Tone and Intonation in the Languages of the Caucasus[1]

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1. Introduction

This chapter provides an overview of the issues pertaining to tone and intonation in the languages of the Caucasus. These phenomena are often addressed together, since they rely on pitch movements, and clear-cut distinctions between them can be difficult to make. For instance, it is not always easy to determine if a high tone on a certain morpheme is best analyzed as lexical tone, pitch-based stress (so-called lexical pitch accent), or part of the intonational make-up of a phrase. Many of the issues related to tone and intonation in the languages of the Caucasus require extensive further research. The aim of this chapter, therefore, is to serve as a comprehensive summary of the known facts and existing descriptions that can inform and encourage further investigations, both instrumental and theoretical.

This chapter is structured as follows. Section 2 is dedicated to the various tonal properties that the languages of the Caucasus exhibit or are hypothesized to exhibit. The uncertainty stems from the fact that it is unclear if some of the contrasts are truly tonal (i.e, based on pitch), or rely on other feature(s), such as vowel length, phonation/register, or an articulatory property. The systems considered here range from limited tonal ones, in which only some morphemes are specified for tone (2.1), to languages in which tonal contrasts are made on the stressed syllable only (2.2) to full-fledged tonal systems, in which every syllable is specified for tone (2.3). More complex and/or less clear cases are discussed in 2.4, and the issue of pitch as the main correlate of stress is addressed in 2.5.

Section 3 discusses the suprasegmental properties of the so-called phrasal prominence languages, also known as intonational or intonation-only languages, which rely mainly or exclusively on phrase-level as opposed to word-level prosody. Section 4 further addresses the phrase-level prosodic facts that have been established for some other languages of the Caucasus, based both on impressionistic observations and instrumental studies.

2. Tonal properties

The contentious question of whether tonal distinctions are present in the languages of the Caucasus encompasses several distinct phenomena.

Firstly, Chechen and Ingush have been described as carrying a contrastive high tone on a small number of morphemes. Because most of these morphemes appear in marked information structural contexts (vocatives, imperatives, etc.), it is not immediately clear if this tonal contrast is lexical or phrasal.

Second, numerous Dagestanian languages have been described as possessing tonal contrasts either instead of or in addition to word stress. Such analyses have generated considerable controversy, due to the brevity of the descriptions, scarcity of instrumental studies, and the uncertainty that the contrasts in question are truly pitch-based. Their exact nature is still to be investigated. Further complicating matters, incompatible tonal analyses are available for some languages.

Finally, in the descriptions of stress systems in some languages of the Caucasus it has been mentioned that word stress in them is primarily based on pitch, though few of these descriptions are supported by instrumental evidence. The question they raise is whether these languages can be described as pitch accent ones, or whether such descriptions are just an artifact of a view (that used to be prevalent) that pitch is an acoustic cue necessarily used in marking word stress.

2.1 Limited tonal systems

In closely related Ingush and Chechen, certain particles (proclitics and enclitics) and suffixes bear high (more specifically, rising-falling) tone (H) (Nichols 2011: 43, 104, 709). In Ingush, the proclitics are *mɪ*[2] (prohibitive), *t͡sɪ* (nonfinite negative), *t͡ʃi* 'in, into' and *t'ɪ* 'on, onto':

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      H
      |
(1)   mɪ      jɛ́lxʌ!
      PROH    AGR.cry.IMP[3]
      'don't cry!'                                        (Nichols 2011:104)
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The suffixes specified for high tone include: -*ʌt͡s* (negative in present and imperfect tenses), -*ʌndz*- (negative in witnessed past), -*ʌr* (witnessed past marker), -*ʌd/ad* (non-witnessed tense marker specified for gender), and -*ʌl* (imperative). Enclitics *'ʌ* (chaining particle/ coordinating conjunction), *ji* (NP-coordinating conjunction) and *j/-i:* (interrogative) also bear H (Nichols 2011: 105). See ==Borise-stress (this volume)==, section 5.2, as well as ==Komen et al. (this volume)== for the Chechen facts, and ==Borise-stress (this volume)==, section 5.2 for stress-attracting properties of negative morphemes in other Nakh-Dagestanian languages.

Nichols (2011: 106) shows that H in Ingush cannot be analyzed as an inherent property of all negative morphemes. For instance, while witnessed negative past forms carry H on the negative marker -*ʌndz*- (2a)*,* nearly homophonous negative past participles do not (2b):

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[2] The examples have been converted into the IPA from the transcription standards used in the respective languages. Aspiration is marked in the examples if the source indicates that (non-ejective) voiceless stops and affricates in a given language are aspirated; the degree of aspiration in the voiceless series varies widely between the languages of the Caucasus.

[3] Glosses used (following the Leipzig Glossing Rules and including some additional glosses not listed in the Leipzig Glossing Rules): 2 – second person, 3 – third person, A – agent, ABL – ablative, ABS – absolutive, AGR – agreement, ALL – allative, APPL – applicative, AOR – aorist, CAUS – causative, CV – converb, DAT – dative, EMPH – emphatic, ERG – ergative, EVID – evidential, GEN – genitive, IMP – imperative, INF – infinitive, IO – indirect object, IPFV – imperfective, LOC – locative, M – masculine, NEG – negation, NOM – nominative, OBL – oblique, PL – plural, PRS – present, PTCP – participle, PROH - prohibitive, PROX – proximative, PST – past, PV – preverb, Q – question marker, REFL – reflexive, SG – singular, VOC – vocative. Glosses in examples cited from other work are modified for uniformity.

(2)   H
             |
    a. *qei̯kʌndzʌr* 'didn't invite'

    b. *qei̯kʌndzʌ* 'uninvited'   (Nichols 2011:106)

Neither can H be attributed to properties of certain vowels or syllables – in contrast with the prohibitive particle *mɪ* (3a), the emphatic particle *mɪ* does not bear H (3b):

(3)   a. H
           |
       mɪ   aːlʌ
       PROH say.IMP
       'don't say/tell (it)!'

       b. mɪ   aːl   iː   t͡su̯o
          EMPH   say   Q   3SG.ERG
          '(After all,) he said (it)'.   (Nichols 2011:107)

Therefore, the tonal opposition found in Ingush is that between the presence and absence of H. This tonal specification is independent of stress, although, according to Nichols (2011: 104), H can interact with secondary stress and phrase-level intonation.

For instance, if more than one H is present (e.g., a witnessed past marker *-ʌr* and an interrogative clitic *-iː*, as in (4b)), Nichols (2011: 709) notes: "The clitic has prominent high pitch (so prominent that perhaps it might be analyzed as having secondary stress) except that in tenses with high tone on the ending … the ending keeps its high tone (which is not as high as the usual high pitch of the interrogative clitic) and the interrogative clitic is lower in pitch than the ending, but higher than a postverbal pronoun would be." In (4), the height of H's is marked by a solid line; dashed lines represent the pitch level on non-H-marked syllables:

(4)   a.   —   b.   c.
                                          __   __
         ---   ---   —   ---
                 ---   ---   ---
       diːɛʃ   iː ʔʌ?   diːʃʌr   iː ʔʌ?   diːʃʌr   ʔʌ
       read.PRS Q 2SG.ERG   read.EVID Q 2SG.ERG   read.EVID 2SG.ERG
       'do you read?'   'did you read?'   'you read'

                                                                (Nichols 2011:710)

Complex cases like this are ripe for instrumental study, which is outside of the scope of Nichols' grammar. Another, theoretical caveat to this approach is that it takes H to be correlated with the degree of stress – e.g., the interrogative clitic is hypothesized to carry secondary stress, as in the quote above. Essentially, it makes these two notions, stress and H, dependent on each other. This

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has the potential to obscure the relationship between primary and secondary word stress, H, and phrasal pitch targets, since interrogatives are commonly marked by high pitch targets (though their exact location in an interrogative utterance may vary) (Ladd 1981:389, a.o.). Therefore, the interrogative clitic *-iː* in Ingush might be a locus of phrasal high pitch characteristic of the interrogative context (along with, possibly, other pitch targets that characterize interrogative contexts in Ingush), and not an intrinsic property of the clitic. This would mean that the H-marked particles and suffixes, as described by Nichols, actually include two distinct phenomena: (i) morphemes, intrinsically specified for high tone and (ii) intonational pitch targets, such as pitch accents or boundary tones, realized on particular morphemes, e.g., in interrogative contexts.

To illustrate, facts similar to those found in Ingush have been reported for some other languages of the Caucasus, but they have not been analyzed as possessing tonal contrasts. For instance, in Adyghe, rising pitch is realized on certain morphemes, such as the element *-əj* used in clausal coordination, interrogative morpheme *-a* (*-æ* in Abzakh) and its negative counterpart *-ba* (*-bæ* in Abzakh), as well as the vocative morpheme *-a* (Smeets 1984: 128; Paris 1989: 166). In the existing descriptions, these morphemes have not been viewed as intrinsically specified for tone.

2.2 Tonal contrasts on stressed syllables
V. A. Dybo, A. E. Kibrik, S. V. Kodzasov, S. A. Starostin, and S. L. Nikolaev in their work suggested that numerous Dagestanian languages, as well as Abaza, possess phonemic tone contrasts. According to their descriptions, such languages fall into two groups: those in which only stressed syllables are specified for tone, and those in which every syllable is. A typical tone system includes four tones: H (high), L (low), R (rising), F (falling). This section addresses the languages of the first group: Dyubek Tabasaran, Luchek Rutul, Chadakolob Avar, and Tapanta Abaza. For alternative, non-tonal analyses of these languages, see ==Borise-stress (this volume)==, sections 3 (Tabasaran), 5.1 (Rutul), 7.2 (Avar) and 6.1.2 (Abaza).

In earlier work, a distinction between the stressed syllable carrying tone and a whole word being specified for tone was also made. For example, Kibrik et al. (1978: 44) analyze Chirag Dargwa as specifying stressed syllables for tone, but Kharbuk Dargwa as specifying a word for tone as a whole.

According to the tonal analysis, stressed syllables in Dyubek Tabasaran (marked by an acute accent) are specified for one of the four tones: H (high), L (low), R (rising), F (falling): *gardán* (H) 'neck', *naːráth* (L) 'pine tree', *júkʼu* (R) 'heart', *jákʼa* (F) 'axe' (Kodzasov & Muravyova 1982: 10; Kibrik & Kodzasov 1990: 337). There are no attested minimal pairs based on these tonal contrasts.

Four tonal distinctions are also postulated for stressed syllables in Luchek Rutul: *huqʼúl* (H) 'head', *fétir* (L) 'flatbread', *wirɨ́ɣ* (R) 'sun', *zúba* 'thigh' (F) (Kibrik & Kodzasov 1990:343). Similarly, Kibrik et al. (1978: 44) and Kibrik & Kodzasov (1990: 321) suggest that a four-way tonal contrast is found on stressed syllables in Chadakolob Avar: *nodó* (H) 'forehead', *bat͡s* (L) 'badger', *mat* (R) '(finger/toe) nail', *ʃibí* (F) 'tooth' (Kibrik & Kodzasov 1990: 321). At the same time, some other dialects of Avar are described as non-tonal (Starostin 1978: 88).

Dybo et al. (1978: 17) suggest that two tones, high and low, are distinguished on the stressed syllable in Tapanta Abaza. According to their analysis, high tone is found on so-called dominant morphemes, and low tone corresponds to recessive morphemes (see Borise-stress (this volume), section 6.1.2 for morpheme classification in Abkhaz-Abaza). However, the original analysis was not based on instrumental findings, and instrumental data collected during recent fieldwork (2017-2018) did not lend support to the tonal analysis (Peter Arkadiev, p.c.).

In terms of acoustic correlates, it has been suggested that, at least in some languages, the contrasts are in fact quasi-tonal – i.e., based on a phonetic feature other than pitch. According to this view, what is intuitively appreciated by speakers of such languages as 'high tone' is better described as stiffness of articulators, while 'low tone' corresponds to slackness (Kodzasov 1999a: 997). The uncertainty about the acoustic nature of the supposed 'tones', and scarcity of instrumental investigations have made it difficult to assess the tonal analyses.

2.3 Tonal contrasts on each syllable

Languages of the second group, which make tonal contrasts on each syllable, are typically analyzed as not having word-level stress. Here, too, the descriptions suffer from scarcity of quantitative instrumental investigations.

According to Kibrik & Kodzasov (1990), languages including Budukh, Tad-Magitli Akhvakh, Andi and Tladal Bezhta make tonal distinctions on each syllable. For non-tonal analyses of these languages, see Borise-stress (this volume), sections 3 (Budukh), 7.2 (Akhvakh, Bezhta), and 4.1 (Andi).

Budukh in Kibrik & Kodzasov's (1990: 346) account has a system of four tones: L, H, R, F: *jiz* (F) 'fur', *məm* (H) 'nipple' *azu* (RF) 'molar', *k'ut'un* (LR) 'cheek'. Attested tonal combinations: RF, HH, LL, LR, RH, LH.

The same four-part tonal inventory is proposed for Tad-Magitli Akhvakh (Kibrik & Kodzasov 1990: 323). According to different accounts, various tonal combinations are attested in Akvakh disyllabic words: RF, FF, HF, RL, LL, FR, FL, RR (Kibrik et al. 1978a:44), or HH, LL, HL, HF, RH, RL, RR (Kibrik & Kodzasov 1990: 323). Creissels (2010) suggests that some of these distinctions might be allophonic. See Figure 1 for an example of an Akhvakh tonal contrast from Kodzasov (1999:1000); note a significant difference in amplitude between the two words, in addition to pitch.
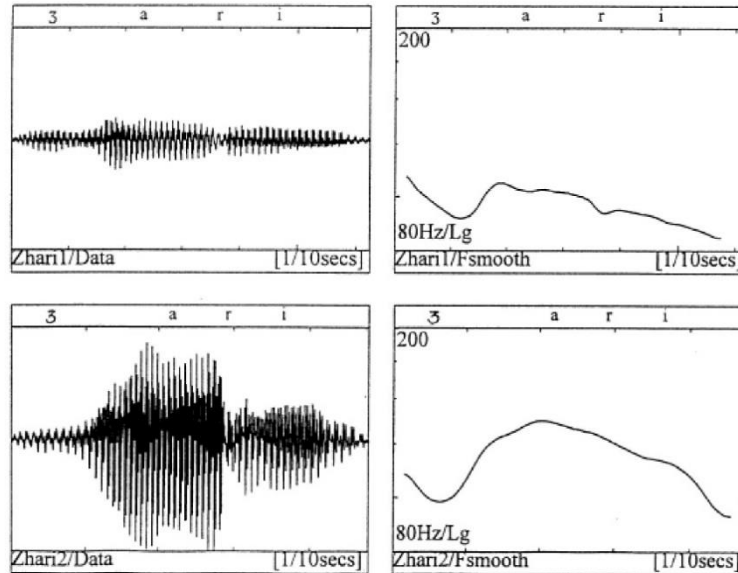
Fig. 1. Tonal contrasts in Akhvakh: ʒari (LL) 'glass' vs. ʒari (RL) 'first' (Kodzasov 1999:1000)

Kibrik & Kodzasov (1990: 322) also postulate a system of four tones for Andi: *seb* (H) 'one', *k:ub* (L) 'iron', *t͡s':un* (R) 'eagle', *q'ir* (F) 'grain'. Attested tonal combinations include: LL, HH, LH, HL, RR, RH, RL, RF, HR, FL.

Finally, Kibrik & Kodzasov (1990: 331) and Kibrik & Testelets (2004: 220) analyze Tladal Bezhta as having a tonal system unusual for Dagestan, with three tones: H, M (mid), and L: *sora* (MM) 'fox', *ãzo* (HH) 'frosting', *biʃe* (LL) 'calf', *t'iga* (HM) 'billy-goat', *ħære* (LM) 'eye'. When suffixes are added, if not specified for tone, they copy the tone of the preceding syllable. At the same time, in their earlier work, Kibrik et al. (1978: 44) analyze Bezhta as having each word specified for tone as a whole.

The stress and tone system in Godoberi is quite complex. Godoberi contrasts with other languages discussed so far: it possesses word stress in addition to a tonal system. For nominals, several accentual paradigms have been proposed, with fixed and mobile stress (Saidova 1973:36; Kibrik et al. 1996:4). While Saidova (1973) identifies Godoberi as possessing stress only, Kibrik et al. (1996: 4) also take each syllable in Godoberi to be specified for tone, H or L. However, even though Godoberi speakers think of this distinction as tonal, Kibrik et al. (1996: 4) and Tatevosov (1999: 239) emphasize that the relevant suprasegmental feature has to do with the stiffness and slackness of articulators and/or spectral properties of vowels, and not pitch.

Combinations of HH, LL and HL but not LH are attested: *íma* (HH) 'father' *rit͡ʃ'á* (LL) 'dear', *oʔót͡ʃa* (HHL) 'hen'. Both H and L can carry stress, but the rules of stress placement have not been established. According to Saidova (1973: 36), stress on the second syllable is most common in Godoberi, as in other Avar-Andic languages, but it is unclear how robust this generalization is for Godoberi. There are stress-based minimal pairs: *basá* 'say/sing.IMP', *bása* 'say.PST.3SG.M': *ámi* 'wooden dish', *amí* 'eat.INF' (Saidova 1973: 39).

Verbal accentual system in Godoberi is much simpler: in Kibrik et al.'s (1996: 6) analysis most verb forms consist of H syllables and have final stress, except for the simple past, which carries an HL pattern and penultimate stress: ʁumí (HH) 'sleep.INF/IMP', ʁumibú (HHH) 'sleep.PST.PTCP.', ʁumatʰabú (HHHH) 'sleep.PST.PTCP.'; ʁúmi (HL) 'sleep.PST'. Certain verbal particles, such as -da, -ssu and negative -t͡ʃi, are presetressing (i.e., require for stress to appear on the immediately preceding syllable) and not specified for tone (Saidova 1973:39; Kibrik et al. 1996:6).

In addition to the H/L distinction, Kibrik et al. (1996: 4) note that some syllables in Godoberi contain an 'impulse of articulatory stiffness', which they identify as H! or L!. Not all lexical items have a syllable of this type, but in those that do it aligns with stress: gédu (H!H) 'cat', buʁałí (HHL!) 'bull.DAT'. The plural morpheme -be often provides an impulse of stiffness and attracts stress, though it is not specified for 'tone': geda-bé (HHH!) 'cat-PL', it͡ʃʰa-bé (HHL!) 'mare-PL' (Saidova 1973:36; Kibrik et al. 1996:6). Finally, Kibrik et al. (1996: 4) identify certain words as specified for breathy voice, which extends over the whole word, and mark it as -B: set'íl (LL-B) 'finger', ziní (HH-B) 'cow'.

2.4 Conflicting descriptions and accounts

There is less clarity about tonal systems in some other Dagestanian languages, due to dialectal variation, conflicting descriptions and scarcity of instrumental investigations.

Dialects of Chamalal have been analyzed as possessing various tonal properties, with some contradictory descriptions. Kibrik et al. (1978: 44) analyze Low Gakwari Chamalal as contrasting four tones (H, L, R, F) on the stressed syllable only, while Kibrik & Kodzasov (1990: 325) describe it as specifying each syllable for one of the four tones, and list a number of tone-based minimal pairs: muna (RR) 'flay.PST.3SG.M', muna (HH) 'go.PST.3SG.M'; has' (H) 'saliva', has' (L) 'wife'; mis' (R) 'tongue', mis' (L) 'nettle'. According to their analysis, long vowels and diphthongs can carry two tones: aː (RL) 'broth', aː (LL) 'pus', aː (HH) 'ear of grain'. In disyllabic words, the following tonal combinations are attested: HH, HL, HF, HR, LL, LH, RR, RL. Finally, Starostin (1978: 88) in his discussion of short vowels in Low Gakwari Chamalal mentions only two tones, R and F.

For Gigatli Chamalal, Kibrik & Kodzasov (1990: 324) postulate both a system of four tones, as in Low Gakwari Chamalal, and word stress. Attested tonal combinations include HH, LL, HL, LH, RL, HR, LR, and HF. Stress targets a syllable with a R or F tone, if a word includes one. Otherwise, stress and tone are not correlated, e.g., bát͡łi (HL) 'intestine.SG' vs. bat͡łí (HL) 'intestine.PL'. For a non-tonal analysis of Gakwari Chamalal, see <mark>Borise-stress (this volume)</mark>, section 6.2.

Kibrik & Kodzasov (1990: 344) describe Mikik Tsakhur as having four tones: gat͡ʃ (H) 'horn', t͡ʃiː (L) 'dew', t'ub (R) 'finger', wok (F) 'pig'. The tones are contrastive only on the first two syllables, with subsequent syllables subject to tonal neutralization. This is reminiscent of the stress window analysis of Tsakhur, according to which word stress targets one of the two initial syllables; see <mark>Borise-stress (this volume)</mark>, section 7.2. Attested tonal combinations include: HH, LL, HL, LH, RR, RL, FH. Final sonorants can carry their own tone, and long vowels can carry two tones: zej (RL) 'urine', t͡ʃ'er (HL) 'hair'; weːɣ (RL) 'part of stomach'. In contrast, Kibrik et al. (1978: 44)

analyze Mikik Tsakhur as specifying words for tone as a whole, but Gelmets Tsakhur as only specifying the stressed syllable for tone.

The Inkhokwari dialect of Khwarshi is sometimes considered a separate language. Nikolaev (2000: 154) reports on collective fieldwork carried out in 1974 with S. A. Starostin, A. E. Kibrik, and S.V. Kodzasov, during which Inkhokwari was described as having phonemic tone. The tonal differences were identified by both fieldworkers and informants and confirmed with instrumental data. However, the brief report in Nikolaev (2000) does not specify if contrastive tonal oppositions in Inkhokwari were found on each syllable or just the stressed syllables. According to Nikolaev (2000), monosyllabic nominals have a three-way tonal distinction, with 'rising', 'falling' and 'rising-falling' tones; the distinction between 'rising' and 'rising-falling' tones might not be phonemic. Disyllabic words are described as making a distinction between 'rising-falling' and 'falling-rising' tonal contours. At the same time, Starostin (1978: 88) Kibrik & Kodzasov (1990: 328) describe Inkhokwari as possessing four tones and no word stress. Monosyllabic words, according to their analysis, most often carry an F tone, while disyllabic ones exhibit an HL tonal pattern.

Starostin (1978: 88), Kibrik et al. (1978: 44) and Nikolaev (2000: 154) also report on collective fieldwork on Tindi performed in 1974, during which Aknada Tindi was tentatively described as possessing three distinct tones: 'rising', 'falling' and 'levelled', which apply to a word as a whole. Other dialects of Tindi were described as having merged the 'rising' and 'levelled' tones and contrasting them with 'falling'. Stress was analyzed as targeting syllables with 'rising' tone. An instrumental investigation, however, revealed that the supposedly tonal distinctions are attributable to the interplay of vowel length and stress. Similarly, the 'tonal' contrasts on the final syllable of mono- and disyllabic words can be explained in terms of vowel length: 'rising' and 'levelled' tones correspond to a long vowel, and a 'falling' tone is reserved for short vowels. Pitch distinctions that also accompany these vowel length contrasts turned out to be weak and unstable (Nikolaev 2000: 155). See also Borise-stress (this volume), section 6.2 for a non-tonal analysis of Tindi.

2.5 Pitch as the acoustic correlate of stress
Descriptions of stress systems of some languages of the Caucasus mention pitch as the main correlate of stress. Such descriptions raise the question of whether the pitch target that is associated with the stressed syllable is an intrinsic property of stress, or part of the phrasal intonational contour; cf. the discussion on Chechen and Ingush in section 2.1. For instance, earlier literature (e.g. Fry (1955), Mol & Uhlenbeck (1956)) mentions pitch as one of the important acoustic correlates of stress, but it has since been established that a pitch peak on the stressed syllable in English, for example, is attributable to an intonational pitch accent and not stress as such. Intonational pitch accents can be especially prominent in certain elicitation conditions, such as words uttered in isolation, often used in older studies; cf. van der Hulst (2014) for a discussion. On the other hand, a pitch peak on the stressed syllable can be a manifestation of lexical high tone H associated with the stressed syllable, and, as such, an intrinsic property of stress, in so-called lexical pitch accent languages. In such languages, there is a minimal tonal opposition between stressed syllables, specified for H, and unstressed syllables, unspecified for tone. The two theoretical approaches, however, can be difficult to tease apart; see Hyman (2006; 2014) and van

der Hulst (2011; 2014) for a range of arguments pertaining to these issues. Which of the two analyses fits best the languages of the Caucasus discussed in this section is yet to be established.

Chechen stress is described as being accompanied by high pitch, though this has not been verified instrumentally (Desheriev 1960: 101; Komen 2007a: 2). The Munib dialect of Andi has been reported to have word-level stress characterized primarily by high pitch as opposed to intensity or length (Tsertsvadze 1967: 279). Authier (2009: 26) notes that stressed syllables in Kryz are pronounced with rising-falling intonation, but rejects the idea that Kryz is a tonal language. There are also reports that some dialects of Avar have primarily pitch-based stress (Gabdulaev & Sulejmanov 1965: 34). Schulze (1997: 22) describes Tsakhur stress as accompanied by high pitch but does not support a tonal analysis of Tsakhur.[4] In some dialects of Laz, such as Atina (today's Pazar) and Ahavi (Chikobava 1942: 302), as well as Batumi (Adjarian 1899: 99), a high tone regularly appears on the penultimate syllable. It is unclear if it is attributable to word stress or phrasal prosody. Chikobava (1942: 302) hypothesizes that Laz used to have pitch-based stress at an earlier stage. Chikobava (1924: 339) also reports that in Mtiuli Georgian, the penultimate syllable has increased duration and a 'musical' tone on it, which he analyzes as a *Tonakzent*. Zhghenti (1958: 262; 1963: 149), too, notes that penultimate stress in Mtiuli speech is characterized primarily by pitch movement and not a peak of intensity, unlike in the Khevsuri and Mokheuri Georgian dialects, where stress relies primarily on intensity.

3. Phrasal prominence languages
In some languages of the Caucasus, phrasal prosodic phenomena, such as prosodic phrasing/grouping and the distribution of phrasal pitch targets, play a crucial role, either in addition to word-level stress or instead of it.

3.1. Ossetic
For word stress placement in Ossetic, see Borise-stress (this volume), section 4.2. However, the phenomenon that is described as word stress in the traditional literature on Ossetic in connected speech is in fact assigned within a prosodic group/phrase as opposed to a lexical/prosodic word (Abaev 1924; 1939: 96; Bagaev 1965: 62; Isaev 1959: 65; Testen 1997: 728). Prosodic groups/phrases are determined in the context of a larger utterance; within a prosodic group, stress is realized on the first word, and omitted in all other words. Prosodic grouping applies to the following elements (Abaev 1939: 116):

    i.   Nouns and their modifiers;
    ii.   Nouns and postpositions;
    iii.   Verbal negation/n-words and verbs;
    iv.   Wh-words and verbs;[5]

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[4] Additionally, different phonations/registers, such as palatalization, labialization or pharyngealization can span a number of syllables in Tsakhur and constitute a contrastive suprasegmental feature (Schulze 1997: 22; Kodzasov 1999b: 19). Their location also interacts with stress: they most often apply to the syllables to the right of the stressed one (Schulze 1997: 22).

[5] Pronominal clitics and certain particles can surface between the elements in cases (iii) and (iv) and be part of the prosodic group too.

v. A preverbal element (subject, direct or indirect object, or adverbial) and the verb (optionally, depending on the semantics and pragmatics of the utterance).

Certain complementizers and pronominal clitics following these elements can remain stressless and not be part of any prosodic group. The same is true of parentheticals and vocatives (Abaev 1939: 107; Bagaev 1965: 64).

Changes to prosodic phrasing can change the meaning of the utterance:

(5) c. (kʰɜʃgón) (gál-tʰɜ ɜrbá-tʰard-tʰa) (báʒar-mɜ).[6,7,8]
     Kabardian bull-PL.NOM PV-drive.PST-PST.3SG market-ALL
     "A Kabardian drove bulls to the market"

    d. (kʰɜʃgón gal-tʰɜ) (ɜrbá-tʰard-tʰa) (báʒar-mɜ).
     Kabardian bull-PL.NOM PV-drive.PST-PST.3SG market-ALL
     "(S/he) drove Kabardian bulls to the market" (Isaev 1959:65-66)

Retraction of stress from a noun onto a preceding modifying adjective in Ossetic is used to signal definiteness (6).[9] The same picture is obtained in Digor Ossetic (Abaev 1949: 386; Takazov 2009: 34).

(6) a. ɜ́ʒ bá-lχɜd-tʰon t͡s'ɜχ á**χorɜn.**
     1SG PV-buy.PST-PST.1SG blue paint
     'I bought (some) blue paint'

    b. ɜ́ʒ bá-lχɜd-tʰon **t͡s'ɜ́χ** aχorɜn.
     1SG PV-buy.PST-PST.1SG blue paint
     'I bought the blue paint' (Bagaev 1965:62)

The fact that only the head word (the one that is modified by other elements) within a prosodic phrase/group keeps its stress, while other words lose theirs, raises questions about the nature of Ossetic word stress. Specifically, it is unclear whether Ossetic has true word stress, which is assigned to a lexical item and disappears when individual lexical items are grouped into prosodic phrases, or whether Ossetic has phrasal stress only, which is assigned to the head of the prosodic group. The latter approach leads to a simpler analysis of the Ossetic stress facts, based on their descriptions in the literature. It is adopted by Abaev (1939), who suggests that Ossetic is best

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[6] Many thanks to David Erschler for his help with the Ossetic examples.
[7] Following Dzakhova (2013), ɜ is used here to render the sound represented by letter <æ> in the Ossetic Cyrillic script, as opposed to æ, traditionally used in transliterating Ossetic, in order to avoid confusion with the IPA /æ/. Note that Erschler (this volume) uses ɐ for <æ>. I thank Oleg Belyaev for bringing this issue to my attention.
[8] Transliteration used for the Ossetic examples reflects the current pronunciation: /ʃ, ʒ, s, z/ are used were older sources use /s, z, t͡s, d͡z/, respectively; see also Dzakhova (2013: 63). Thank you to David Erschler and Oleg Belyaev for bringing this issue to my attention.
[9] This process is similar to the retraction of stress to the first syllable in nouns, which is also used to signal definiteness; see Borise-stress (this volume), section 4.2. The productivity of this phenomenon is disputed: it is argued for in Testen (1997: 729) and Dzakhova (2010:12) and contested by Cheung (2002: 118) and Erschler (this volume).

analyzed as possessing phrasal stress only (*Satzakzent*). Most literature on Ossetic (Isaev 1959, 1966; Bagaev 1965; Dzakhova 2010), however, takes it to have word stress.

3.2 Georgian

The existence and placement of word stress in Georgian has been a matter of debate, and a considerable amount of literature has been amassed on the topic; for an overview of earlier work, see, e.g., Zhghenti (1965a). For an overview of the prosodic properties of Georgian dialects, see Gamqrelidze et al. (2006).

The existing accounts of Georgian suprasegmental properties fall into three main categories: (i) those that advocate for word stress, (ii), those that advocate for phrasal stress (i.e., for Georgian being a phrasal prominence language), and (iii) those that suggest that Georgian has both.

3.2.1 Word stress approaches

Accounts advocating for the existence of word stress in Georgian vary according to whether they take main stress to target the initial, antepenultimate, or penultimate syllable. Some of the accounts allow for variation between these stress loci and/or appearance of secondary stress on one of them. According to Tschenkeli (1958: LX), Georgian stress targets the initial syllable in di- and trisyllabic words, and is harder to locate in longer words, though there, too, it is often initial. Tevdoradze (1978: 40) also describes Georgian as having fixed initial stress, but notes that secondary stress may occur in longer words. Specifically, in words of four syllables, secondary stress targets the penult, in five syllable long ones – the antepenult, in six syllable long ones – the antepenult or the fourth syllable from the end.

Antepenultimate stress placement is advocated, among others, by Ioseliani (1840: 145), Gorgadze (1912: 3), Akhvlediani (1949: 135) and Gudava (1969: 106). Gorgadze notes that in longer words/phrases, the first syllable receives secondary stress; exceptionally, if the antepenultimate syllable consists of a vowel only, stress targets the fourth syllable from the end: *sáidumlo* 'mystery', *miirbina* '(he) came running' (Gorgadze 1912:3).

Avanesov (1956: 69) in his overview of stress systems lists Georgian as having penultimate stress. Zhghenti (1958: 262) describes the Khevsuri and Mokheuri dialects of Georgian as having penultimate stress. At the same time, because he discusses, among other phenomena, penultimate stress placement before a question particle *-a* (*qat͡ʃaɣád-a?* 'bandit-Q?', *vín-a?* 'who-Q?'), it is unclear if the phenomenon at hand should be analyzed as word stress or phrasal stress.

In numerous accounts, Georgian stress placement is described as dependent on syllable count. According to Marr (1925: 13) and Rudenko (1940: 24), stress is initial in disyllables, and antepenultimate or penultimate in longer words. In words over four syllables long, a secondary stress on the initial syllable is possible; both are obligatory in words over six syllables long. Dirr (1904: 3), Janashvili (1906: 5) and Akhvlediani (1949: 132) place stress on the first syllable in disyllables and/or trisyllables and on the antepenult in longer words; Dirr also notes that these rules apply regardless of the morphological makeup of a word. According to Aronson (1990: 18), in words of four syllables or fewer, stress falls on the antepenult or the initial syllable, while in longer words both the initial syllable and the antepenult are stressed. Finally, according to Hewitt (1995:

28), in trisyllabic words the antepenult takes the stress; in longer words, stress is either antepenultimate or initial.

It seems that the accounts that posit initial stress in shorter words and (ante)penultimate stress in longer words can be straightforwardly subsumed under a single account that posits antepenultimate stress. According to such an analysis, stress in disyllabic words, for the lack of an antepenultimate syllable, would target the initial syllable. Some evidence against this seemingly more economical analysis comes from a recent instrumental study, Borise & Zientarski (2018); see section 4.2.2.

3.2.2 Phrasal prominence approaches
The uncertainty that surrounds the accounts of Georgian word stress might suggest that there is no such phenomenon in Georgian. Instead, the prominence found on some syllables might be attributable to phrasal prosody, as has been suggested for French (Vaissière 1983; Féry 2001). Some evidence supporting this view comes from traditional Georgian poetry, which is based on syllable count and not alternation of stressed and unstressed syllables (Gachechiladze 1966). The same view - that the domain of stress assignment in Georgian is a phrase and not a word – has also been expressed in the literature, and goes back to Gorgadze's (1912: 13) 'syntactic groups' and Marr's (1925: 14) 'accentual complexes' as domains of stress. Chikobava (1942: 302) agrees that in contemporary Georgian, word stress is considerably weaker than phrasal stress. According to Zhghenti (1953: 162), too, stress in Georgian is a property of a 'rhythmic group' and not individual words. Zhghenti (1963: 144) also expresses the idea that individual words lose their stress when they become part of an intonational phrase, as in French; cf. also Ossetic in section 3.1. A similar view is expressed in Tschenkeli (1958: LXI). Furthermore, Zhghenti (1963: 144) suggests that the difficulty of identifying word-stress in Georgian stems from the fact that the phrasal nature of Georgian stress is not recognized; in other words, that the nature of Georgian stress can only be accounted for if it is recognized as a property of prosodic phrases and not individual words.

3.2.3 Mixed approaches
Finally, some analyses aim to combine the word and phrasal prominence approaches. Jun et al. (2007) and Vicenik & Jun (2014: 156) report on a preliminary production study that found that the initial syllable in Georgian is characterized by higher intensity and longer duration, regardless of syllable count. They also report an HL tonal contour that spans the antepenult and penult, which they take to be a manifestation of phrase accent. Based on these results, they suggest that word stress in Georgian is fixed on the initial syllable, while the antepenult and penult are loci of intonational pitch targets. Borise & Zientarski (2018) come to a similar conclusion; see section 4.2.2 for the instrumental results. An important theoretical question that these proposals raise is where the line between word and phrasal prosodic prominence lies, and whether making such a distinction is meaningful in languages like Ossetic or Georgian.

Furthermore, data from both Ossetic and Georgian show that prosodic grouping/phrasing is one of the key prosodic phenomena in these languages. This has also been noted for other languages of the Caucasus, though the function of prosodic grouping varies from language to language. In Ossetic, focused words, like wh-phrases, occupy the preverbal position and create a single prosodic group together with the verb (cf. Abaev 1939:118 for a detailed discussion). In contrast, no

postverbal element can be prosodically grouped with the preceding verb (Abaev 1939: 119). Similarly to Ossetic (and Georgian, as will be shown below), in Chechen, focused and wh-elements are grouped together with the final verb (Komen 2007b), which seems to be a prominence-lending strategy. In contrast, in Ingush, prosodic grouping is an automatic process that applies to any two words that are final in an utterance (often the direct object and the verb), or form an utterance by themselves, regardless of their syntactic properties (Nichols 2011: 453). The properties and functions of prosodic grouping in the languages of the Caucasus, therefore, require further investigation.

4. Phrasal intonation

Phrasal prosody of the languages of the Caucasus has not received much attention in the literature. In the existing descriptions, the information about intonational and prosodic properties of these languages is often based on impressionistic observations and is quite limited in scope. With the advance in recording techniques and wider availability of easily portable high-quality recording equipment, the situation is changing, but most work is still to be done. This is especially true for Dagestanian and smaller Kartvelian languages. In this section, an overview of the existing descriptions of phrasal prosody of the languages of the Caucasus is offered, with impressionistic observations (often limited to the prosody of yes/no-questions, YNQs, and wh-questions, WHQs) summarized in section 4.1, and the existing instrumental studies discussed in 4.2.

4.1 Impressionistic observations

Among the Kartvelian languages, in Mingrelain YNQs there is strong prominence on the penultimate syllable of the question, which precedes the question particle -o: *midartu-o?* 'did he leave? (Kipshidze 1914: 14; Amirjebi-Mullen, Danelia & Dundua 2006: 89). In Laz questions, the question-final particle -*i* receives high tone, or, if lengthened, might attract stress as well (Amirjebi-Mullen, Danelia & Dundua 2006:89; Öztürk & Pöchtrager 2011:155). If the interrogative particle is absent, YNQs typically end in a high tone; if the question particle is present, the YNQ can end in a high or low tone, or a low-high-low tonal contour. WHQs typically end in a high tone; see Öztürk & Pöchtrager (2011: 146) for a detailed overview. In Svan, the question particle *ma:* is targeted by a special tonal contour, which, combined with a special contour at the end of the question, creates a prosodic pattern characteristic of questions (Zhghenti 1960: 107).

Little is known about the prosody of Nakh-Dagestanian languages. For Mehweb Dargwa, the only intonational property reported is the existence of a special 'calling contour', which can be used with disyllabic words denoting human beings; cf. Ladd (1978; 2008:103) for the 'calling contour' in English. Moroz (2016: 27) notes that at present it is unclear whether the 'calling contour' should be analyzed as exceptionally carrying stress on the initial syllable (since stress is fixed on the second syllable in Mehweb; cf. Borise-stress (this volume), section 3), or as carrying another pitch target, such as a pitch accent or a boundary tone, on the initial syllable: *adáj* 'father', *ádaj!* 'father.VOC'. Kibrik et al. (2001: 47) note that in Bagvalal YNQs the syllable preceding the question particle -*jʃ* has high tone. In WHQs, the final syllable of the wh-word typically has a falling tone. Polinsky (2015) addresses the intonation of WHQs in Tsez, noting that regardless of the position of the wh-word in a WHQ, it is accompanied by prosodic prominence, and a fall in

pitch on the following material. Finally, in Tsakhur, the question particle *-ne,* found in YNQs and WHQs, is marked by a pitch peak, while the negative particle *deʃ* is marked by a drop a pitch; see Kodzasov (1999b: 25) for more details and some instrumental data. Desheriev (1953: 242) observes that in Batsbi, the question particle *-i* is accompanied by a rise in pitch, and in YNQs that do not include *-i*, the first syllable of the predicate carries high pitch; cf. Chechen & Ingush facts in section 2.1.

Smeets (1984: 128) makes some general observations about Adyghe prosody, and notes that when the predicate is not in its typical sentence-final position, both the predicate and the sentence-final element are realized with a low pitch pattern typical of the right-edge of a sentence; cf. also Paris (1989: 179). Adyghe YNQs receive the same intonation as declaratives, as long as the utterance is morphologically marked as a question, either by an interrogative affix on the verb or by the absence of the affirmative affix, depending on tense; cf. Kabardian facts in 4.2.1. Rise in pitch on the final syllable of the predicate is reserved for indicating surprisal (Jakovlev & Ashkhamaf 1941: 18; Balkarov 1970: 39).

4.2 Instrumental studies
4.2.1 Kabardian
Among the North-West Caucasian languages, the prosody of Kabardian has received the most attention in the literature. This is true both of the varieties spoken in Russia and especially those spoken by the extensive diaspora in Turkey.

Applebaum & Gordon (2007) provide an initial description of Turkish Kabardian phrasal prosody in a small study involving six speakers and various utterance types, including declaratives, questions, imperatives, and focus constructions. An inventory of boundary tones and pitch accents is proposed and illustrated with examples. The pitch peak on nominals bearing focus in Turkish Kabardian is aligned with the syllable carrying stress, unlike in an analysis of Ulyap Kabardian, discussed below. There is evidence for an initial boundary tone %L, which is somewhat less common typologically than final boundary tones.

An absence of a final rise and an overall falling contour is reported for YNQs in Kabardian, both spoken in Turkey (Applebaum & Gordon 2007) and Russia (Paschen 2014). That is not to say, however, that statements and questions receive identical prosody. In a perception study, Applebaum (2010) showed that the final boundary tone L% in questions is lower than in declaratives, and the fall from the stressed syllable is steeper:
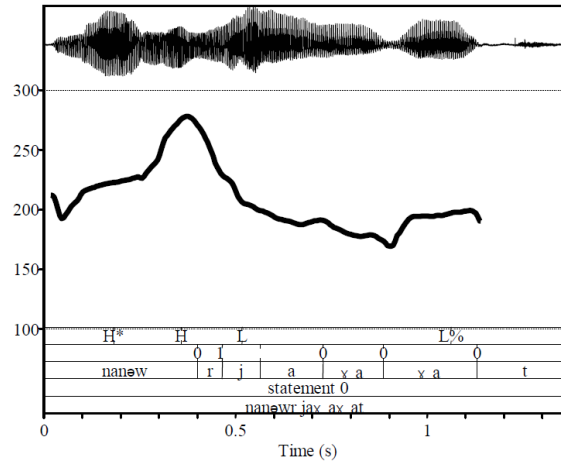
Fig. 2: Statement intonation in Turkish Kabardian: /nanəwr jaɣaɣat/
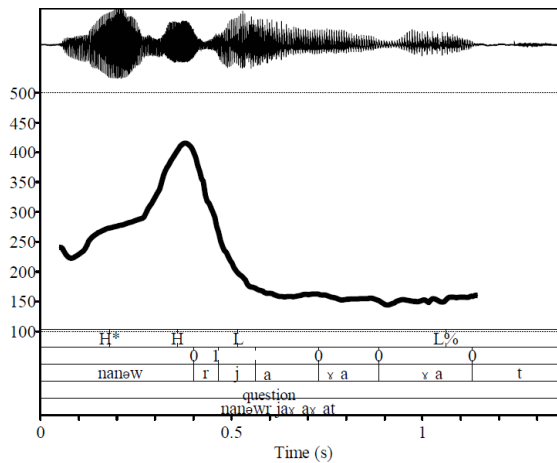*'they made the baby cry' (Applebaum 2010)*

Fig. 3: Question intonation in Turkish Kabardian: /nanəwr jaɣaɣat/ 'did they
make the baby cry? (Applebaum 2010)

Applebaum (2013) provides a thorough overview of Kabardian phrasal prosody. Her main conclusion is that finite verbs in Kabardian are the locus of most salient prosodic phenomena, both at their left and right edges. Specifically, finite verbs are marked by a high initial pitch reset, low final boundary tone, and longer pauses following them. Non-finite verbs are marked with a low initial pitch reset, a high final boundary tone and a shorter following pause. Lexical items other than verbs show levelled pitch both on their initial and final syllables, and shorter pauses following them. Based on these facts, Applebaum proposes a hierarchy of prosodic units for Kabardian: prosodic word, intonation unit, and prosodic sentence. A prosodic sentence typically corresponds to a clause (which usually ends with a finite verb), an intonation unit is a subpart of a clause that ends in a non-finite verb[10], and a prosodic word is a lexical word.

Some typologically unusual prosodic processes are operative in Kabardian. A complex made of a reduced relative clause (consisting of multiple roots) and its head can be pronounced as a single

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[10] Though "a non-finite verb with no noun phrase argument is like a prosodic word" (Applebaum 2013: 195).

prosodic word (Applebaum 2013: 108). Similarly, a process of so called 'prosodic fusion' is found in Kabardian: two lexical roots can fuse to form a single prosodic word in order to satisfy the minimality requirement on a possible word. The resulting word is phonologically parallel to a prosodic word containing a single root (Gordon & Applebaum 2010):

(7)   qʷɐ   + fʼə   →   qʷɐfʼ
        'pig' + 'good'   →   'good pig'   (Gordon & Applebaum 2010)

Turning to Kabardian spoken in Russia, Paschen (2014) reports on a study of prosody of Ulyap Kabardian, involving five informants and four information-structural contexts: neutral statements, WHQs, lists, and YNQs with narrow focus on one of the nominals. Paschen offers a ToBI analysis (Tone and Break Indices; Beckman & Hirschberg (1994)) of the obtained results and proposes a tonal inventory for Ulyap Kabardian. The key finding of the study is that nominals bearing narrow focus are marked by a very high tonal peak (up to 400Hz in the examples provided) on the first syllable, which is not necessarily aligned with predicted stress placement. In (8), *adəɣábzɐ*[11] 'Adyghe language' is expected to carry stress on the penultimate syllable, but, instead, there is a prominent tonal peak aligned with the initial syllable:

(8)   Fatjəmɐ Asɬɐn   **adəɣa+bzɐ**   mə   kabjənjɐtə-m
        Fatima   Aslan   Adyghe+language$_{FOC}$PROX classroom-OBL
        ʃʲə-r-jə-ʁa-ş̂ʼɐ-tɐ-r?
        LOC-IO.APPL-3SG.A-CAUS-know-IPFV-ABS
        'Was it Adyghe that Fatima taught Aslan in this classroom?'   (Paschen 2014: 790)

Paschen (2014) analyzes this phenomenon as a stress shift that takes place in focus contexts, citing a similar phenomenon in Turkish (Özge & Bozsahin 2010: 142). However, it is unclear if this phenomenon should be treated as a shift of stress; the height of the peak, which reaches much higher than any other tonal targets in the utterance, suggests that it might be a pitch accent or a boundary tone specifically used to mark prosodic prominence in focal contexts.

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[11] Applebaum's (2013) system of transcribing Kabardian vowels (from low to high: /a, ɐ, ə/) is used here for both Turkish and Ulyap Kabardian.
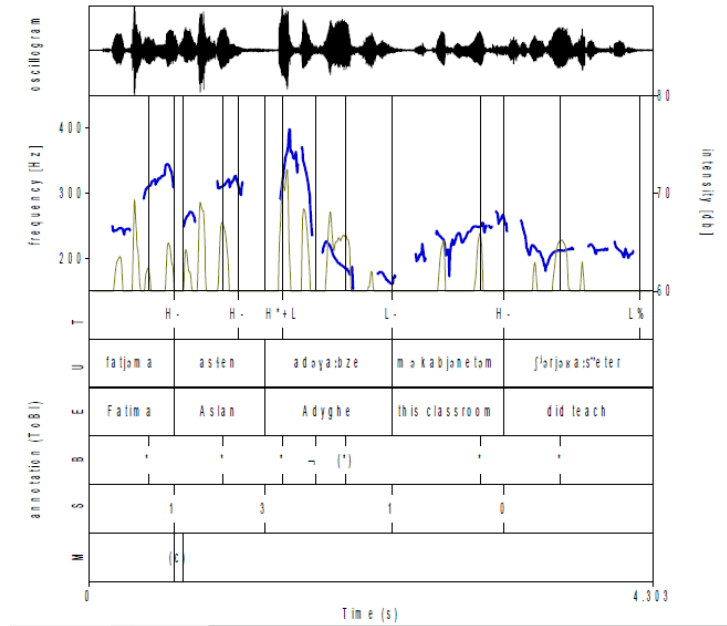
Fig. 4. Intonation of a YNQ with focus on adəɣabzɐ *'Adyghe language' in Ulyap Kabardian (Paschen 2014)*

4.2.2 Georgian

Instrumental studies of Georgian suprasegmental properties are numerous, ranging from those targeting word stress to those investigating phrasal prosody, but since the two can be hard to tease apart, many studies address both. This section starts with the studies primarily dedicated to word stress and proceeds to those mainly concerned with phrasal prosody.

Selmer (1935) reports on one of the earliest instrumental investigations of stress in Georgian, based on recordings of a Georgian speaker pronouncing 27 Georgian words, some iterated twice, of variable syllable counts (2σ: n=20, 3σ: n=6, 4σ: n=1). According to the results, the initial syllable invariably carries an F0 peak, though it can be insignificant compared to F0 on subsequent syllables. Duration measurements show that in disyllabic words, the two syllables are almost equal in duration, while in trisyllabic words the second syllable is the shortest, with the initial syllable and the ultima being comparable in duration. Selmer cautiously interprets his results as consistent with Vogt's assessment, later published as Vogt (1936; 1971), in that di- and trisyllabic words are stressed on the initial syllable, but, notably, Selmer himself refrains from making conclusions about stress placement in Georgian, discussing only the distribution of F0 peaks and rhythmic patterns. It is worth noting that Selmer's duration results contrast with those in Borise & Zientarski's (2018), according to which the initial syllable has greater duration than all subsequent ones. This is likely due to the fact that Selmer's stimuli were not embedded in carrier phrases, and, as such, were subject to phrase-final lengthening.

According to Zhghenti's (1953; 1959) investigation, based on a production experiment, the initial syllables in Georgian words (i.e., all syllables up to the final two) are high in prominence (pitch and intensity), and the final two syllables (final one in disyllables) are less prominent. These results are based on the analysis of pitch-tracks of individual words 2-6 syllables long (2σ: n=6, 3σ: n=6,

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4σ: n=7, 5σ: n=4, 6σ: n=2). The total number of stimuli or speakers is not reported. Zhghenti's results and their interpretation are summarized below:

σ count	Stressed σ	Prosodic make-up
2σ	1st	1st σ accompanied by high pitch and intensity; pitch drops on the 2nd σ.
3σ	1st	1st σ accompanied by high pitch and intensity; pitch drops on the last two σ's, intensity drops on the last syllable.
4σ	1st & 2nd	1st & 2nd σ's accompanied by high pitch and intensity; pitch drops on the last two σ's, intensity drops on the last syllable.
5σ	unclear	First three syllables accompanied by high pitch and intensity; pitch drops on the last two σ's.
6σ	unclear	First four syllables accompanied by high pitch and intensity; pitch drops on the last two σ's.

Table 1. Stress placement in Georgian according to syllable count (Zhghenti 1953, 1959)

Robins & Waterson (1952:58) come to a different conclusion about Georgian stress placement, based on data collected from one speaker (number of stimuli not reported). According to their results, word stress in Georgian is characterized by a certain rhythmic pattern, with alternating non-adjacent syllables carrying stress (Table 2). They also note that in words with multiple stresses, the one on the initial syllable, if present, is secondary:

σ count	Stressed σ
2σ	1st
3σ	1st or 2nd
4σ	2nd or (1st & 3rd)
5σ	(1st & 3rd) or (2nd & 4th)
6σ +	1st & antepenult

Table 2. Stress placement in Georgian according to syllable count (Robins & Waterson 1952)

Finally, Borise & Zientarski (2018) in their investigation of Georgian stress report on two pilot studies. In the first one, a native speaker of Georgian was recorded pronouncing a set of Georgian words (n=179) of CV structure, 1-6 syllables long, embedded in carrier phrases. The results show that the initial syllable in di- and trisyllabic words has significantly greater duration than the subsequent syllables, but this effect disappears in words of four or more syllables.

σ no. → σ count ↓	1st σ	2nd σ	3rd σ	4th σ	5th σ	6th σ
1 σ	350					
2 σ	264	226				
3 σ	225	207	208			
4 σ	198	191	192	189		
5 σ	186	183	180	173	167	
6 σ	181	190	182	185	178	155

Table 3. Average syllable duration in words 1-6 syllables long (ms) (Borise & Zientarski 2018)

The initial syllable in words of any length is not marked by a significant F0 event. Borise & Zientarski interpret these findings as evidence in favor of duration-cued word stress, fixed on the initial syllable, with an independent process, such as polysyllabic shortening (Lehiste 1972), possibly responsible for the lack of the same durational effect on the initial syllable in longer words.[12]

In terms of tonal movements, the words in the same dataset are consistently marked by a pitch peak on the final syllable. This contrasts with Zhghenti's results above, most likely because the words in Borise & Zientarski's study are embedded in carrier phrases, and, as such, are marked by utterance-medial (rising) rather than utterance-final (falling) tonal contour. Consistently with Jun et al. (2007) and Vicenik & Jun (2014), Borise & Zientarski interpret this tonal movement as a boundary tone rather than a manifestation of word stress.

σ no. → σ count ↓	1st σ	2nd σ	3rd σ	4th σ	5th σ	6th σ
1 σ	187					
2 σ	167	191				
3 σ	169	169	198			
4 σ	166	164	170	198		
5 σ	166	162	165	166	201	
6 σ	174	167	169	168	168	197

Table 4. Average F0 values per syllable in words of 1-6 syllables (Hz) (Borise & Zientarski 2018)

Finally, no significant durational or F0 event marking antepenultimate syllables was detected. This finding does not lend support to the antepenultimate stress hypothesis mentioned in section 3.2.1 as a possible way to unify the stress placement rules in longer and shorter words.

The second pilot study included into Borise & Zientarski (2018) tests the hypothesis that the final two syllables in a Georgian prosodic phrase are dedicated to phrasal tonal movements. This hypothesis is derived from the contrast between Zhghenti's (1953, 1959) results and the first experiment included into Borise & Zientarski (2018), discussed above. Specifically, the fall in prominence on the final two syllables in Zhghenti's study is attributable to the phrase-final status of words uttered in isolation, while the final rise that Borise & Zientarski note in their stimuli is due to their utterance-medial position. To test the hypothesis that the final syllables in Georgian are reserved for the expression of phrasal tonal movements, Borise & Zientarski analyze the tonal contours of predicates extracted from YNQs (n=27) and WHQs (n=46). Predicates extracted from questions were selected as the object of investigation since they had been identified as the loci of several phrasal tonal targets (Borise 2017).

According to the results, predicates in YNQs, regardless of syllable count, are characterized by a significant drop in pitch on the penultimate syllable, followed by a steep rise on the ultima. Predicates of any length embedded in WHQs are also characterized by a drop in pitch on the penult, with the drop becoming even steeper on the ultima. These results provide further support for the hypothesis that the final two syllables of a word are reserved for phrasal intonational pitch targets.

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[12] A larger study with six speakers (Borise, to appear) shows the durational effect more consistently in longer words.

These tonal targets, according to Borise & Zientarski, should not be confused with the fixed initial stress in Georgian, cued by duration.

Other studies concentrate on the phrasal nature of Georgian stress more explicitly and suggest that its placement varies with utterance type. Alkhazishvili (1959) in his investigation of the prosodic characteristics of Georgian argues for three such types: broad focus ones (Type I), ones with narrow focus on one of the constituents, with the focused constituent and the verb fronted (Type II), and verb-initial thetic ones (Type III). Alkhazishvili bases his analysis on the distinction between "subject" and "predicate" prosodic phrases, which can be roughly equated with notions of theme and rheme. The "predicate" includes the verb and an immediately preverbal focused constituent (if there is one), while the "subject" includes all the other material in a clause. In information structural terms, the "predicate" phrase is the information about the "subject" that the utterance intends to convey.

In Type I sentences, each word of the "subject" is characterized by rising prosody, while the "predicate" is characterized by a falling intonational contour. The fall in pitch and intensity typically targets the final two syllables of the predicate; despite the overall low and falling pitch, Georgian speakers perceive the "predicate" as overall more prominent than the "subject" that precedes it. Type II sentences, in which the "predicate" precedes the "subject", are characterized by prominent rising-falling pitch on the predicate and levelled low pitch on the "subject". Type III sentences are similar to Type I ones: each phrase within them, apart from the final one, is characterized by a rising F0 contour, with the final one having a falling tone.

Alkhazishvili's results show that in "subject" phrases, which have an overall rising intonational pattern, initial stress is identified by speakers. He notes that this judgment is supported by instrumental data but does not specify whether this is based primarily on F0, duration or intensity. In "predicate" phrases, the picture is more complex; both initial and antepenultimate syllables can be identified as stressed by speakers, and both judgments find some support in instrumental data. The most important conclusion that Alkhazishvili (1959) makes, therefore, is that the perception of stress in Georgian varies according to the type of phrase that a word occurs in. He also suggests that further instrumental investigations are needed, especially with respect to 'predicate' phrases.

More recently, several studies of Georgian phrasal prosody have been carried out, such as the detailed Autosegmental-Metrical description by Jun et al. (2007) and especially Vicenik & Jun (2014). Their key insights include the following: (i) an utterance is comprised of Accentual Phrases (APs), all but the last one of which are characterized by rising pitch, and are subject to downstep (Fig.5); (ii) APs such as a noun and its modifiers can be optionally combined into intermediate phrases (ips); (iii) wh-phrases, regardless of their length, are prosodically grouped with the verb immediately following them (Fig.6).

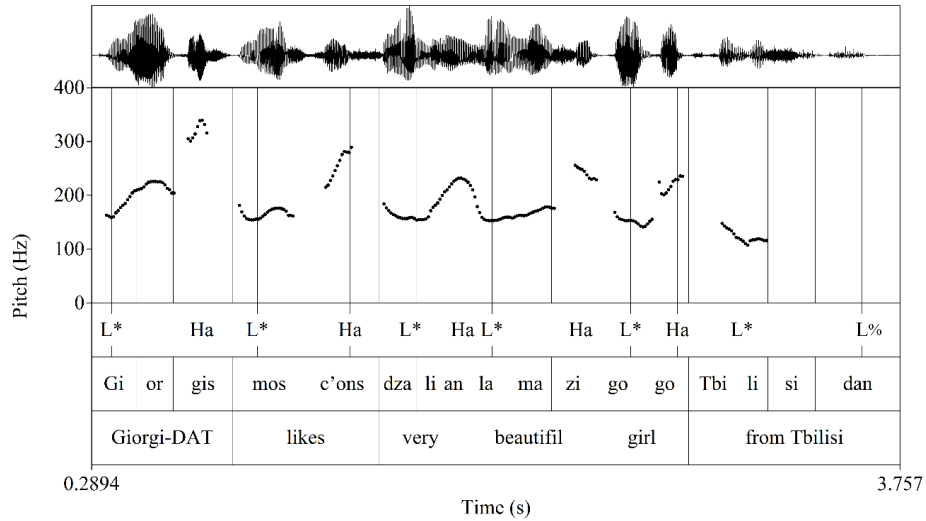| tones | L* | | Ha | | L* | | Ha | | L* | | Ha | L* | | Ha | | L* | | Ha | | L* | | | L% |

Fig.5. Declarative intonation in Georgian: each word is an AP with overall rising intonation; downstep applies to each successive high boundary tone Ha (Borise 2017).
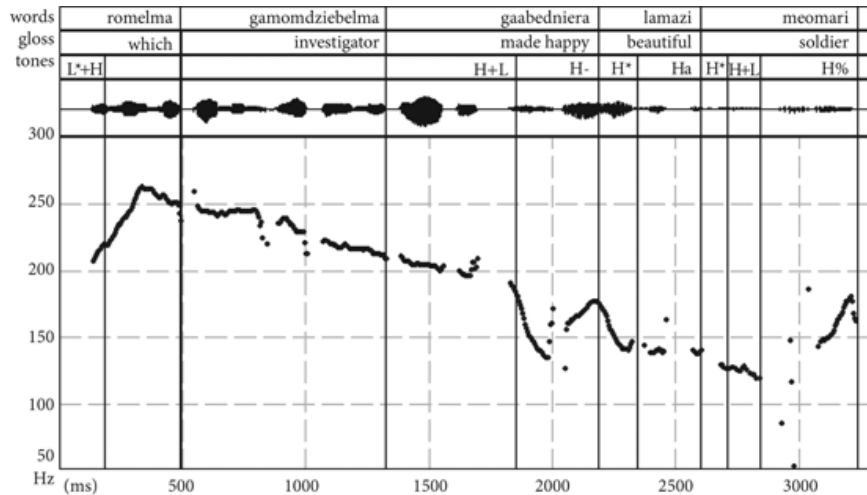

Fig.6. In a question "Which investigator made the beautiful soldier happy?" the whole wh-phrase is prosodically grouped together with the verb (Vicenik & Jun 2014:167)

Information structural properties of Georgian, too, have been an object of study. Skopeteas & Féry (2010) and Asatiani & Skopeteas (2012) in their investigation of syntactic and prosodic properties of topic and focus in Georgian also conclude that preveral focal items are separated by a prosodic boundary from the material preceding the focus+verb prosodic unit, while postverbal foci are separated by a prosodic boundary from the verb. In addition to the patterns of prosodic phrasing, it has been established that both pitch-based and non-pitch-based factors play a role in the expression of information structure in Georgian. For instance, Skopeteas & Féry (2010) note that postverbal foci are typically realized with a low and flat pitch contour that does not occur in other contexts (Fig.7). In turn, Skopeteas & Féry (2011) conclude that exhaustivity in Georgian is signaled by pitch expansion on the exhaustively interpreted constituent combined with increased duration and breathy voice on the first syllable.
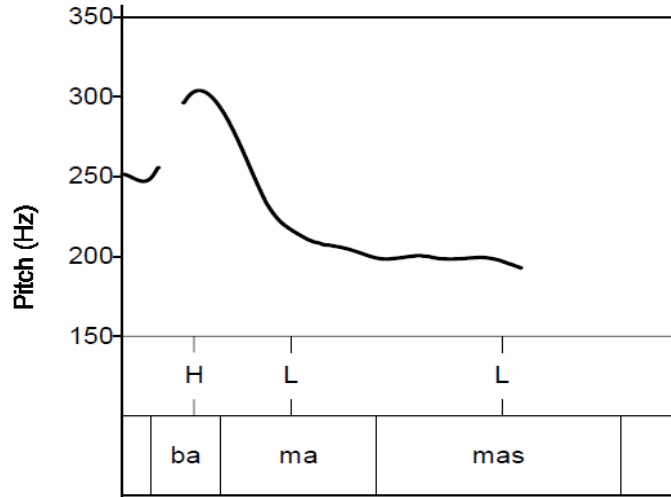
Fig.7. Postverbal focus in an utterance Nino eloliaveba MAMAS ("Nino cherishes her FATHER") is characterized by a low and flat tonal contour (Skopeteas & Féry 2010).

Overall, as these studies show, phrase-level prosodic phenomena such as prosodic phrasing/grouping and the distribution of phrasal pitch targets play an important role in Georgian, especially in information structurally-marked contexts, supporting its status as a phrasal prominence language. On the other hand, consistently with some of the older literature, there is evidence for initial word stress in Georgian, cued by duration and easiest to identify in shorter words and specific information structural contexts. However, stress does not play a significant role in the overall phonological make-up of the language: e.g., it does not cause other phonological processes, such as reduction of vowels in the unstressed syllables, or morphological processes, such as regular variation in stress placement in declensional or conjugational paradigms. Following Hyman's (2012) analysis of the various degrees to which languages 'care' about their stress systems, Georgian patterns with languages that do not – i.e., languages in which stress is not subject to *phonological activation* (cf. Clements 2001).

Furthermore, there is some other evidence suggesting that Georgian phrasal prosody differs from that of languages with strong word-level stress. For example, Georgian exhibits no evidence of nuclear stress on the most deeply embedded constituent in the verb phrase (Zhghenti 1963:147; 1965b:275; cf. Chomsky & Halle 1968:89; Cinque 1993); instead, the verb itself is the locus of prosodic prominence (Alkhazishvili 1954: 25; Dzidziguri 1954: 59; Tevdoradze 2005: 85; Borise 2017). Overall, then, by possessing identifiable word stress but relying mainly on phrasal prosody, Georgian finds itself in a typologically unusual middle ground between languages that have strong word stress, such as English, and those that arguably rely solely on phrasal prosody, such as French.

4.2.3 Other languages
Phrasal prosody of the other languages of the Caucasus has not received as much attention as that of Kabardian or Georgian. Still, some facts have been established for the Nakh languages and Ossetic, discussed here.
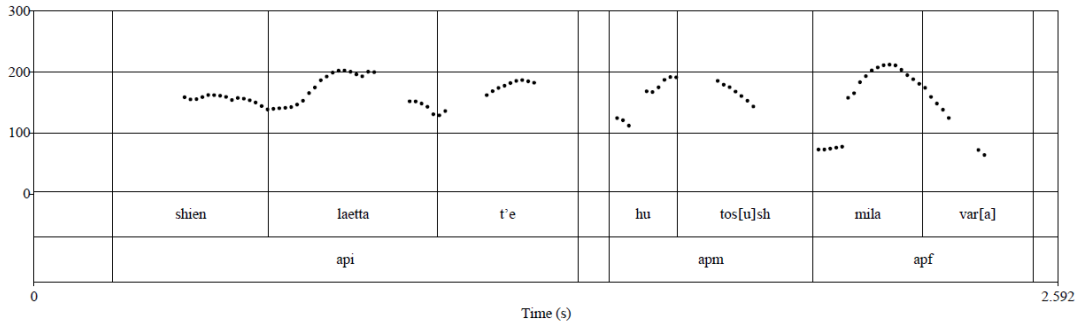
Certain aspects of Chechen sentential prosody have been highlighted in Nichols (1994; 1997), and Komen (2007b). Nichols (1994: 69; 1997: 967) reports that the overall intonational contour for both questions and statements is falling, but the YNQ marker, which appears on the verb, carries high pitch (cf. section 2.1). Also, chained clauses (a combination of a number of non-finite clauses followed by a single finite one) are reported to have a distinctive downstepped intonational contour, so that in each chained clause, the verb phrase (VP)[13] constitutes a domain of downstep, with an overall falling-rising contour and the final rise downstepped relative to the initial high. Downstep resets at the boundaries of chain clauses. In (9), square brackets mark downstep domains, H and L mark high and low pitch targets, respectively, and H- marks a downstepped high tone; note that in addition to the VPs, the two NPs, unexpectedly, are treated as downstep domains too. Portions of the sentence not in brackets do not take part in the downstep process. A similar "distinctive stepped contour" is found in Ingush clausal intonation (Nichols 1994).

(9)   H L H-   H   L   H-
   [NP T͡sħana ʕyːranna]   voqːa   stag [VP ħala-ʁætːa-t͡ʃa], t͡sunna gu̯o
       one.OBL morning.DAT old   man   up-stood-CV   he-DAT see-PRS

           H L H-   H   L   H-   L
   [NP ʃajn   kertara] [VP dʕa-j-yøduʃ]   larʃ.
       his-REFL fence-ABL   away-AGR-going tracks
   'One morning the old man gets up and sees tracks leading away from his fence.'

                                                                    (Nichols 1997:968)

Komen (2007b, 2011) highlights the fact that in focal contexts in Chechen, such as WHQs, replies to WHQs, and corrective statements, the focal element forms a single prosodic phrase with the following verb, similarly to Georgian and Ossetic (cf. section 3); in (10), φ indicates a prosodic phrase. See also Komen et al. (this volume) for more instrumental results.

(10) (ʃi̯en latːa t'e)φ   (hu   tos(u)ʃ) φ   (mila   var(a)?) φ
      his   land on   seed   throwing   who   was
      'Who was sowing his land?'   (Komen 2011)

---

[13] Or another verbal projection, depending on the syntactic assumptions about the position of the external argument and the verb in Chechen (Nichols 1997:967).

Fig. 8. Intonation of a wh-question in Chechen, showing the prosodic grouping of the wh-word and the verb (Komen 2011)

Finally, phrasal prosody of Ossetic has also been subject to instrumental investigation. Using the data from Dzakhova (2014), Andieva (2015) makes some initial observations about Ossetic phrasal prosody, noting that questions, like statements, often exhibit overall declining pitch. Dzakhova & Andieva (2016) further observe that declarative sentences in Ossetic typically have a single pitch peak, in the first part of the sentence, while YNQs have two. They also note that even though these prosodic patterns are similar, the overall pitch range is greater in YNQs:
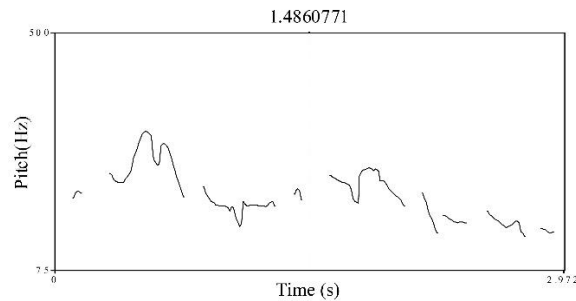
Fig. 9: Statement intonation: (ɜχšɜnadon sardə jən) (ɜppəndɜr nisə bartɜ wədi) 'In the public life, s/he had no rights at all.' (Dzakhova & Andieva 2016)
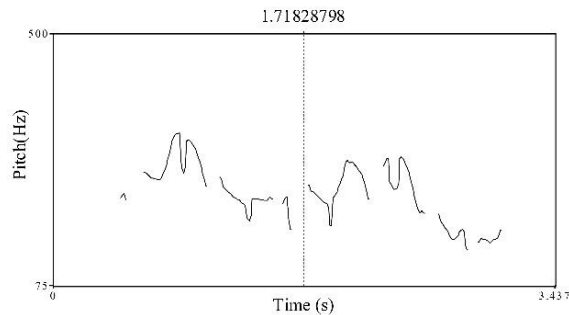
Fig. 10: Question intonation: (ɜχšɜnadon sardə jən) (ɜppəndɜr nisə bartɜ wədi?) 'In the public life, s/he had no rights at all?' (Dzakhova & Andieva 2016

5. Conclusion

This chapter summarizes the rich and diverse tone and intonation facts in the languages of the Caucasus. A wide variety of tonal properties in these languages range from limited tonal systems,

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in which only certain morphemes are specified for tone, to the ones that make tonal contrasts on stressed syllables, to full-fledged tonal systems.

The limited tonal systems require further theoretical study, since it is not immediately clear whether the high tone found on some morphemes in these languages is best analyzed as a lexical or phrasal property. Instrumental support for the current analyses is also required. As for the latter two types of tonal systems, it is still to be established whether these contrasts are truly based on tonal movements, as opposed to some other suprasegmental feature, such as stiffness or slackness of articulators. Indeed, some systems first analyzed as tonal, such as that of Tindi, later turned out to be based on a feature other than pitch, such as vowel length. For other languages, such as Godoberi, it has been suggested that labels 'high' and 'low' should be thought of as pre-theoretical rather than reflecting a true tonal opposition. In general, the tonal accounts have been difficult to assess, due to scarcity of instrumental evidence. Such evidence is still largely missing and is greatly needed.

Further, this chapter addresses the languages in which phrasal (as opposed to word-level) prosody plays a significant role. It reveals that word stress and phrasal prosody in such languages interact in intricate ways. In Ossetic, the status of stress as word-level or phrasal is yet to be established. In Georgian, phrasal prosody plays an important role, but there is also some evidence for word stress, which, in contrast, does not take part in any other processes in the language. Finally, some questions of phrasal intonation, both based on impressionistic observations and instrumental investigations, are discussed.

The importance of phrasal intonation in language descriptions and its interaction with other phenomena, such as word stress and sentence structure have been recognized in the linguistic community. This, however, also revealed the gaps in theoretical understanding of prosody and scarcity of reliable descriptions. This is especially true for the languages of the Caucasus. While some languages, such as Kabardian and Georgian, have received considerable attention, many others are virtually unexplored in this respect. The need for further investigations, both theoretical and instrumental, is hard to overestimate.

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