



**University of  
Zurich** <sup>UZH</sup>

**URPP 'Language and Space'**

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## **Swiss German Dictionary**

**A research service for the Swisscom provided by the  
Language and Space Lab of the University of Zurich**

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## 1 Outline of the Project

This project was a research service provided from the University Research Priority Program (URPP) 'Language and Space' to the Swisscom Company. Contributors from the University were the three students Raphael Tandler, Alina Mächler, Larissa Schmidt. They were under the supervision of the Language and Space Lab director Dr. Tanja Samardžić. The project was intended to take place from October 2018 to December 2019 and was later delayed to the end of January 2019.

The goal of the project was to build a Standard German to Swiss German pronunciation dictionary of 10'000 Standard German words. Due to some non-intended additional work, this number was reduced to 9000 words in the end.

For each of the Standard German words, the task for the university team was to give the pronunciation of the according Swiss German word in different varieties. These variations are due to the fact that Swiss German is a language composed of many dialects that differ from region to region.

## 2 How to represent Swiss German?

As it was not feasible in the scope of this project to produce the pronunciations of all the various Swiss German dialects, a number of dialects were selected. The aim of the selection was to cover a range of different varieties across Switzerland.

### 2.1 Slicing up Swiss German

A dialectometric analysis of Swiss German dialect areas provided by Scherrer and Stöckle (2016) was used in the selection process. They differentiate dialectal regions in Switzerland in relation to lexical, phonological, morphological and syntactical properties of the dialects. Their analysis is based on data of the 'Spachatlas der deutschen Schweiz' (SDS) and the 'Syntactical Atlas of Swiss German dialects' (SADS); two of the most important sources in Swiss dialectology that map differences in the properties mentioned above. As our goal was to build a dictionary, we focused mainly on phonetical properties of the dialects, and not on syntactical properties.

### 2.2 Number of Swiss German dialect areas

Our first intention was to work on ten Swiss German dialect areas, as they are divided in Scherrer and Stöckle (2016). Later, we reduced this number to six due to time restraints and similarities between some of the different areas (see the appendix for pictures of the clusters of ten and six dialects). Those six areas can be described as:

Wallis and German speaking part of Grisons,  
Bernese Oberland,  
the rest of Bern,  
Central Switzerland,  
Zurich and St. Gallen,  
Basel and surrounding area.

We opted for a change concerning these clusters. We chose not to differentiate Bern and Berner Oberland by focusing exclusively on Bern. And we chose to differentiate Zürich and St. Gallen, as we had the impression that tracing the pronunciations of Zürich and St. Gallen would yield a greater diversity than Bern and Berner Oberland would have. Furthermore, St. Gallen as a city is a more densely populated area than Berner Oberland with its many different dialects is, thus rendering St. Gallen a more numerically representative dialect variation.

### 2.3 Selection of specific places within the areas

One option considered to represent the six areas was to pick the places within them that were most paradigmatic for the area. Yves Scherrer provided us with the list of places that had the average values of dialectal properties. For the 10-cluster analysis, these were:

Meikirch (BE)  
 Illnau (ZH)  
 Römerswil (LU)  
 Alpnach (OW)  
 Näfels (GL)  
 Reichenbach (BE)  
 Kirchberg (SG)  
 Gelterkinden (BL)  
 Davos (GR)  
 Brig (VS)

However, we chose other places, as there was a bigger interest in having dialects with a lot of speakers. Another pragmatically chosen criterion was acquaintance with the dialects: The better we already knew a dialect, the quicker we would be in working on it. We chose the following places and all three of us, Larissa, Alina, and Raphael, worked on two of them:

#### **City Zurich**

Raphael is a native speaker.

#### **City St. Gallen**

Edited by Raphael.

#### **City Basel**

Edited by Alina.

#### **City Bern**

Edited by Alina.

#### **Visp**

Larissa is a native speaker.

#### **Stans**

Edited by Larissa.

Concerning the first five places, we chose to focus on the dialect of the cities and their close surroundings because they are varieties spoken by many people. To represent the area of Central Switzerland, we chose the main town of Nidwalden, namely Stans. We had also considered taking dialects with a higher number of speakers for the area of Central Switzerland. We found an informant of Schwyz and did some test recordings, but noticed that this dialect was rather similar to other northern dialects, like for example Luzern (earlier, when we were still opting for 10 dialects, we also had included the dialect of the city of Luzern, so the first 2800 words, we have for Luzern).

## 3 Methods

### 3.1 Knowledge Gathering

In general, the goal for our working process was to make some preliminary rule for the phonetics of a dialect using a grammar and checking back with a native speaker, whether these rules apply. We also used dialect specific lexica and the SDS. However, depending on the accessibility of the different knowledge sources, all of us set the focus in knowledge gathering a bit differently.

### 3.2 Vertical rather than horizontal

At the beginning of our work, we intended to work horizontally, thus annotating all the dialect words for one Standard German at once. However we decided to work horizontally, which left us with the option of reducing the dialects from ten to six. We worked through one single dialect for a set of Standard German words, and only then went on to the next dialect. Especially in the beginning, when zeroing in on a new dialect, this was a good approach to get to grips with a dialect. Once we had gained some expertise in both of the dialects every one of us worked on, we also switched between dialects and synchronized them.

### 3.3 Interface

At the beginning of this project, we aimed to annotate the words simultaneously on a web-interface. Christof Bless, a student of the university of Zurich and then assistant at the Language and Space Lab set up this interface. It is accessible under <http://linguistik-web.uzh.ch:5000> when logged into the VPN of the university of Zurich.

As the implementation of the interface took some time, we had started working on Excel and, as we had gotten used to some of the features of excel which the Interface did not have (as for example copy paste of multiple cells at once), we mainly worked with Excel. Still the interface might be of use for the second phase of this project.

## 4 Phonetical writing

The pronunciation of the six Swiss German dialects had to be given in phonetical writing. In order to do this, we received from Swisscom a set of SAMPA (Speech Assessment Methods Phonetic Alphabet) characters. This set consists of modified SAMPLA and is based on Swisscom's SPEechDat dictionary:

vowels	diphthongs	consonants	affricates
/2/	/OY/	/C/	/dZ/
/2:/	/aI/	/N/	/pf/
/9/	/aU/	/R/	/ts/
/@/		/S/	/tS/
/E/		/Z/	
/E:/		/b/	
/I/		/d/	
/I:/		/f/	
/O/		/g/	
/U/		/h/	
/Y/		/j/	
/a/		/k/	
/a:/		/l/	
/e/		/m/	
/e:/		/n/	
/i/		/p/	
/i:/		/r/	
/o/		/s/	
/o:/		/t/	
/u/		/v/	
/u:/		/x/	
/y/		/z/	
/y:/		/a~/	
		/o~/	

Swisscom's set also has the SAMPA character for a glottal stop /?/. In writing, the SAMPA characters are individuated by a single space before and after them.

This initial phoneset from Swisscom needed to be adjusted to fit the dialects we chose. We did not use some of the initial SAMPA characters:

First of all, we did not use /z/, /Z/, or /dZ/ as there are no sonorant *s* or *sch* in Swiss German. And, we did not include the glottal stop character /?/.

We added some phones to the initial set:

We added the following long open vowels which do not exist in Standard German but they do in Swiss German: /U:/, /O:/, /Y:/, /9:/.

And we added the open vowel /f/ and lengthened /f:/ as this ä is often used in Swiss German.

For Stans we included the characters /A/ and /A:/ which are forms of the a that is more backed.

For Bern and Stans, we included the character /w/, that refers to a vocalised l which sounds a bit like a u but is not quite as vocalic.

Plosives in Swiss German are sometimes aspirated, especially in Basel, which is why we included the signs /kh/, /ph/, /th/.

We also used the tilde ~ in more combinations than intended, as we included some nasal sounds. Sometimes (for example in french loanwords) those are used in Swiss German.

In Swiss German dialects there are more diphthongs than in Standard German, and the diphthongs vary a lot from dialect to dialect. This is why we included a lot of new characters by leaving away the space which normally separates the SAMPA vowels.

We did include lengthened consonants as singular elements in our phoneset (again, by leaving away the space between two of them), because one can differentiate word meanings by them. For example: /S t e ll @/ means *to put* and /S t e l @/ means *to steal*.

We included some more affricates for Swiss German than for Standard German.

We provided Swisscom with two dictionaries. One based on the extended phoneset, including all the before mentioned characters we added. Also, we provided Swisscom with a dictionary based on a smaller phoneset, as for processing purposes a set of only about sixty characters was needed. We also provided Swisscom with the Python script to reduce the bigger set to the smaller, in which we chose to follow these rules:

Additional nasal sounds: delete the tilde.

Additional diphthongs: Separate two vowels by adding a space in between. That way, one unfortunately is not be able to distinguish between diphthongs and separate vowels. Nevertheless, one is able to keep the quality of the sounds.

Additional geminates: For the reduction, we chose to add a space between consonants (for example, turn /S t E ll U/ into /S t E l l U/). That generates an ambiguity for any two consonants separated by a space. Alternatively, one could have replaced two adjacent consonants with just one consonant /S t E l U/. That would have meant loosing the information about the lengthening of consonants, but avoid the before mentioned ambiguity.

Aspiration: For the reduction, we includes an empty space between the two letters. Alternatively, we could have deleted the "h". The decision between the two options here came down to the same as with the geminates: Introducing ambiguity into the transcription or loosing some information.

Additional affricates: Include an empty space between the characters.

Additional vowels: Were kept.

## 4.1 Big Set used (134 phonemes)

## vowels:

/y:/, /O:/, /2:/, /@/, /U:/, /o:/, /E:/, /O/, /e:/,  
/o/, /f/, /2/, /9:/, /f:/, /I:/, /Y:/, /A:/, /A/, /i:/,  
/E/, /U/, /Y/, /a/, /i/, /u/, /y/, /u:/, /9/, /I/,  
/a:/, /e/

## diphthongs:

/oU:/, /y<sup>f</sup>/, /Ou/, /2I/, /OI/, /yE/, /y@/, /OU/,  
/ei/, /fU:/, /eU:/, /eU/, /EI/, /IU:/, /EU/, /oU/,  
/UI/, /UE/, /AU/, /Ue/, /AU:/, /EU:/, /u@/, /ue/,  
/ua/, /aU/, /iE/, /fu/, /fU/, /U@/, /Io/, /fI/,  
/eI/, /AI/, /oI/, /Ei/, /Ai/, /9i/, /9I/, /Y@/, /uI/,  
/i<sup>f</sup>/, /Y<sup>f</sup>/, /i@/, /IU/, /I@/, /IE/, /I<sup>f</sup>/, /oi/, /au/,  
/io/, /aI/, /iU/, /Eu/, /ou/

## consonants:

/d/, /h/, /l/, /p/, /t/, /x/, /C/, /S/, /g/, /k/,  
/s/, /w/, /b/, /f/, /j/, /n/, /r/, /v/, /m/, /N/,  
/R/

## affricates:

/tS/, /ts/, /pS/, /pf/, /kS/, /ks/, /kx/

## geminated:

/ll/, /rr/, /tt/, /xx/, /pp/, /mm/, /ss/, /nn/,  
/SS/, /ff/

## aspirated:

/th/, /ph/, /kh/

## nasal:

/O~/, /o~/, /A~/, /E~/, /o~:/, /a~/, /f~/

## 4.2 Small Set used (57 phonemes)

## vowels:

/U:/, /f:/, /y:/, /O:/, /Y:/, /I:/, /u:/, /2:/, /2/,  
/o:/, /E:/, /9/, /A:/, /A/, /@/, /i:/, /E/, /I/, /9:/,  
/O/, /U/, /e:/, /Y/, /a:/, /a/, /e/, /i/, /y/, /f/,  
/o/, /u/

## diphthongs:

/aI/, /aU/

## consonants:

/C/, /S/, /R/, /b/, /d/, /g/, /f/, /h/, /k/, /j/,  
/m/, /l/, /n/, /p/, /s/, /r/, /t/, /w/, /v/, /x/,  
/N/

## affricates:

/tS/, /ts/, /pf/

## 5 Content of the dictionary

Overall, the dictionary contains 9000 Standard German words. These were compounded in the following way:

**1st list (2828 words):** This was composed of those words from Swisscom which also occur in the Archimob corpus and therefore already have writings in different dialects (from Archimob) and SAMPA writings for the Standard German (from Swisscom).

**2nd list (1891 words):** We then received some more Standard German words from Swisscom which were connected with a few variations of Swiss German dialect writings but it was not marked which dialect it was. In a time-consuming process, we extracted from these words a second list of 1891 Standard German words and put all the Swiss German writing variations in one row.

**3rd list (1435 words).**

**4th list (2846 words):** Both the third and fourth list were compiled from Archimob-words, after cleaning out the outdated and war topic based words.

The lists we received from Swisscom required some cleaning up for them to meet our needs:

Some of the words were in Swiss German rather than Standard German.

Many of the words were already in a former list: e.g. without a hashtag (e.g. “#merci”), not capitalised (e.g. in one list as “Abend”, in another one as “abend”) and many other words overlapped (e.g. “müssen”, “mich”, “sollen”).

There were a number of orthographic mistakes (e.g. “füfundzwnazig” or “inkluiw”). In many cases, the right version of the word was there already (“füfundzwanzig”, “inklusiw”), but not for all of them (e.g. “naher”).

There were also a number of non-sensical word like “iost” or “ghe\_”.

Some words (or parts of words) were also doubled but with an underscore (e. “he” / “he\_”), or very similarly repeated (“he\_” / “hei\_”).

The lists had to be reduced by these words and either corrected or replaced by words from other sources, such as a list with the most common German words.

## 6 Dialect Specific Decisions

### 6.1 Zurich – Raphael

For the phonology of the Zurich dialect Fleischer and Schmid (2006) was consulted. In consideration of these theoretical restrictions, the words were translated according to the mother tongue pronunciation of Raphael. During the process other Zurich speakers were consulted for certain words where a non-city influence was suspected, in order to minimize idiosyncrasies.

### 6.2 St. Gallen – Raphael

For Sankt Gallen, the theoretical basis consisted of the entry “Ostschwizer Dialekt” on the Alemannic Wikipedia, since no current grammar books are available. The only current literature on the Sankt Gallen dialect is a dictionary (Osterwalder-Brändle 2017) with selected expressions; however, those expressions are very specific and do contain few if any of the entries in our word lists.

For St. Gallen, the first 2800 words were recorded with a St. Gallen native and were then transcribed. Based on those transcribed words, 23 rules from Zurich dialect to St. Gallen were formulated. Those rules were applied across following words. Furthermore, all the words individually checked, by saying them out loud, and adjusted; when there was uncertainty regarding the pronunciation of a specific word, it was marked for consultation with a St. Gallen native.

Some of the most important rules were:

R: zhd. /r/ -> sgd. /R/

E: zhd. /f/ -> sgd. /E/

OR: zhd. /or/ -> sgd. /OR/

TSEI: zhd. /tseI/ -> sgd. /tsaI/

GEGEN: zhd. /gʰg@/ -> sgd. /geg@/

VER-: zhd. /f@r/ -> sgd. /fE/ oder /fER/



### 6.3 Bern – Alina

For Bern, there isn't a brand new grammar book but the one from Werner Marti (Werner Marti 1985) provided a good starting point to formulate some phonetic rules. As a next step, we compiled a list of words with which we elicited specific phonetic features from Bern speakers and checked if they match the ones in the grammar book; these sessions were recorded and served as the basis for elaborated rules that were used in the translation. In case of uncertainty regarding the pronunciation, we checked back with a Bern native speaker. Based on the phonetic features, we decided which SAMPA sounds are specifically needed for Berndeutsch and had to be added to the basic set: in this case, /w/ had to be added to express the vocalised [l], in comparison to the unvocalised /l/. The Most important phonetic features in Berndeutsch are:

- the grapheme [l] becomes vocalised before a consonant, at the end of a syllable (mostly in combination with "e") and in doubles (eg. *Milch* /mIwx/ *Hügel* /hygw/ *Müller* /myw@r/)
- the combination of [n] and [d] becomes often /N/ (eg. *anders* /aN@rs/ *Kind* /xiN/)
- std. [au] becomes /ou/ (eg. *Frau* /froU/ *kaufen* /xoUf@/)
- std. [ei] remains /ei/ and doesn't become /ai/ as in eg. zhd. (eg. std. *Bein* brd. /bei/ vs. zhd. /baI/)
- the grapheme [k] is mostly pronounced as /x/ in the initial sounds
- In the Prefix [ver] the vowel [e] is left away (eg. *vergessen* /frgʃss@/)
- Suffix [lich] is pronounced as /lex/

### 6.4 Basel – Alina

For Basel, there is a grammar book that has been updated several times (Rudolf Suter 1920-2011) as well as a dictionary with specific words just used in Baseldeutsch (Markus Gasser et al. 2010). Those two were our foundation/base to start formulating phonetic rules. As a next step, we compiled a list of words with which we elicited specific phonetic features from Basel speakers and checked if they match the ones in the grammar book; these sessions were recorded and served as the basis for elaborated rules that were used in the translation. In case of uncertainty regarding the pronunciation, we checked back with a Basel native speaker or the dictionary. We decided which SAMPA sounds are specifically needed for Baseldeutsch and had to be added to the basic set: in this case, /kh/ and /ph/ for the aspirated version of /kx/ and /p/ as well as uvular /R/ in comparison to the alveolar /r/. The Most important phonetic features in Baseldeutsch are:

- the Plosive /k/ is aspirated in the initial and final sounds (eg. *Kiste* /khISt@/ *Dreck* /dRʃkh/) within a word /kx/ is pronounced as /k/ (eg. *drucken* /dRUK@/)
- the Plosive /p/ is only aspirated in certain irregular conditions
- the [r] is always uvular pronounced and therefore represented by /R/
- the unrounding is regular but starts to disappear in favor to the std. version (eg. *müde* bs. /mI@d/ vs. zhd. /my@d/)
- the vowels especially [o] and [u] are mostly pronounced open and therefore represented by /O/ and /U/
- the [lich] as a suffix or within a word is always pronounced as /lIg/ (eg. *möglich* /m2glIg/ *Wirklichkeit* /vIRklIgkhaIt/)
- in open syllable are the vowels lengthened (eg. *leben* /lʃ:b@/)

## 6.5 Visp – Larissa

The Wallis German words are mainly depicted according to the mother tongue pronunciation of Larissa. For some specific phonetic questions the grammar of Bohnenberger (1913) for the whole German speaking wallis, and the SDS (volume I) was consulted. Also for some lexical questions, friends and family from Wallis were asked.

Some phonetic features:

It is salient for the dialects of Wallis that unstressed final vowels have kept a full tone. For western Wallis, which Visp is a part of, this tone is a /U/.

In Standard German, there is a distinction between /x/ (the voiceless velar fricative) and /C/ (the voiceless palatal fricative). In Swiss German dialects, there generally only occurs the /x/. Yet, in Wallis German, both versions do occur. In none of the mentioned sources were there found regularities of context in which /C/ does occur. It was chosen to mostly use /C/ in order to give a variety to the other dialects – except for cases where the sound seemed inappropriate.

no /O/: According to SDS (volume I, card 42) there are only closed *o* in Visp, so only SAMPA /o/ and no /O/ were used.

In general it was assumed that long vowels are closed and short ones open – though there are some exceptions to this.

## 6.6 Stans – Larissa

Some preliminary phonetic regularities for the whole canton NW were registered with the help of Hug and Weibel (2003), Troxler (1958), and Niederberger (2007). Informants to record or check these rules were sought after yet difficult to find. And the one who was found was considered too adapted to the Zurich German. So instead of new informant recordings, it was worked with two recordings from the Archimob Corpus – one from Stans and one from Wolfenschiessen. The latter dialect has some phonological properties which do not occur in the rest of NW. So it was tried not to give them too much weight. Also a lot of words were checked on their correctness in the fairly new lexicon from Niederberger (2007).

### Vowel changes of Stans:

unrounding:

- From [ü] to [i]: Standard German *Dünger* is *dinger'*, Standard German *Tür* is *tire*
- From [ö] zu [e]: Standard German *Akkörde* is *Akkerd*, Standard German *schön* is *schen*

palatalisation

- From [u] to [ui]: Zurich German *Muul* is *Muil*
- Middle High German [ou] and Standard German [au] become [ai] in Stans: Standard German *Frau* is *Frai* in Stans.

**Notes about vowel inventory** (as according to Niederberger (2017, S. 14-15)):

only /A/: The *a* in Stans is always a dark, backed one. This is why SAMPA /a/ was always replaced with /A/

only /I/: There is only one *i* in Stans, namely a middle one (so not closed and not open). It was chosen to represent this with *l* and not *i*.

only /o/: There are only closed *o* in Stans. So all SAMPA /O / were replaced by / o/ for Stans.

no /9/ or /2/: There are no *ö* in Stans.

only /U/: There are no closed *u* in Stans, only middle ones. It was chosen to represent them with SAMPA as /U/.

no /Y/ or /y/: There is no *ü* in Stans.

### Consonant characteristics of Stans:

The [l] is mostly vocalized and in that case it was transcribed as /U/. In some phonetical contexts it was transcribed as the less sonorant /w/.

Concerning the plosives, there are some notable differences to the Standard German and other Swiss German dialects: At word-beginnings, the plosives sometimes turn from fortis to lenis (Standard German *plötzlich* is *bletzlich* in Stans) or from lenis to fortis (Standard German *Bähnlein* is *Päändli*).

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## ArchiMob corpus

The ArchiMob corpus was annotated by the Language and Space Lab and contains transcriptions of video recordings collected by the ArchiMob association (see <http://www.archimob.ch>). For more information on the corpus see Samardžić, Scherrer, and Glaser (2016).

