

# Chapter 9

## Geographical Representation of the Royal Italian Army War Sectors and Sites during the First World War



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**Abstract** The commonly agreed representation of the Italian front during the First World War places it along the border between the Austro-Hungarian Empire and the Kingdom of Italy. However, Italy also sent troops to many other fronts throughout Europe, the Middle East, and northern Africa (Cotillo, Italy during the World War. The Christopher Publishing House, Boston 1922). The geographical knowledge related to troop deployments along these war fronts often lacks detail about the actual locations of those places.

After 5 years of research, places involved during the war and their locations are now represented using geographical tools. The research is based on a geographical information system (GIS) technology and is aimed at identifying, cataloguing and georeferencing the so-called places of war.

Dissemination of this information relies on two different, but complementary, tools: a gazetteer and an online GIS. The gazetteer facilitates searching with the online GIS and provides unambiguous results for sites related to the deployment of military units, airfields, harbours, war cemeteries, prisoners of war camps and military logistics infrastructure. Both the gazetteer and online GIS provide geographical

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support not only for historical studies but also for the preservation of local history and the memory of men and events.

**Keywords** WWI · Italian front · Military geography · Geographic information system · Gazetteer

## 9.1 Places and Memory

The link between memory and place is a dynamic and two-way relationship; our memories are closely linked to spatial landmarks that help us to anchor and clarify the memories. The connection between places and memories is so close that the disappearance or alteration of the name of a place can lead to a substantial change in the memory of that place and of the events that took place there, up to the point where the collective memory of the event itself is cancelled. Nevertheless, the community can structure the space around a certain event and, according to shared collective memories, create a place of memory (Till 2003; Truc 2012).

In the case of the First World War (WWI), the memory of places suffered an understandable and inevitable contraction. At the national level, there are only a few dozen places that represent the collective memory. At the local level, the places become more numerous, but they are different from area to area, as are the memories associated with them. However, it remains true that over the course of a hundred years, the connection between many places and their associated war events has been lost.

In 1965, the writer and journalist Paolo Monelli, formerly an officer of the Val Cison Alpine Battalion, commented that

...the names of those damned places became the personification of insatiable monsters: Doberdò and its plateau, which we and the Austrians used to call 'hell'; San Michele, a funereal mountain carved by dry valleys with dark holes and rugged crevasses consisting of four peaks, one of which was called by the Magyars 'the mountain of corpses' because so many had been piled up that they altered the profile; and the Vallone, a sad hollow around the dead swamp of Doberdò, where cemeteries grew like mushrooms after each battle. How many are the survivors now, survivors by miracle, who still remember these names that once had so much evocative strength... (Manzutto and Bianchi 1965, p 12)

Places have always been given names, but how can a place be uniquely identified? It is commonly recognized, geographically, that the location of a place, even if corresponding to an area, is generally indicated by a point and that points are defined by geographical coordinates (Melo and Martins 2016). Although this is true in most cases, there are situations in which the correspondence between the name and geographical coordinates is not unambiguous, as in the case of toponymic homonyms, where the same name may be used to indicate different places having the same name (e.g. there are two occurrences of Monte Cristallo and four of Ronchi in Italy and four of Veliki vrh in Slovenia).

In an ideal world, a geographical entity would have a single and unique name; in reality, geographical names vary according to language, people's habits, history and socio-political situations (Hoelscher and Alderman 2004). These differing names are known as variants. Misunderstandings and uncertainty may, therefore, occur if the name of an entity is written in different ways, when different names are used for the same geographic entity or when a name is attributed to a place in a different way than the generally shared one (DeLozier et al. 2016). In 1928, Paolo Monelli wrote:

For the spelling of certain geographical names I returned to the true and traditional, and I repudiated that one although sanctioned by some war bulletin, but due to the incorrect transcription of the Austrian papers... (Monelli 1928, p XI)

In any case, dealing with geographical names implies the need to take into account the toponymy, which is the study of the place names (IGMI 2004a; Löfström and Pansini 2012). Toponyms, from the Greek words *tópos* (place) and *ónoma* (name) and meaning the name of the place, are represented in natural language, and most of the time they are the result of a subjective interpretation and a creative process guided by the local population (Conedera and Krebs 2007). Moreover, the naming process is strongly dependent on the social and historical contexts (Borin et al. 2014).

Geographical names have a labelling function in order to exactly identify different places. Geotagging, the attribution of geographic coordinates to objects (Lieberman et al. 2010), and naming processes are influenced by elements such as the characteristics of the place (e.g. Busa del ghiaccio – Ice Hole, Bosco triangolare – Triangular Wood), the type of use (e.g. Piani delle Bombarde – Plain of Bombs) and reference to particular people (e.g. Forcella Dal Col – Dal Col Pass, Monte Corno Battisti – Mount Corno Battisti) and often have the purpose of remembering the fallen or commemorating events (e.g. Isola dei Morti – Island of the Dead, der Blutige Kote – Bloody Hill).

At the time of their creation, toponyms have a clear and shared meaning. Their meaning is 'transparent' for the people then, but with the passage of time, the meaning can disappear completely or lose its original clarity so as not to be more explicit and immediately intelligible (Jordan 2009).

## 9.2 From the Name to the Place

Geographic names are usually collected in dictionaries called gazetteers, which include the geographical names as well as their location and information about the type of feature. The names may occur at different scales, both global and local. Nowadays, gazetteers can be consulted online and represent a precious resource for the automatic search for toponyms (Goodchild and Hill 2008; Zhu et al. 2016).

On the other hand, historical-geographical studies are still largely conducted by consulting text documents and maps prepared without the use of computer technology and written by different authors in diverse languages. In addition, some of the texts may have been written under problematic conditions, i.e. during military

actions. It is not an easy task, therefore, having multiple types of documents as sources, to identify and precisely locate places, mainly because many of these places are no longer shown on official modern maps.

A validation of the geographical content is necessary to identify a specific place, i.e. to determine its actual name and position on an official modern map. Most of the time, the enormous quantity of potential historical-geographical information, which can be downloaded from the web, cannot be directly used to know and compare the data with the current geographical position. In addition, inconsistencies and redundancies of names found in different sources can make the identification of places on the maps contradictory and confusing. The same can occur when trying to locate a place via the web with a search. One can get no results, obtain the name on which you are working as the only result or obtain names that are numerous, inaccurate or misleading, resulting in a search that is practically useless.

The automatic resolution of a toponym is, therefore, difficult because geographic databases are sometimes insufficient and because one can run into errors connected to the high degree of ambiguity in the name of a place due, for example, to terminological variations (terminology is defined as the study of words and their use) or, in some cases, to real errors (Leidner 2008). Bringing the name of a place back to a single pair of coordinates, latitude and longitude, that unequivocally identify a point is not an easy task. Different types of errors and variations in the names of the sites and the lexical variants (different forms of a word that concern the morphological or phonological characteristics or are limited to spelling variants) make the task of identifying and georeferencing places particularly challenging.

### 9.3 The Great War of the Italian Royal Army: In Search of Places

In the early twentieth century, even during WWI, geographical knowledge of the war zones was lacking and incomplete in most of the population. At best, the knowledge was limited to combat units, confined to the local level or available in military and academic environments (Porro 1898). This situation is clearly recognizable in the historical texts that we have analyzed.

There are places whose names help to anchor collective memories; those where WWI was fought from May 1915 until November 1918 are no exception. Some toponyms like Monte Cengio, Pal Piccolo, Grave di Papadopoli, Montello and Caporetto have a highly symbolic value because they were the sites of important events, sometimes decisive for the fate of the war. Furthermore, some places that did not have names before the war or whose names were changed during or immediately after the conflict became an element for the preservation of memory.

The association of place names with events allows us to better remember the event itself. Using tools that manage the names of these places in a computerized system allows the events of the past to be brought closer to today's reality. The use

of geographical information systems (GISs) to collect and organize the names of WWI has, therefore, had a dual purpose: to correctly place the most or lesser-known places on current maps and, above all, to make them accessible to the public, thus passing on their memory.

Defining an a priori strategy aimed at finding places is a challenging and complex task. If there is no adequate pre-existing digital corpus or a local geographic dictionary, it is necessary to consider the chronological distance from the facts and the heterogeneity of the available textual and cartographic sources.

The search for places, whose names were extracted directly from texts and old maps and which are identified on official modern maps, was one of the major problems encountered during this study. The difficult cases were numerous also due to the extension of the area under examination, which includes, in addition to Italy, parts of the current Republic of Slovenia (Primorska), the Republic of Austria (Carinthia), France (Lorraine, Champagne-Ardennes and Picardy) and Albania, Macedonia, and Greece.

In the data organization phase, homogeneous geographical macro-sectors were defined a priori. These are (Fig. 9.1) Ortles-Cevedale-Adamello, Giudicarie-Garda-Altipiani, Dolomites-Carnic Alps, Julian Alps-Isonzo-Friuli lowland, middle-low Piave, Linea Cadorna, Western Front (Second Battle of the Marne) and Eastern Front (Albania-Macedonia-Greece). We decided not to create a sector dealing with the activities of the Italian Navy since the places are widely scattered along the coasts of the Mediterranean. These choices, in addition to having a scientific and operational motivation, also took into account the chronology and type of war events.



**Fig. 9.1** The war sectors involving the Italian Army. (1) Western Front, (2) Linea Cadorna, (3) Ortles-Cevedale-Adamello, (4) Giudicarie-Garda-Altipiani, (5) Dolomites-Carnic Alps, (6) middle-low Piave, (7) Julian Alps-Isonzo-Friuli lowland, (8) Eastern Front. (Data from the National Research Council of Italy (CNR), map from the Database of Global Administrative Areas (GADM))

## 9.4 The Sources

The collection of geographical data on WWI was performed by manually extracting the information from over 400 documents attributable in terms of publication date to two periods. The first refers to documentary material published from 1915 until the end of the 1940s. This material includes the ‘War Bulletins’ issued daily by the General Staff (Anon. 1923); the ‘Historical Corps and Commands Summary in the 1915–1918 War’ (Ministero della Guerra 1924–1929); the official report ‘Österreich-Ungarns Letzter Krieg 1914–1918’ in seven volumes, issued by the Austro-Hungarians and published in the 1930s (Glaise-Horstenau 1931–1938); and many other reports on the early years of the war. Official and unofficial monographs predominantly describe the character of events and the actions of specific combat units. This group includes battlefield guides prepared by the Italian Touring Club (Anon. 1929–1940) and Michelin (Anon. 1919a; Anon. 1919b). All these documents have a very heterogeneous content and very often lack geographical precision, both in terms of textual information and in the availability of cartography.

The second category of documents includes volumes published from the 1950s through to the present. On the occasion of the 50th anniversary of the war (1965–1968), several volumes with a predominantly celebratory and reminiscent character were published, whereas in subsequent years, texts dedicated to specific topics such as battles, fortifications and coastal defences, photographic collections and historical-hiking itineraries began to appear. A detailed list of the sources used is listed in an ad hoc web page (Bibliotecalpina 2006).

The analysis of the texts and the extraction of the sites from the documents were carried out without the support of information technology tools. This low technology and time-consuming procedure allowed the search for sites to be extended to cartographic sources and contemporary texts only available in paper form. The approach also guaranteed the identification of a large number of sites with remarkable exactitude from the point of view of their location.

The main purpose of the project was to create an inventory of places as complete and detailed as possible. To populate the inventory of places, we chose the following methodology: the researcher reading the document (in printed or digital form) identified a geographical name then searched the existing raw geodatabase. If already present in the database, the record was marked, ready to be filtered to create the WWI geodatabase and become a WWI place name. If there was no result from the raw geodatabase, the GeoNames online database (GeoNames n.d.) was consulted in parallel with a web search to find the name and insert it, duly marked, in the raw database. If the name was still not found, a modern map was consulted to find the place, using the information about its position obtained both from text and/or maps. Again, if nothing occurred, the last step in the process was to search for the geographical name on an historical map. This last step provided fruitful results, especially when the place name had changed after the war. Finally, in the case where no result was obtained, the last possibility was that the candidate WWI place name contained an error (a typo, for example) or was an unregistered kind of variant of the

proper name. In this case, a sort of ‘trial and error’ procedure was used to find the correct form of the name by substituting one letter or inverting part of the term. At the end of this process, the correct name (toponym) and its variants were inserted into the geodatabase.

We adopted an approach that analyzed official Italian and Austro-Hungarian source texts with additional documentary material. Some of the official summary documents have not proved particularly exhaustive: this is the case for the collection of the Bulletins of the War, in which less than 9% of the total census sites are mentioned. On the contrary, documents, such as summaries or historical diaries of battalions, regiments, and brigades, contain detailed references to places that should be considered. Although of secondary importance in the general framework, these places deserve to be remembered. They represent second- or third-line locations, troops’ transit hubs, airfields, ports, headquarters or military medical facilities. At present, more than 400 volumes have been read and the geographic information contained extracted. Although the material contains an enormous amount of geographical information, the lack of associated maps must be noted: the information contained in the texts tends to take readers for granted by assuming a thorough knowledge of the places.

### ***9.4.1 Basic Cartography***

The official Italian Military Geographical Institute (IGMI) maps at a scale of 1:25,000 were used to position the places extracted from the source documents. In the area not covered by Italian cartography, different resources were used depending on the area. For Slovenia, the cartographic portal of the Republic of Slovenia, (eZKN [n.d.](#)), was used. For France, Albania, Macedonia and Greece, mainly historical maps were used.

Recent cartography related to Italy (IGMI 1:25,000 and 1:100,000 scale maps and orthophotos) was accessed using the national Geoportal through Web Map Services (WMS) (Geoportale Nazionale [2017](#)). In the same way, it was possible to consult maps of the Trentino-Alto Adige, Veneto, and Friuli-Venezia Giulia regions.

For the identification of the sites, we made extensive use of period and modern maps, both in digital and printed format. The most useful resources among the historical maps of Italy were the 24 1:100,000-scale sheets of the ‘Great Map of the Italian War’ published in 1917 by the Italian Touring Club and the Military Geographic Institute (TCI [1917](#)). In 1965, those maps were described in the following manner:

Who has not unfolded and used the two hundred and fifty thousand and then the most detailed one hundred thousand scale [maps] created on purpose for the War, staying at his own table at home or, even along the lines of combat and movement, finding places never heard before... (Manzutto and Bianchi [1965](#), p 5)

As for the Austro-Hungarian sources, we used the online version of the ‘Spezialkarte der Österreichisch-Ungarischen Monarchie’ produced by k.u.k. Militärgeographisches Institut at a scale of 1:75,000, completed in 1890 and integrated in 1894 (NYPL 2020). It includes the part of the Austro-Hungarian Empire currently in Italian territory. The online version of the 1910 ‘General Atlas of Central Europe’ (Generalkarte von Mitteleuropa), at a scale of 1:200,000 was also used (Landkartenarchiv 2003-2019; katonai felmeres n.d.).

From this description of cartographic sources, the heterogeneity of the representation scales is evident. The maps thus required projections and coordinate systems to be harmonized to make them compatible with the WGS84 geodetic geographic coordinate system adopted within the GIS.

In addition to the official maps, around four hundred papers, maps, sketches, drawings and photos containing information referring to the territory were analyzed, following the procedure above described. All this allows the extraction of the greatest possible amount of information, such as the evolution of the front line or the locations of sites no longer found on modern maps.

#### **9.4.2 Digital Sources**

During the first phase of the project, the largest amount of material already available in digital format (gazetteers) was collected. The Database of Global Administrative Areas (GADM 2018) was used, as well as the OpenStreetMap database (OpenStreetMap n.d.; Haklay and Weber 2008). Other sources consulted were the GeoNames database (GeoNames n.d.) and the online place search engine provided by the Italian Geographic Military Institute (IGMI n.d.). The Italian Official Toponyms database is not available since it has been developed only for the internal use of the IGMI.

The data were mainly organized in layers of points, although objects, such as lines and polygons, have also been taken into consideration. These were necessary to highlight changes in the front line during the war. Representation of the drainage network and national, regional and municipal boundaries was also necessary.

### **9.5 The Analysis of Toponyms**

As easily predicted, the toponyms collected by an analysis of the texts do not always present themselves in an unambiguous form. About a quarter of the sites have one or more different forms. All the forms encountered in the texts were duly collected, archived and brought back to the form considered preferred, which is, for the Italian territory, the one represented on the official IGMI 1:25,000 scale maps. When the name of the location was no longer available on current maps, the name was found in other sources. If the place was located abroad and had a name in Italian, the latter



was used; otherwise, the name in the local language was used. Using the same criteria, the linguistic equivalents in French, Slovenian and German, as well as forms in the local languages (mainly Friulian and Ladin), were also collected.

Identification of the terminological variants was fundamental to guarantee exactitude and precision, both of which were key factors in obtaining completely acceptable geographical names accessible using a search engine. Harmonizing toponyms from different sources along with their geographic coordinates led to the creation of a table specifically dedicated to the management of toponyms themselves, i.e. a gazetteer or geographical dictionary (IGMI 2004b). This allowed terminological issues related to the different forms of geographical names, such as use, language, translation and meaning, to be highlighted.

When carefully analyzing the numerous terminological variants of geographical names for their locations, we noted that many of these variations were connected at different levels with the memory of places as true commemorations of events and people or as traces of the passage of time. The abundance of these variants suggested a careful analysis of their nature and how the variations may retain a meaning linked to events and can, therefore, be read as memories of events.

The toponyms showing variant forms were collected and marked by distinct terminological classes, in the following lexical variants:

- Spelling variants (spacing and punctuation, spelling, omitted components, misspellings)
- Dialectal variants
- Translations, and
- Other names (civil and military)

Lexical variants differ from synonyms in that the latter are different terms for the same concept, whereas lexical variants are different forms of words for the same expression (Adesam et al. 2012). These forms can derive from variations in spelling or grammatical variations or even appear as abbreviations.

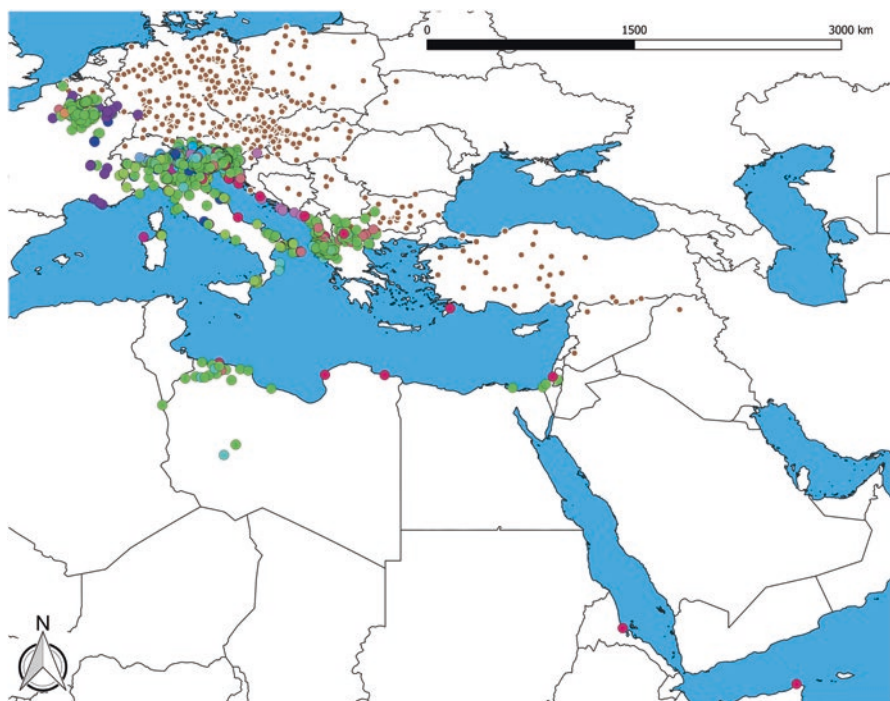
Spelling variants give us little information regarding the memory related to a certain place but are important for the unambiguous attribution of coordinates for a certain toponym. Therefore, in our analysis, we have taken the most significant spelling variants used in place names into consideration.

Dialectal variants include those cases in which one of the names is represented by the Italian form, where a variant with the same meaning in the local dialect occurs in other texts (e.g. Valle dell'Acqua, Fiumicello and San Pelagio in Italian vs. Valle de l' Aga, Flumisel and San Polai in local dialect). Due to the complex geomorphology and cultural history of the places located in mountainous areas, it is important to emphasize that the dialectal form could sometimes vary even between two adjacent valleys; therefore, the generic form 'local dialect' was used without going further into detail. In the case of toponyms located in Friuli-Venezia Giulia, all the equivalents available in the Friulian language have been recorded in a separate field. In the case of the exonym equivalents of translation, i.e. the national form of a foreign name, and translation from other languages, most of them represent

toponyms in Slovenian (e.g. Monte Lupo – Volkovnjak Croda Rossa – Rudeci rob, Dresenza – Drešnica; the first name is Italian and the second Slovenian).

Finally, the last class is dedicated to names that have undergone changes in both civil and military origin, connected or not to war events. For example, Il Triangolo became Croda Rossa, altitude 213 became Monte Sambuco, Rifugio Longeres became Rifugio Auronzo, Bocchetta del Gendarme became Passo di Casamadre and Pizzo Tresero became Cima Tresero. Once the classes of toponyms were finalized, the terminological variants were compared to show possible correlations, trends and evolutions. More than 4600 toponyms have at least one and up to seven variants (lexical, formal, linguistic, synonyms), for a total of more than 6500 alternative names.

At present, over 11,700 sites have been identified and located on the so-called Italian front in Italy, Slovenia and Austria and away from this front in France, Albania, Macedonia, Greece, Croatia and Montenegro (Fig. 9.2). The places have been clustered into two main geographical macro-categories respectively dealing with physical and human geography. They were then classified successively into 55 sub-categories (Table 9.1). Four hundred and sixty-one sites have at present been



**Fig. 9.2** The places identified so far. Larger dots in different colours represent the war places classified according to different sub-categories. The colours (e.g. green for inhabited places, violet for cemeteries, light blue for areas, magenta for naval bases) are used within the GIS to identify the different types listed in Table 9.1. In the online GIS, they are replaced by symbols. The small brown dots identify the POW camps where Italian soldiers were detained. (Data from CNR, map from GADM)

**Table 9.1** List of typology of places so far identified

Air field	Fountain	Pass	Sea
Area	Gallery	Pathway	Spot elevation
Artillery battery	Glacier	Peak	Spring
Bridge	Inhabited place	Port	Stronghold
Building	Island	Quarry	Telemetry tower
Bunker	Lake	Railway barrier	Armoured train
Cableway	Lighthouse	Railway gallery	Trench
Canal	Memorial	Railway junction	Trenched line
Cave	Monument	Railway station	Valley
Cemetery	Mountain chain	Railway viaduct	War village
Crossing keeper's booth	Mountain group	River	Water pump
Dolina	Mountain ridge	River bank	Waterfall
Emplacement	Naval base	Road	Woodland
Fort	Observatory	Road barrier	

identified as prison camps (POW camps) where captured Italian soldiers were detained. These were located mainly in the Austro-Hungarian Empire but also in Germany, Ukraine, Turkey, Syria and Iraq and some other European states.

According to the terminological variant categories, more than half of WWI toponyms belong to the class of spelling variants. More than one third are names that have undergone changes following historical, civil and military events; 9% can be attributed to translation variants and only 5% to dialect variants.

The situation of spelling variants appeared problematic from the beginning. The most relevant situations were represented by formal variants in which both forms of the names could be considered correct (e.g. Tre Ponti or Treponti, Zuc dal Bôr or Zuc dal Bor, Governolo or Govérnolo, Malè or Malé). Furthermore, partial inversions, the replacement of one or more letters, and partial transliterations often occurred.

When the variants are linked to different languages, it is important to relate them to changes in the national borders before and after the war. These changes led to the need to manage names in three languages (Fig. 9.3). The places located along the border between the Kingdom of Italy and the Austro-Hungarian Empire now mainly belong to Italy and Slovenia; only a line of about 50 km still follows the historical border along the Carnic Alps. Therefore, the places now located in Italy had German names (e.g. Malborgeth became Malborghetto), whereas those in Slovenia had both Italian and Slovenian names (e.g. Cosarsa and Kozaršče). In some cases, places have names in up to three languages (e.g. Sv Duh na Banjščici in Slovenian, Bainsitza S. Spirito in German, Santo Spirito della Bainsizza in Italian).

It is interesting to note that during the war, the use of names such as Toblacco resulted from an adaptation of the original German name Toblach, whereas the actual Italian name is Dobbiaco. Some names have been converted into Italian based on the original foreign name, which was derived from their geographical position before the war (e.g. Crna Griža became Cerna Grisa), whereas others (Valle



**Fig. 9.3** An example of places along the Carnic Alps border showing the names in Italian, Slovenian, German and local dialect. (Data from CNR, base map from Google Earth™)

Seebach) are the result of the merging of part of the German name (Seebachtal) with another part of the Italian one (Val Rio del Lago).

Within the large number of accessible documents, some places are named in different ways. Some of them can be classified not as actual terminological variants but as places that have changed their names for historical reasons to remember and commemorate specific relevant events or fallen soldiers (Kadmon 2000). Some toponyms officially known as spot elevations were renamed during the war, such as the so-called quota 85, which became Quota E. Toti, taking its name from Enrico Toti, a civilian aggregated to the Third Regiment of the Bersaglieri Cyclist Battalion, who fell on 6 August 1916 during the Sixth Battle of the Isonzo. He was awarded the Gold Medal for Military Valour. Other toponyms that already had a name were renamed during the war. These are mainly dedicated to soldiers who fell there (e.g. Volnik became Quota Gen. Papa).

Another case is that of places that did not have a name before the war but were named during the war for a specific reason. For example, the fighting during the Isonzo battles caused the Italian Army to assign names, even if not officially, to uniquely identify relevant places, such as the Vallone del Sangue (Bloody Valley). Another interesting case is that of a peak previously, and only unofficially, known as quota 2556, which is located in the mountainous group of the Piccolo Lagazuoi. It was renamed Punta Berrino by the Italians and Öllacher Stellung (Öllacher emplacement) by the Austro-Hungarians in memory, respectively, of two soldiers

who fell five days apart in October 1915. In other cases, the names of the places have been modified after the victory to remember battles or symbolic places. For example, Nervesa became Nervesa della Battaglia and Paderno d'Asolo became Paderno del Grappa. Finally, some cities or municipalities changed their names many years after the war without any connection with WWI. Among others, Cavazuccherina became Jesolo, Grisolera became Eraclea, Ronchi di Monfalcone became Ronchi dei Legionari and Moglena (Μογλενιά, Greek Macedonia) became Almopia (Αλμωπία).

Numerous toponymic homonyms have also been found, e.g. Monte Cristallo in the Central Alps (3434 m) and Monte Cristallo in the Dolomites (3221 m). Since, in many areas, the places may have the same physical and/or historical characteristics, very often the names come from the geographical characteristics that make them distinguishable and unique in a given area. A specific analysis was necessary to disambiguate these cases. For example, in the historical summary of the Pinerolo Brigade (Ministero della Guerra 1924-1929 vol 10: 18), the troops were described as having left the Tagliamento river, heading towards a place called Pielungo by crossing the Forcola Pass. The pass in question certainly cannot correspond to the Passo della Forcola, which is near the border between Italy and Switzerland in the Lombardy region more than 200 km away. It is instead the Cuel di Forchia, the official (and Friulian dialectal) form of the toponym, which when translated into Italian would correspond to Passo della Forcola. This is a case where the evaluation of the context as described in the source avoided significant errors.

In some cases, even the variant found in a document must be considered as a variation of another variant of the official name. Cima Valbruna, for example, is a variant of Cima Val Bruna, whereas the official name is Monte Foppe.

A further case study concerns those sites where the name has remained but today corresponds to a place different from that of wartime. The Osteria di Monfenera shown on the Italian Touring Club maps (TCI 1917) is today called Malga il Doc, whereas Osteria di Monfenera is located 3 km to the east.

Special mention should be given to transcription errors. These are cases in which the form found in a document is not acceptable as it cannot be traced back to any of the above cases, such as the changes from Collibron instead of Colbricon, Callari instead of Calgari and Conegliano (which exists but in this case was wrongly reported) instead of Conogiano.

While analyzing the toponyms, we found that the most frequent and numerous dialectal and linguistic variants are related to the names of peaks and mountain groups. This could be related to the geographical position of the war events since the events of WWI took place mostly in mountainous areas on the Italian border. In ancient times, only places relevant to agriculture and husbandry were given a name by local communities, and many peaks were only given names when they became interesting to climbers and tourists. The same mountain could have different names when its slopes were inhabited by people with different cultures and languages or communities with poor mutual interaction. Only in 1879, with the first edition of the Grand Map of Italy (Mori 1922), have official names been given to the mountains.

Lexical variations were rare for the drainage network in general and for rivers in particular (Costanzo Garancini 1975). In fact, the names of the rivers are traditionally very stable and are little influenced by dialectal variants, perhaps because a river maintains a long, recognizable identity throughout its journey. The only variations are due to linguistic changes related to rivers that flow through different countries.

The naming process of cemeteries and war monuments mainly deals with places that have been given a name only during or after the war. Examples include Cimitero di guerra ‘Col. Cisterni’ and Cippo Brigata Sassari, respectively.

## 9.6 The Places-of-War Gazetteer

The analysis of name variations resulted in a specific Places-of-WWI Gazetteer, in which the names are listed. This list of terminological forms of toponyms represents an improvement leading to a better, easier and more effective geographical search. Whereas variants usually produce a noise level incompatible with common search tools, in this case they provide extra value and an additional element, leading to positive search results. They also provide a contribution in terms of the lexical richness of geographical names that are strictly connected with both geographical features and the history of places.

The Places-of-WWI Gazetteer along the Italian fronts contains all the necessary information to ease the search for toponyms within the online GIS (see below). All the occurrences are listed, and the non-preferred ones are linked to the preferred forms, which contain the additional information coming from the geodatabase. The preferred place names in this gazetteer can be used in any activity where it is important to mention the preferred toponymic form.

All the forms contained in the gazetteer are pivotal elements connected to the search function in such a way that each name now corresponds to one and only one place and the name itself can be used while performing queries to provide unambiguous results. Only in the case of synonyms is the user’s skill required to make the right choice that takes the historical and geographical context into account.

Two gazetteers, namely ‘Places-of-WWI Gazetteer Along the Italian Fronts’ and ‘List of Prisoner-of-War Camps Where Italian POWs Were Detained’ were published on 15 May 2020 and are now available online (<http://luoghigrandeguerra.cnr.it/risultati/il-geodatabase/>) as PDF files. New versions of the gazetteers are expected to be published every six months.

## 9.7 GIS and Online GIS

A specially structured GIS was created to manage the geographical data collected and to guarantee the precise positioning of each site. A GIS is an integrated system that allows the acquisition, management, visualization and return of geographic

information. Two characteristics make a GIS suitable for the activities involved in this study: being able to create information layers from data associated with geographical coordinates and to allow the stratification of these layers. For example, in a historical GIS (Gregory and Healey 2007), it is possible to overlay one or more layers of information corresponding to locations no longer shown on the map, such as landscape elements, front lines, and deployments, onto a current cartographic base. This system of geographic data management can also be used profitably for the analysis of historical events linked to the territory, as in the case of the places where combat occurred during WWI (Plini et al. 2017).

The GIS used to manage the identified places was then set up to be used as an online GIS (<http://webgis.isp.cnr.it/GGGIS>) to guarantee remote access for all users interested in the locations linked to the events of WWI. The online GIS was organized to allow places to be searched using any of the forms found in the texts, in addition to forms in the other languages used in the geodatabase. By selecting the name of the place, it is possible to view its location in the territory, with the possibility of configuring the display parameters and the representation scale.

The views are generated by the server in real time. The user has at his disposal a set of navigation tools. Depending on the area to be represented, it is possible to enlarge or reduce the view, set the transparency of layers, position the selected level in the centre of the display window or search on some vector layers.

Using the internal search engine, it is possible to enter all or only the initial part of the name to be searched. The system automatically searches for the selected field and positions itself to include the identified locations on a single screen showing the following information in a pop-up window: preferred name, place type, height, province, region, state, other names, French name, other French names, German name, other German names, Slovenian name, other Slovenian names, local name (dialect or other languages), other local names, war sector and the Touring Club of Italy (TCI 1917) map reference. In the case of search by site name, the system draws on the fields related to Italian, Slovenian, German, French or other names.

There are three types of data available in the online GIS:

- Vector data from the gazetteer related to locations, drainage, airfields, exhumation zones of the 11 Italian Unknown Soldiers, places mentioned in songs and poems about WWI, the tracing of front lines in different periods and the location of the so-called Case del Soldato (Soldiers' Houses, small buildings containing books, 78 rpm discs, playing cards, built by the Italian Army along the front line to provide momentary relief to the combatants)
- Cartographic data, such as historical georeferenced maps and a digital terrain model derived from the Shuttle Radar Topography Mission imagery (SRTM 2020); and
- Cartographic data accessible via WMS

## 9.8 Final Considerations

The creation of a combined WWI GIS and a Places-of-WWI Gazetteer dealing with the operations of the Italian Army is quite unique in the international scene, in that this is the first effort with such wide geographical coverage and that it takes its cue not solely from official documents available in digital format but also from an analysis of a heterogeneous set of texts available only in printed form. We were initially faced with a situation of a relatively small number of points scattered over a wide area, but these did not provide a complete view of the extent of the territory involved and/or the complexity of the war actions. At present, however, the large number of points reveals the complexity of the events on the Italian war fronts and correlates the toponyms in an area with a detailed memory of the events.

The possible associations of toponyms and their location with respect to current maps can be summarized as follows:

- One name, one place
- One name, no place (the place no longer exists)
- No name, one place (this is the case of numerous anonymous spot elevations)
- One name, several places (in the case of homonyms)
- Multiple names, one place (toponymic variants)

These situations have been addressed and resolved using a manual terminological approach because the absence of a similar geographic dictionary and a true digital corpus made it difficult to use automatic or semi-automatic tools. Such tools were not fully suitable for this specific project, and in fact the use of semi-automatic and automatic text analysis tools (Boschetti et al. 2014) was limited to the analysis of the digital corpus, which included only a low number of volumes. It highlighted important shortcomings when it came to effectively identifying all the places potentially identifiable and to distinguishing differences in the geographical domain where misinterpretations and multiple terminological occurrences (homonyms) can be very frequent. A couple of examples, both taken from the War Bulletins, help to clarify this. The phrase ‘a valle di Seebach’, meaning ‘downstream of Seebach’, was interpreted as ‘valley of Seebach’ and consequently misplaced. In the phrase ‘sulla zona tra Isonzo e Vippacco’, meaning ‘between Isonzo and Vippacco’, where both Isonzo and Vippacco are rivers, Vippacco was associated with the wrong homonym, the Slovenian town on Vipava instead of the Vipava river (both translated into Italian as Vipacco or Vippacco).

The analysis of the collected data allowed us to identify 21,856 toponyms linked to 11,700 preferred forms. This high level of exactitude is mainly due to an approach that made it possible to harmonize historical, linguistic and geographical knowledge by combining it with the experience gained during the research work. This procedure, apparently of low technology and very expensive in terms of time, has guaranteed very high coverage in terms of identified places and very good coverage with regard to their location in the territory (26 states covered). Only slightly more than 2% of toponyms are still devoid of location. The geographic/terminological



component has enriched the system with valuable information that is difficult to find elsewhere, as it is generally disaggregated into a myriad of different cartographic texts and sources.

The high level of detail exhibited within the data (granularity) reached, combined with a dual geographical and terminological point of view, resulted in the creation and maintenance of a specific Places-of-WWI Gazetteer. In this gazetteer, the aforementioned terms are listed, unambiguously geolocalized and made available on the web through an online GIS where the available search keys are represented by preferred forms, variants and equivalents in other languages and the result is represented by the preferred form and its location in the territory.

The analysis of terminological forms of toponyms represents a huge step forward that leads to better, easier and more effective research. The names of the places in this gazetteer are linked in such a way that each name now corresponds to only one place and the name itself can be used when executing queries that provide unique and unambiguous results.

Until a few years ago, anyone who wanted to carry out place name research dealing with the Italian Army operational fronts would have had to rely on generic search engines. However powerful they might be, the result would be generally heterogeneous, sometimes conflicting and frequently lacking geographical context. For example, in the historical summary of the Livorno Brigade, we read ‘... operations that led to the occupation of Prezzo and Baite’ (Ministero della Guerra 1924-1929 vol 2: 166). In Italian, Prezzo means ‘price’ and Baite means ‘huts’. A combined search for ‘Prezzo’, ‘Baite’ and ‘war’ produces no meaningful results. Searching for ‘Prezzo’ and ‘Italy’ on Google™ leads to a meaningful result located in the Trento Province. This is not the same for ‘Baite’. In this case, a different place called ‘Baite’ can be found in the Sondrio Province (Lombardy region). Only the use of the online GIS makes it possible to identify the locations of the two toponyms.

Compared to the pre-existing situation, the search and dissemination of results online represent a turning point, bringing together all the information acquired in a single system, normalizing its content and allowing controlled but flexible access. The high number of sites identified, which is destined to grow larger, gives a measure of how much Italy suffered from the impact of WWI, although in many cases there is nothing left but a name to remember.

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