Mapping change in colloquial German in real and apparent time

Stephan Elspaß (Salzburg) & Robert Möller (Liège)

Colloquial vernaculars of German have been the subject of the *Wortatlas der deutschen Umgangssprachen* (WDU) ('Word atlas of colloquial German', cf. Eichhoff 1977–2000) and the long-term project *Atlas zur Alltagssprache* (AdA) ('Atlas of everyday language', cf. Elspaß & Möller 2003ff.). Such colloquial vernaculars can be defined as

> registers and variants in everyday communication, i.e. in the social and functional domains of private life, of spontaneous speech among friends, relatives, acquaintances, or in informal situations among people from the same place who are not necessarily close to each other, e.g. in the local corner shop (cf. Möller & Elspaß 2019: 760)

As both the WDU and the AdA essentially build on similar survey methods (questionnaires, responses assigned to ca. 500 cities and towns in the German-speaking countries), as both use point-symbol maps which account for maximally two variants per locality, and as they cover a time span of almost fifty years, the data from both linguistic atlases can be compared with respect to real time change (cf. for Elspaß 2005 for an early pilot study). Moreover, as the AdA uses data from almost 2,000 up to 20,000 informants per survey round, the sheer amount of data from different age groups can be used for apparent time studies.

In our presentation, we will present methods of mapping real time change, based on data from WDU and AdA (cf. also Leemann, Derungs & Elspaß 2019 for a comparison of data from WDU and Leemann et al. 2018), as well as apparent time change, based on data from AdA. Since the AdA informants are regularly asked how long they have been living at the respective locality and whether their parents were raises there, the AdA data also allow for the investigation of change pertaining to factors such as the informants' degree of mobility and their family roots in the respective localities. Thus, it will also be explored – in a tentative approach – how such factors can be mapped.

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Data Presentation in the REDE SprachGIS: Possibilities and Limits (*Regionalsprache.de*)

Robert Engsterhold, Jeffrey Pheiff, Maria Luisa Krapp

The purpose of this talk is to introduce the online platform *Regionalsprache.de* (cf. REDE) and its browser application the REDE SprachGIS, a geographic information system for linguists. We will discuss the possibilities users have to consult existing data that the REDE SprachGIS makes digitally available and to present their own linguistic data cartographically with point-text, point-symbol, or area maps. In addition to these rather qualitative approaches to mapping, users can also opt for a quantitative approach in visualizing their data in the form of pie-chart maps, bar-chart maps, or choropleth maps.

In addition, we would also like to discuss new possibilities that go hand in hand with digital data presentation. Users are no longer dependent on the representation of data in printed dialect atlases, but they can now "interact" with the underlying data. For example, users can recode the data according to their wishes; they also have more options available to more comfortably analyze the data with frequency charts for example, or by highlighting particularly important variants. Furthermore, they have direct access to additional materials such as recordings, other atlases, survey materials, bibliographic information to benefit their analyses.

In our presentation, we will discuss these issues from a technical perspective, illustrate them with several application examples of new features of the REDE SprachGIS and show how to quickly and easily access central results of the project. In this context, we will demonstrate how users can compile "speaking" linguistic maps like the Digitaler hessischer Sprachatlas (cf. DHSA) and access interactive maps of the vertical spectra between the dialects and the standard language, including sound samples of german speakers in various contexts. Additionally, we will introduce approaches to more complex data visualizations and show how to import, export, and map data in GeoJSON format in the application.

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Mapping techniques used to explore dialect variation and change in the project 'Swiss-German Dialects Across Time and Space'

Péter Jeszenszky, Carina Steiner, Adrian Leemann

Center for the Study of Language and Society, University of Bern, Bern, Switzerland

Swiss German dialects are known for their regional variation within a relatively small area. They enjoy high prestige as opposed to Standard German, but there is dialect change and levelling going on (cf. Christen, 1998). In addition, one of the main driving factors of dialect change in Swiss German is hypothesised to be the spatial mobility of the population. Due to this variation and change of spatial character it is crucial to assess linguistic and sociodemographic records in space as well.

In this contribution we present different mapping techniques we employ in the SDATS project. 'Swiss-German Dialects Across Time and Space' is a 5-year project supported by the Swiss National Science Foundation, aiming at the investigation of variation and change in Swiss German since the last comprehensive survey of Swiss German dialects conducted in the 1950s, the 'Sprachatlas der deutschen Schweiz' (SDS). The SDATS corpus (Leemann et al. 2020) includes structured interviews with 1000 participants (belonging to two age cohorts, 20-35 and 60+ years old) in 125 reference localities (i.e. 8 per locality; Jeszenszky, Steiner & Leemann, 2021) in German-speaking Switzerland. The SDATS survey elicited ~300 linguistic items, and participants filled out a 300+ item metadata questionnaire.

For different kinds of publications, we analyse various kinds of data for which diverse mapping techniques are needed, some of which will be showcased in our conference contribution. Please follow the link[1] below for the figures mentioned further on. Owing to the sociolinguistic aims of the project, we have eight speakers at each reference locality, rather than only one. This makes it more difficult to use point-based techniques for mapping such as symbolisation (Figure 1). Thus, one thousand data points have to be visualised in an aggregated manner in most cases. The area over which we can aggregate may be the reference localities, cantons or even larger regions (Figure 2). Data loss can be prevented using diagrams which are, however, often suboptimal for comparison. Voronoi- (or Thiessen-) polygons around reference localities are often used for extending reference points' visibility in space and thereby also signalling the potential influence of the point in space. In these polygons the most dominant variant is represented by colour (Figure 3). Beyond this interpolation technique, we also use others, such as the *k* nearest neighbours (*knn* – Figure 4) and the kriging interpolation (Figure 5). Age often means large differences in variant usage. Mapping the two age cohorts separately shows us apparent-time change and reduces the number of data points with the same coordinates. For the purpose of real-time comparison, we often accompany such maps with ones based on SDS data. The two largest-scale visual products of the project will be an interactive online atlas and a physical printed atlas. A prototype of the former and preliminary maps (Figure 6) from the latter will also be presented at the conference, along with offline and online platforms at which to implement them the different mapping techniques discussed.

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[1] https://doi.org/10.6084/m9.figshare.19874089.v1

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New visualization techniques in dialect geography: The merging of analytic and synthetic mapping in the virtual and interactive cartography of VerbaAlpina

Christina Mutter | Project VerbaAlpina, Munich University (LMU)

Cartography is the most plausible form of representation of dialect variation and - indirectly - of dialectal change. In dialectology, two traditions have developed since the 19th century that use 'analytic' or 'synthetic' maps both of which have advantages and disadvantages. Analytic maps are typical of the Romance tradition; they reflect the single linguistic utterances as a whole, as for example is the case of the linguistic atlas of Italy and Southern Switzerland (AIS). Here the focus is on the documentation of the single utterances and the reader has to understand the geographical distribution of more abstract types from the single utterances by himself. This form of visualization has the advantage that it provides very detailed information that is reliable to the source, traceable and verifiable; analytic atlases are dialectal corpora avant la lettre. On the other hand, analytic maps are rather confusing due to the large number of utterances. The so-called synthetic maps, which mostly use point symbols for visualization, primarily represent the Germanic tradition, as for example the linguistic atlas of Vorarlberg (VALTS); in this case, single utterances are documented only occasionally if they are strongly marked. However, the geographical distribution of selected features of the single utterances is directly apparent through the allocation of symbols. Quantitative relationships, especially those of dialectometric nature, can only be represented in this way. A disadvantage due to the feature selection is the rather limited transparency of synthetic maps which are also very suggestive.

In order to address the described disadvantages of traditional cartography, mapping methods are needed that make it possible to merge the two mentioned visualization traditions. Such a mapping tool, for example, is the virtual interactive map of the DFG long-term project VerbaAlpina which investigates the Alpine region in its cultural and linguistic unity. The online mapping of VerbaAlpina (https://www.verba-alpina.gwi.uni-muenchen.de/) is based on georeferenced linguistic utterances and combines the two methods. While at first glance 'synthetic' maps are displayed, at second glance, after clicking on the individual symbols on the map, the user also has access to the single utterances, which guarantees empirical transparency; in addition, the utterances are enriched with metadata and links to reference dictionaries. The visualization of language data via the interactive map also allows to combine different data sources and to display not only data from linguistic atlases but also data from dictionaries and crowdsourcing. Thus, via the interactive map, vocabulary can be viewed not only from an onomasiological perspective (as in traditional geolinguistics) but also from a semasiological one. The visualization of the linguistic data can always be done qualitatively as well as quantitatively. In addition, the interactive map offers the function of creating so-called synoptic maps. This function enables the user to save a certain selection of maps on a synoptic combination map in order to visualize the range of any linguistic and non-linguistic features in context.

This talk will present the described visualization techniques offered by the virtual interactive map of VerbaAlpina in more detail.

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Dialectology in work. Research Using the Visual Interface of the DMW-Project

Nicole Palliwoda (Kiel), Helmut Spiekermann (Münster)

The *Dialektatlas Mittleres Westdeutschland (DMW)* (Spiekermann et al. 2020) is a long-term (2016-2032) project funded by the North Rhine-Westphalian Academy of Culture and Sciences. Its main goal is to document the Low und Middle German dialects in North Rhine-Westphalia and the neighboring regions in Lower Saxony and Rhineland-Palatinate, mainly in form of a digital, speaking atlas based on approx. 3000 explorations in 1000 places. The data is gained by using a question book (Fragebuch), consisting of about 800 questions on phonological, morphological, syntactic and lexical features. The project is divided into four modules of which the second (Exploration, 2018-2015) and the third (Analysis, 2026-2030) form the central part of the empirical work. Even though a linguistic analysis actually requires a more or less completed Exploration of the data, the DMW-Project aims to present preliminary dialectological insights and findings from the collected data while the exploration is still in progress. This is realized by preview maps, which show dynamically the present state of exploration and editing (transcription) of the data. The advantages – and disadvantages – of this approach are the topic of the given talk.

The preview maps fulfil two main purposes: (1) They are directed to people, who do not have a linguistic training but are interested in the development of the local dialects. The popular scientific notation (POP-Notation) used in the preview maps is based on the Latin alphabet and enables people to read the transcription easily. (2) The preview maps are useful to linguistics as well. Even though the data is not yet fully analyzed and the transcription is simplified, it nevertheless allows the examination of linguistic problems, such as the current course of the isoglosses of the *Rheinischer Fächer*. This will be shown by some examples.

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