YA.ZA.ki.KEn
mi.ya.za.ki.KEN.min	MI.YA.ZA.KI.KEn.MIn	MI.YA.ZA.KI.ken.MIn

NoContour-syll >> AlignRight-H

AlignRight-H >> NoContour-syll

36

NoCONTOUR-syll
active Kagoshima vs. inactive Kikaijima & Koshikijima



37

Kagoshima

input	output	opt	Final-T	H-to-Head	Max-T	NoContour-Mora	NoContour-Syll	AlignR-H	NoMulti-H
/miyazaki-ken, HL/	miyaza KI ken	WINS						**	*
	miyazaki KE n						*!	*	
/miyazaki-ken-min, HL/	miyazaki KE nmin	WINS						**	*
	miyazakiken MI n						*!	*	

Koshikijima

input	output	opt	NoMulti-H	Final-T	NoContour-Mora	Max-T	H-to-Head	AlignR-H	NoContour-Syll
/miyazaki-ken, HL/	miyaza KI ken							**!	*
	miyazaki KE n	WINS						*	*
/miyazaki-ken-min, HL/	miyazaki KE nmin		*!					**	*
	miyazakiken MI n	WINS						*	*

38

Difference in Kikaijima and Koshikijima

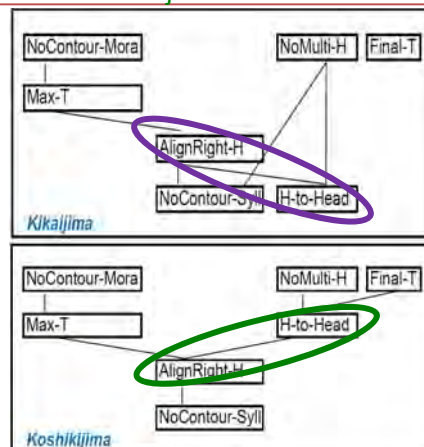
Kagoshima dialect.	Kikaijima dialect	Koshikijima dialect
mi.ya.ZA.ki	MI.ya.ZA.ki	MI.ya.za.ki
mi.ya.za.KI.ken	MI.YA.ZA.ki.KEn	MI.YA.ZA.ki.KEn
mi.ya.za.ki.KEN.min	MI.YA.ZA.KI.KEn.MIn	MI.YA.ZA.KI.ken.MIn
mi.ya.za.ki.KEN.mo	MI.YA.ZA.KI.keN.mo	MI.YA.ZA.KI.KEn.mo

AlignRight-H >> H-to-Head

H-to-Head >> AlignRight-H

39

H-TO-HEAD:
active Koshikijima vs. inactive Kikaijima



40

Kikaijima

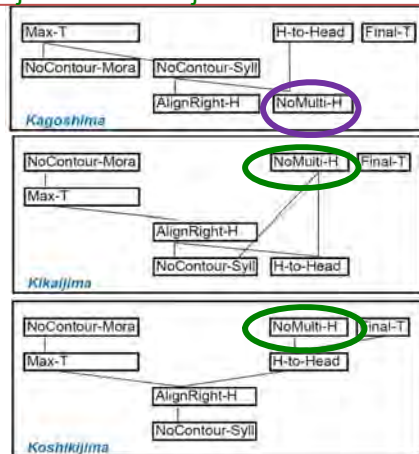
input	output	opt	NoMulti-H	Final-T	NoContour-Mora	Max-T	AlignRight-H	H-to-Head	NoContour-Syll
/miyazakiken-mo, HL/	miyazaki KE nmo		*!				*	*	
	miyazakike N mo	WINS					*	*	(*)
	miyazaki KE nmo						**!	*	*

Koshikijima

input	output	opt	NoMulti-H	Final-T	NoContour-Mora	Max-T	H-to-Head	AlignRight-H	NoContour-Syll
/miyazakiken-mo, HL/	miyazaki KE nmo		*!				*	*	*
	miyazakike N mo						*!	*	*
	miyazaki KE nmo	WINS					**	*	*

41

NoMulti-H
active Kikaijima & Koshikijima vs. inactive Kagoshima



42

Kagoshima

input	output	opt	Final-T	H-to-Head	Max-T	NoContour-Mora	NoContour-Syll	AlignRH	NoMulti-H
/miyazakiken-mo, HL/	miyazaki KEN mo	WINS							*
	miyazakike N mo			*!			(*)	*	
	miyazaki KE nmo						*	**	

Kikaijima

input	output	opt	NoMulti-H	Final-T	NoContour-Mora	Max-T	AlignRH	H-to-Head	NoContour-Syll
/miyazakiken-mo, HL/	miyazaki KEN mo		*!						
	miyazakike N mo	WINS					*	*	(*)
	miyazaki KE nmo						**!	*	

Koshikijima

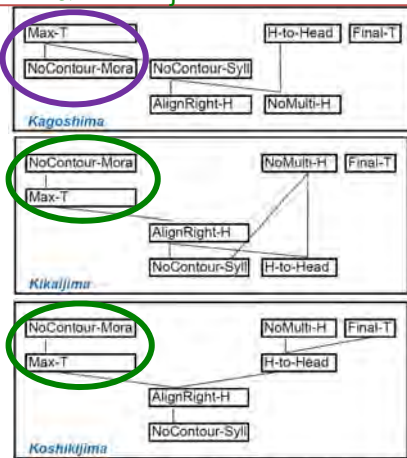
input	output	opt	NoMulti-H	Final-T	NoContour-Mora	Max-T	H-to-Head	AlignRH	NoContour-Syll
/miyazakiken-mo, HL/	miyazaki KEN mo		*!					*	
	miyazakike N mo						*!	*	(*)
	miyazaki KE nmo	WINS					**	**	43

Tonal patterns for short words:

	Kagoshima dialect	Kikaijima dialect	Koshikijima dialect	
HL#	SAn	SAn	SAn	'three'
	Ki (HL): falling on a single mora.	KI (H): no fall on single mora <to be checked>	KI (H): no fall on single mora	'spirit'
H#	SEN	seN	seN	'thousand'
	KI	KI	KI	'tree'

Max-T >> NoContour-mora NoContour-mora >> Max-T

NoContour-mora active Kikaijima & Koshikijima vs. inactive Kagoshima



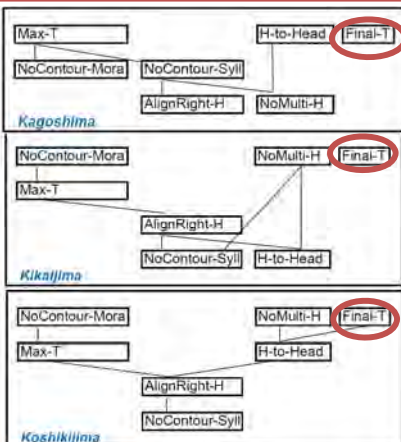
Kagoshima

input	output	opt	Final-T	H-to-Head	Max-T	NoContour-Mora	NoContour-Syll	AlignRH	NoMulti-H
/san, HL/ 'three'	SAn	WINS					*	*	*
	SAN				*!				*
/ki, HL/ 'spirit'	Ki	WINS				*	*	*	*
	KI				*!				*

Kikaijima

input	output	opt	NoMulti-H	Final-T	NoContour-Mora	Max-T	AlignRH	H-to-Head	NoContour-Syll
/san, HL/ 'three'	SAn	WINS					*	*	*
	SAN		*!			*			*
/ki, HL/ 'spirit'	Ki				*!				*
	KI	WINS			*				*

Final-T undominated: H# always on final mora



Kagoshima

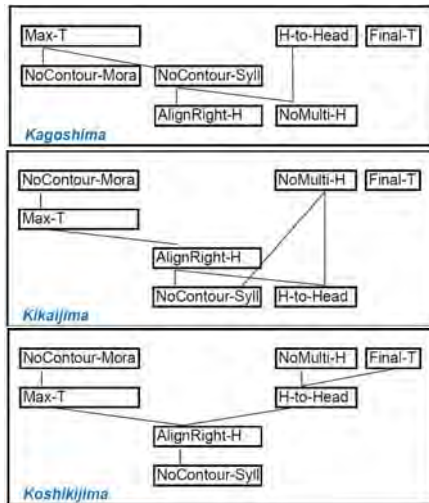
input	output	opt	Final-T	H-to-Head	Max-T	NoContour-Mora	NoContour-Syll	AlignRH	NoMulti-H
/sen, H/ 'thousand'	SEN	WINS						*	*
	SEn		*!				(*)	*	
	seN			*!			(*)		

Kikaijima

input	output	opt	NoMulti-H	Final-T	NoContour-Mora	Max-T	AlignRH	H-to-Head	NoContour-Syll
/sen, H/ 'thousand'	SEN		*!				*	*	(*)
	SEn			*!			*	*	(*)
	seN	WINS					*	*	(*)

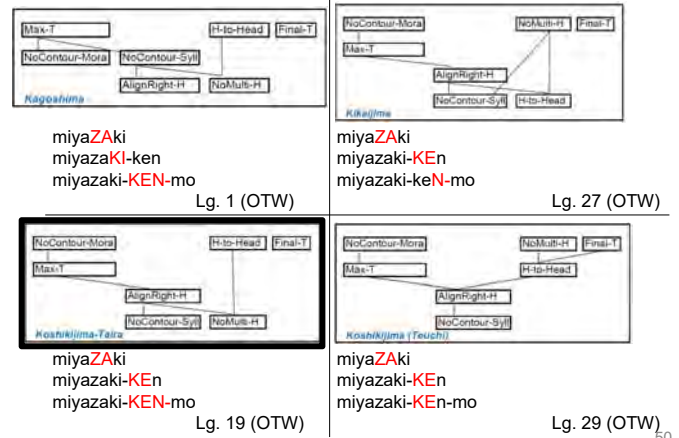
Koshikijima

input	output	opt	NoMulti-H	Final-T	NoContour-Mora	Max-T	H-to-Head	AlignRH	NoContour-Syll
/sen, H/ 'thousand'	SEN		*!					*	(*)
	SEn			*!			*	*	(*)
	seN	WINS					*	*	(*)

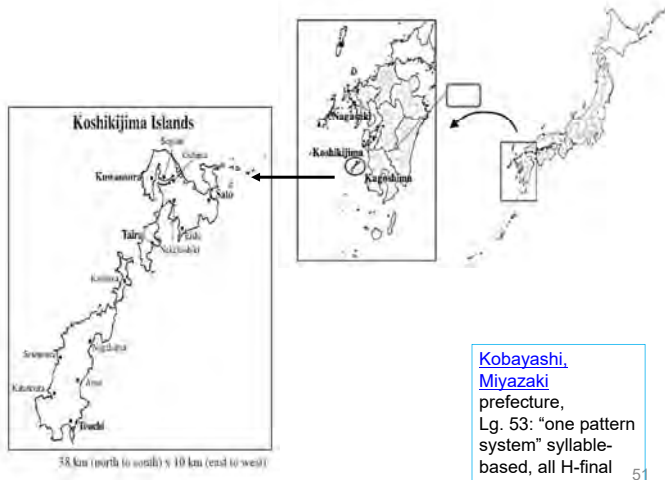


49

Predicted fourth dialect found:



50



51

Conclusion

We focused on the basic “autosegmental” constraints governing accentual melodies:

- tonal alignment (ALIGNRIGHT-H, FINAL-T)
- head licensing (H-TO-HEAD)
- anti-spreading (NOMULTILINK-H)
- NoCONTOUR (σ, μ)
- tonal faithfulness (MAX-T)

52

Conclusion

Descriptive and explanatory goals achieved:

- The accentual microvariation in Kagoshima Japanese dialects discovered in recent work by Haruo Kubozono
 - reveals itself as due to a simple reranking
 - of the basic constraints dealing with the alignment of the accentual melodies HL and H.

53

Conclusion

- Syllable and mora structures are the same in the dialects,
- syllable- vs. mora-counting behavior is not a "parameter setting",
- but follows from the ranking of constraints against tonal contours on moras and syllables.

54

References (incomplete)

- de Lacy, Paul. 2002. The interaction of tone and stress in Optimality Theory. *Phonology* 19, 1-32.
- Goldsmith, John. 1976. *Autosegmental phonology*. MIT, Doctoral dissertation.
- Gussenhoven, Carlos. 2004. *The Phonology of Tone and Intonation*. Cambridge, U.K.: Cambridge University Press.
- Haraguchi, Shosuke. 1977. *The Tone Pattern of Japanese: An Autosegmental Theory of Tonology*. Tokyo: Kaitakusha.
- Kubozono, Haruo. 1988. *The Organization of Japanese Prosody*, Doctoral dissertation, University of Edinburgh. (Published by Kurosio Publishers, Tokyo 1993).
- Kubozono, Haruo. 1989. Syntactic and rhythmic effects on downstep in Japanese. *Phonology* 6. 39-67.

55

References

- Kubozono, Haruo. 1995. Constraint interaction in Japanese phonology: Evidence from compound accent. In *Phonology at Santa Cruz* [PASC] 4, eds. Rachel Walker, Ove Lorentz and Haruo Kubozono. Santa Cruz: Linguistics Research Center, UC Santa Cruz. 21-38.
- Kubozono, Haruo. 2003. The syllable as a unit of prosodic organization in Japanese. In *The Syllable in Optimality Theory*, ed. by Caroline Féry & Ruben van de Vijver. Cambridge: Cambridge University Press. 99-122.
- Kubozono, Haruo. 2009. Japanese Accent. In *Handbook of Japanese Linguistics*, ed. by Shigeru Miyagawa and Mamoru Saito Oxford: Oxford University Press. 165-191.
- Kubozono, Haruo. 2012. Word-level vs. sentence-level prosody in Koshikijima Japanese. *The Linguistic Review* 29. 109-130.

56

References

- Kubozono, Haruo. 2016. Moras and Syllables in Japanese Dialects. Talk delivered at the *JK Workshop on Syllables and Prosody*, NINJAL, Tachikawa, Japan. Oct. 13, 2016.
- Martin, Samuel E. 1952. *Morphophonemics of Standard Colloquial Japanese*. Baltimore: Linguistic Society of America.
- McCawley, James D. 1968. *The Phonological Component of a Grammar of Japanese*. The Hague, The Netherlands: Mouton.
- Pierrehumbert, Janet, and Mary Beckman. 1988. *Japanese Tone Structure*. Cambridge, MA: MIT Press.
- Poppe, Clemens Pieter. 2015. *Word-prosodic Structure in Japanese: a Cross-dialectal Perspective*. Doctoral dissertation, Tokyo University.

57

References

- Poser, William J. 1984. *The Phonetics and Phonology of Tone and Intonation in Japanese*. Cambridge, MA: MIT Doctoral dissertation.
- Prince, Alan S., and Paul Smolensky. 1993(2004). *Optimality Theory: Constraint Interaction in Generative Grammar*. RuCCS-TR-2. Ms. Rutgers University and University of Colorado. Brunswick, New Jersey, and Boulder, Colorado. [Published 2004, Blackwell. Malden, MA.]
- Prince, Alan S., Bruce Tesar and Nazarré Merchant. 2013. OTWorkplace Installer Package. OTWorkplace_X_68a, version of June 3, 2014.
- Yip, Moira. 2002. *Tone*. Cambridge textbooks in linguistics. Cambridge; New York: Cambridge University Press.

58