Peder Gammeltoft

peder.gammeltoft@uib.no
https://orcid.org/0000-0002-6996-9616
University of Bergen
Bergen, Norway

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Spatial Focus or Onomastic Focus? An Unsolved Problem in Digital Onomastics

Abstract

As with other research, an important part of place-name research is how to localize one's object of study. Traditionally, place-name localization has been indirect, stated in relation to in which administrative unit the place name was situated. With the so-called spatial turn, geolocation and place-name geodata have started to play an even more significant role in digital onomastics.

A tacit premise of geolocation is that it is feature oriented, regardless of whether it is point, multi-point, line or polygon oriented. This is principally at odds with the nature of place names, which have an in-built multi-referentiality. No one has focused on this theoretical problem so far, although, to the advanced user of geolocation-oriented digital onomastics, this is a constantly recurring problem.

The present paper explores this problem and proposes a solution to it by introducing the notion of the *Unique Place-Name Concept* to geolocated place-name databases. This addition will have the added bonus of enabling quick comparisons among multiple features with the same name origin and thus strengthening place-name standardization, making it easier to utilize geodata onomastically, and preventing the doubling of data, among other benefits.

Keywords
digital onomastics, place-name databases, conceptual modelling, name-centric model

1. Introduction

One of the most important aspects of place-name research is localizing our object of study. Traditionally, place-name localization has been indirect (Kemp, 2010, p. 44), mainly by association to a certain administrative unit, or to a country. Sometimes localization is also given as a Grid Reference (e.g., in the United Kingdom). However, with the growing availability over the last decades of coordinate based geodata, direct localization, in the form of spatial coordinates, is now in common use everywhere. In digital humanities, however, geolocated place-name data are only just now beginning to gain popularity in toponymic, cultural, and historical research. Linguistic and locational complexity – which is often referred to as the "essence" of place names – does not, unfortunately, combine well with existing place-name geodata models, the expression-type-location, or "gazetteer model" that most standard geodata adhere to.

This article aims to delve into this problem and show that place names may have multi-reference for both the concept of **place** and that of **name**. Although multi-reference is well-known in geolocation-oriented digital onomastics, seemingly no one has focused on it. A solution will be presented here, which is to introduce the notion of a *unique place-name concept identifier* to geographical datasets to enable linking of the same-origin place-name form across feature locations, thus enabling coordination between multiple features. Implementation of this feature will allow for a better and more exact representation of place-name data across time, space, and domains of usage.

2. How are place names represented geographically?

Let us first look at how place-name data is represented in place-name research, as opposed to their representation as geodata. A classical representation from onomastics can be seen in the national Swedish place-name lexicon, "Svenskt ortnamnslexikon" (SOL). Here the place name *Motala* is given as "**Motala** kn, stad, Östergötland" (SOL, p. 214), where *Motala* is described as the name of a municipality (Swedish: kn = kommun) and at the same time as that of a city (Swedish: stad), within a given administrative division of Sweden (Östergötland). The entry *Motala* refers to two distinct feature types – a settlement as well as an administrative unit. However, this does not make localization ambiguous, as the settlements are nested within the same administrative unit. The function of indirect location is to refer to the area where the place name is found (Ell, 2010, pp. 148–149; Bucher et al., 2019, p. 12), despite creating a certain amount of fuzziness about the concept (cf. Jones & Purves, 2008, pp. 216, 221).

This function goes directly against the finiteness of geodata, which must have a specific geographical location and a specific feature type. Thus, the name of *Motala* in a geodata-dataset like that of "GeoNames.org" would be represented in Table 1.

Table 1. Example of traditional geolocation model

Name	X	Y	Feat.Class	Feat.Code	Country
Motala	58.65131	15.19105	A	ADM2	SE
Motala	58.53706	15.03649	P	PPLA2	SE

Source: GeoNames.org

Here, each geographical location is explicated by means of an individual set of coordinates and IDs for feature class and feature code: *Motala*[1] designates the administrative unit expressed by "kn." in the SOL article, whereas *Motala*[2] designates the term "stad" of the article.

In cases where a place-name expression only refers to one geographical location, there is no problem with this model. The problem arises when, for example, an administrative unit assumes the name of an existing local place-name expression. And it is exactly the case of *Motala*: one place-name reference with two direct locations: a municipality and a city. Each direct location has its own distinct spatial extent, its own distinct feature type – and both have their own temporality. Unfortunately, traditional geolocation cannot handle this ambiguity of expression versus localization in its data model, as localization must be definite. Thus, in order to represent reality, a traditional geolocation model must focus solely on direct location and establish a distinct entry for each locality. Then everything else, including the name of the place, is considered to be nothing but attribute data. The combination of coordinates and feature types defines the object and supplies it with uniqueness – the place-name expression is an attribute of no significant relevance to the direct location. In this model, occurrences of *Motala* are individual entities, and the fact that they share the same place-name attribute form is purely coincidental. No effort is made to indicate a relationship of origin between the individual *Motala*-localities, as this is not relevant to the model of representation.

3. The true *essence* of place names?

Let us leave the issue of one place-name expression being able to refer to multiple locations for a moment and focus a little on the notion of direct location. In its purest form, direct location is a set of coordinates and a set of attributes that provide sufficient and essential information about the represented object or feature. Since place names are often mono-referential, that is, a place name refers to one feature only, this model is in principle on par with the nature of place names. However, with language and geography, things are not as simple. For instance, it is not uncommon for a feature to have several names, or for the same place-name expression to be used of several geographical features. Depending on the cultural, linguistic, and ethnic makeup of the surrounding user groups, any feature may have several names. For instance, a mountain in the northern Norwegian municipality Nordreisa (North Sami: Ráisa, Kven: Raisi) bears the North Sami name *Gáhkkoroaivi*, as well as the Kven name, *Kaakkurivaara*. In toponymic research, it is well known that one and the same feature may have several names, either as the result of several languages being spoken in the same region at the same time, or as the result of naming of the same feature from different positions, differences in user-group focus, or differences in resource usage. Naming from different positions can be exemplified by the Norwegian mountain, *Kråkvasstinden*, in Oppdal, Trøndelag, which is also authorized as *Sandåhøa*. This mountain has a very steep face with a pronounced peak when observed from the north-east, but from the west and south-west it looks merely like a sloping hill. This fact has given rise to a set of parallel names: *Kråkvasstinden* (-*tinden* ‘the peak’) and

Sandåhøa (*-høa* 'the hill, elevation').[1] Differences in naming focus as a result of different user groups or differences in usage can be found in multicultural environments where different cultural or ethnic groups live by separate means of existence, such as mainly by farming, by fishing, or by transhumance. Differences in usage will also be reflected in what each user group sees as important about a locality. An example of this is the three names *Mikkeli*, *Kersantti* and *Andsjøen* for the same North-Norwegian settlement of in Nordreisa in Troms and Finnmark. The settlement's Kven names reflect ownership of the settlement (once owned by Kersantin Mikkeli).[2] The Norwegian language name of the locality, however, *Andsjøen*,[3] appears to be a name-transfer from Trøndelag (Rygh, 1911, p. 186), presumably commemorating the place of origin of an earlier inhabitant/owner.

Traditional geolocation can only handle a situation with two or more names for one and the same feature by either adding a new locality to the feature for each place name, or more often, by enlarging the data table with additional attribute fields that contain variant names. With either solution, there are problems. With the first solution, the one location per place name creates a lot of feature-doubling. The result is a geolocation system that is complicated and difficult to manage. It is impossible to ascertain if the place names belong to one and the same feature, or if we are in fact dealing with different features with different place names. For the second solution, where all variation is handled in the attribute fields, the problem is how to retrieve the alternative forms and grade their individual standardization status – for example, which are official, and which are not? Another question is how several alternative name forms are handled – are all place-name forms placed in one additional attribute field, or do we have an attribute field for each possible alternative form?

From these examples, it is clear that place names can have multi-reference for both *location* and *reference*. To the user of geolocation-oriented digital onomastics, this is a constantly recurring challenge – and one making spatial onomastic infrastructures difficult to handle. In database terms we are dealing with a many-to-many relationship between location and reference – or, in plain words, between place and name.

[1] Retrieved November 5, 2021, from https://stadnamn.kartverket.no/fakta/861998
[2] Retrieved November 5, 2021, from http://www.kvenskestedsnavn.no/stedsnavn/view/8156
[3] Retrieved November 5, 2021, from https://stadnamn.kartverket.no/fakta/929739

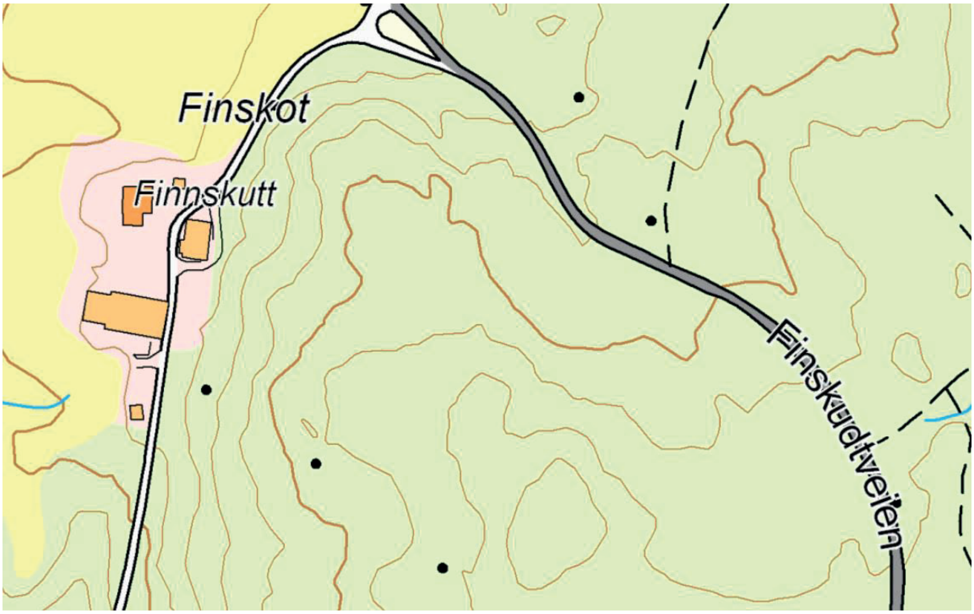

Figure 1. Map showing the result of not stating the same-origin place-name relationship between localities/feature types. The same place name is spelled variously as *Finskot*, *Finnskutt* and *Finskudt-*

Source: Statens kartverk. License: CC-BY.

The consequence of using a traditional geodata model on onomastic data is data discrepancy, at least in the long run, because it is difficult to maintain attribute data if the same data occurs in different data entries, such as in the Norwegian case of *Finskot* in Rakkestad, Viken (see Figure 1). Here the farm name (ID 976174) is authorized as *Finskot*,[4] whereas the main cadastral unit is authorized as *Finnskutt* (ID 669118).[5] In addition, the derived road name is spelled *Finskudtveien* (ID 1062371).[6] Since the underlying place-name database does not have the possibility of linking the individual place-name expressions to each other, the consequence is blatantly visible data discrepancies on the *Norgeskart* (https://www.norgeskart.no) web map of the national mapping

[4] Retrieved November 5, 2021, from https://stadnamn.kartverket.no/fakta/976174
[5] Retrieved November 5, 2021, from https://stadnamn.kartverket.no/fakta/669118
[6] Retrieved November 5, 2021, from https://stadnamn.kartverket.no/fakta/1062371

agency, Statens kartverk. More importantly, it is difficult to connect and link research data to geodata, since it is not clear which research data matches which geodata entry. This ultimately leads to a lack of cooperation between the academia and spatial data providers, because spatial data is seen by researchers as inconsistent and fragmented. Research data, on the other hand, is generally viewed by geodata providers to be ambiguous and too simplistic in representing the world. Fortunately, it is possible to overcome this and to combine the name-centric view with the location-centric one.

4. Place names and spatial data

Solving the problem of matching name-centric data with location-centric data is in principle simple. All that is needed is to adapt the traditional geodata model to be able to handle both name and locality conceptually. To be able to treat anything conceptually, it must be described. There are generally two ways of doing this: either by typologizing or by codifying attribute data, that is, assigning attribute IDs. When working with attribute IDs, it is necessary to know how they function. There are, generally speaking, two kinds of IDs: 1) IDs that represent, or signify, a constant value, and 2) IDs that signify a concept, whose appearance, size or name may vary over time or from dataset to dataset. The first type of ID is called *a constant*, whereas the second ID type is the so-called *variable*, which merely acts as a placeholder. Both ID types are unique values, but their application varies. Coordinates are usually considered to be constants – should a set of coordinates be changed by moving a location, the coordinates automatically gain a new value. Whatever the coordinates represent is constant for as long as the values are unmodified. Often, however, a set of coordinates is also given its own attribute ID, to keep control of which feature the coordinates represent. The ID for an administrative unit is also a constant. However, the object – or concept – it signifies is not. There will be constant revisions to its extent and possibly also to its name label(s). But any changes to the signified will not have any effect on the ID, as it functions as a placeholder. Even though we think of IDs as signifying constants, most IDs act as placeholders for concepts capable of variation.

In the field of spatial data, localities are already treated conceptually, as they contain typological attribute information, such as the feature type, and a codification in terms of a unique locality-ID. Place names, as discussed above, vary over time, necessitating any functional place-name expression ID to be a *variable* – and a placeholder. Hitherto, the place-name expression itself has only been treated as simple attribute data in geodata. By doing the same for the place name – adding an additional codification attribute(s) to the spatial dataset, specifically designed to handle the linguistic side of geodata object – we are able to treat the place-name expression as a concept. All it needs is its own code or ID added to the dataset. To do this correctly, it is necessary to view the place-name expression as **an independently interpretable unit** not restricted by spelling, pronunciation, or time.

In its base form, a place name is only meant to create a cognitive connection in the mental map of the name users. Place names do not indicate exactly where the locality is or what it is, but rather act to establish a spatial framework within which to conceptualize what is being conveyed during a communicative setting. The fact that one place-name expression may refer to several different kinds of localities, or features, is irrelevant for communication, and if specification is needed, then additional markers may be supplied, such as ‘farm’, ‘village’ or ‘parish’, to point out a specific locality. The mechanisms behind this are related to the notion of *metonymy* (association by proximity), and, more specifically, *polyonymy* (association to multiple distinct, but related referents).

5. The current situation, an example

To illustrate this problem, let us travel to the Norwegian small island of *Frøya* just off the coast in Bremanger, western Norway. On this tiny island we find several examples of the same name for different localities and feature types (see Table 2).

Figure 2. Map of Frøya, Bremanger, Norway. Place-name expressions used to explain the conceptual model are underlined

Three of the examples are names of settlements. These have all gained their name from a nearby natural feature by means of metonymy, either the island itself (*Frøya*), a beach (*Stranda*, literally: 'the Beach') or a bay (*Ånnevika*). All six examples are distinct localities with different feature types. However, there are only three distinct place-name expressions. Given the small size of the island, merely 5.5 km × 7 km, it should be relatively simple to retain similar spellings for different features. However, when operating datasets in the region of 1 million named localities and feature types from different data sources are created, maintained and used by different state and local government agencies, it quickly becomes evident that it is very difficult to keep control of spellings. The above example of *Finskot*/*Finnskutt* shows how the management of place names can twist itself out of control if the entire place-name material of a given area is not seen as a whole.

Table 2. Examples of place names from Frøya with similar place-name expressions across different feature types. Distinction between the different localities is made by means of the LocalityID column

LocalityID	Expression	Feature_type
10001	Frøya	island
10002	Frøya	settlement
10003	Stranda	small-holding
10004	Stranda	beach
10005	Ånnevika	farm
10006	Ånnevika	bay

Source: own work.

The outlined problem is not just a trivial onomastic conundrum dreamt up in an academic setting. This issue relates to how we manage place-name datasets and how we secure and implement a uniform means of place-names management – and ultimately gain a uniform means of standardization. If we do not have an overview of when a place-name expression becomes the name of different feature types – or possibly even in another dataset – how can we be certain that we are dealing with the right place name and the right feature? The answer is that we cannot, unless we start looking at place-name expressions as attribute data on par with other attribute variables, such as administrative units and statistics. The solution to this is, in principle, simple.

6. Implementing the *conceptual place-name expression*

The answer is to add a unique identifier (UID) to the data entry for the locality represented in the geodata (here: LocalityID) as well as a UID for the place-name concept variable (here: NameID). By doing this, it becomes possible to control and monitor the place-name inventory inside any geodata-dataset – and across datasets. The NameID functions across time, space, and expression and only acts as a placeholder. It is important to be aware that the NameID acts as a UID of a place name as **a conceptual unit**, not as an ID for the named expression of the actual geographical locality. If there is a need to distinguish the written expression of one feature type from another feature type with the same NameID, this is simply done by combining the UID's LocalityID with NameID. In this way 10005_CCC is distinct from 10006_CCC (see Table 3). Similarly, should the need arise to distinguish across time or datasets, this can be accomplished by adding the combination of source and year (of the source expression), to the ID string (cf., Table 5). Also, if certain feature types are investigated, then data is sorted simply by including attribute data on feature type in the query.

Table 3. Concept table featuring localityID and NameID. The column NameID represents the conceptual place-name expression

LocalityID	NameID	Expression	Feature_type
10001	AAA	Frøya	island
10002	AAA	Frøya	settlement
10003	BBB	Stranda	small-holding
10004	BBB	Stranda	beach
10005	CCC	Ånnevika	farm
10006	CCC	Ånnevika	bay

Source: own work.

The advantage of having individual ID values for different variables in geodata datasets lies in the transformability and scalability of data. Each dataset and individual data entry can stand alone, as well as be a subset of other datasets. The level of detail and the focus of information – location, reference, time, and source, or a combination of these – is determined by which IDs are central and how they are combined to make up the subset. If a focus on location is needed, then LocalityID must be the central one. If, on the other hand, the place name is in focus, then the NameID is the guiding ID. In this way, the same data can be used for displaying place-name geodata, either as used by national mapping agencies where the focus is on displaying correct location, or for place-name specific data, as used in applications and database systems aimed at traditional onomastic research into the origin of place names.

One note of caution, however. The model cannot be used without having insight into onomastics as a discipline or understanding the **nature** of toponyms. The consequence of this is that onomastics finally comes to the realm of geodata management. In terms of geodata management, *name* has finally found its *place*, so to speak. The inclusion of a place-name concept ID (NameID) makes data management more stable, but it does add the complexity of determining which NameIDs belong together internally and across datasets.

However, the benefits of adding an ID to the place-name concept outweighs the increased complexity. They are not limited to the ability to control the spelling of the same name concept across localities or feature types. The main advantage, as seen from an onomastic point of view, is that the addition of a NameID enables interpretation of a place name without having to manage which locality the name denotes in a geodataset. To onomasticians, the most important advantage is that the place-name expression is treated as a linguistic phenomenon and thus lifted to its proper place in geodata management. Not only does this help avoid the traditional issue of doubling of interpretation of the same name for more localities, but it also completely alleviates the risk of interpretation mismatching in place-name databases. By combining NameID with other IDs, it is possible to easily scale and visualize place names across name, locality, type, and time.

7. Extending the *conceptual place-name expression*

The NameID attribute can also be extended to form part of other toponyms whose names derive, fully or in part, from other place-name concepts. In *Frøya*, our island from the above example, there are many situations where place-name concepts form part of other name concepts. For instance, *Frøya* functions as the specific of *Frøya kyrkje*, *Frøyadalen*, *Frøynes*, *Frøyaskjera*, *Frøyagrunnene*, *Frøya-Skorpeflua* and *Frøysjøen*. Similarly, *Ånnevika* also forms part of *Ånnevikholmen*. By adding information on how a toponym is composed, it is possible to manage the relationship between primary and secondary (derived compounded) place-name expressions. This relationship is here conceptually shown in the column NameID_Composition (see Table 4). When an element in a compound place name is derived from another place name, this relationship is expressed by the addition of the NameID of the original place-name expression to the NameID_Composition.

The function of the NameID_Composition data field is to make explicit the linguistic relationship between different name concepts, especially to clarify what role one place-name concept has as part of another compound place-name concept. In Table 4, the compound divide is marked by a vertical line, or pipe. When a place-name concept occurs as the specific, it is to signal a proximity of the compounded place name to the primary place name constituting the specific element. The other part of a place-name concept, called the generic, is usually a word referring to the original type of locality bearing the name. It will often also be necessary to state **how** a place-name concept is compounded, for example, how it is declined, whether it is finite, etc. Depending on the type of language, the internal relationship between compound elements can be expressed in various ways, one of which is presented in Table 4. Place-name compounds such as *Frøynes* and *Ånnevikholmen* only contain the root form of the specific element. This is marked with a suffixed */root* in the figure. Likewise, the definite article is expressed as part of the generic element in *Ånnevikholmen* by the expression + def.art.sg.

Since this model does not have a specific focus, it allows for several name forms for the same feature and makes it possible to describe their internal relationship. In Table 4, LocalityID 10007 has two NameIDs and thus

Table 4. Concept table showing how NameID_Composition can manage formally secondary place names and their relationship to place-name concepts of other toponyms. The column NameID_Composition explains how the place name is compounded

LocalityID	NameID	Expression	Feature_type	NameID_Composition
10001	AAA	Frøya	island	
10002	AAA	Frøya	settlement	
10007	DDD	Frøya kyrkje	church	AAA | kyrkje
10007	AAA	Frøya	church	
10008	EEE	Frøyadalen	valley	AAA | dal + def.art. sg.
10009	FFF	Frøynes	promontory	AAA/root | nes
10010	GGG	Frøyaskjera	sea-rock	AAA | skjer + def.art. pl.
10011	HHH	Frøyagrunnene	shallows	AAA | grunn + def.art. pl.
10012	III	Frøya-Skorpeflua	shallows	AAA | ØØØ
10013	JJJ	Frøysjøen	fjord	AAA/root | sjø + def.art. sg.
10005	CCC	Ånnevika	farm	
10006	CCC	Ånnevika	bay	
10014	LLL	Ånnevikholmen	islet	CCC/root | holm + def.art.sg

Source: own work.

occurs twice. The primary place-name concept of LocalityID 10007 is *Frøya kyrkje* (NameID: DDD) and is the so-called institutional name. As an institution, the church on this island is known both under its shorthand form, *Frøya* (NameID AAA), and under its full name *Frøya kyrkje* (NameID DDD). The full name is in itself a compound of NameID AAA and of the Norwegian term for a church, 'kyrkje'. The compound relationship is described in its NameID_Composition field and readily allows for a greater understanding of the occurrence of two similarly competing place-name concepts for the same place-name locality.

Table 5. Concept table showing how current and historical place-name expressions can be managed within the same model. The column Status explains the type of data entry (current, historical or pronunciation). The columns Date and Source are added to manage the temporal aspect of historical place-name expressions

LocalityID	NameID	Expression	Feature_type	Status	Date	Source	NameID_ Composition
10001	AAA	Frøya	island	current			
10002	AAA	Frøya	settlement	current			
10007	DDD	Frøya kyrkje	church	current			AAA | kyrkje
10007	AAA	Frøya	church	current			
	AAA	Frøien		historical	1919	Rygh NG	
	AAA	*frøí'na*		pronunciation	1919	Rygh NG	
	AAA	Frøen		historical	1723	Mat.	
	AAA	Frøenn		historical	1603	Jb.	
	AAA	Frøø		historical	1516–1521	NRJ. II 134.	
10005	CCC	Ånnevika	farm	current			
10006	CCC	Ånnevika	bay	current			
	CCC	Aannevik		historical	1919	Rygh NG	
	CCC	*å'ŋŋevíkạ*		pronunciation	1919	Rygh NG	
	CCC	Annevig		historical	1723	Mat.	
	CCC	Onneuigen		historical	1667	Mat.	
	CCC	Arreuigen		historical	1608	Jb.	
	CCC	Arnneuigh		historical	1563	Jb.	

Source: own work.

So far, the temporal aspect has not been mentioned. In what follows, it will be outlined how this can be implemented. Although temporal manifestations often relate to both a name and an object, it is important to be aware that the nature of historical sources does not always make it possible to establish exactly what object or feature the historical form describes. Thus, it is important, as in traditional historical onomastics, to align a temporal manifestation (usually called the source form or historical form) to the place-name expression, rather than any current location. Thus, it is best only to add a NameID to temporal manifestations, be they written or phonetic renderings (see Table 5). This allows temporal manifestations to be analyzed under one place-name expression, as well as to be related to one or more direct locations. This is possible through the association of a LocalityID to a NameID.

All place-name expressions are indirect locations capable of referring to more than one direct location. This means that the model needs to be scaled to accommodate this. Aligning a temporal manifestation to the NameID most closely represents reality. Therefore, all place-name expressions, be they current, historical, sound recordings or phonetic renderings, should only be related to a direct location (LocalityID) by means of association to an indirect location (NameID). Nonetheless, should a historical form be able to be associated to a direct location, it is always possible to assign to it the LocalityID of the direct location in question, in order, so to speak, to hard-code it to its direct location.

If the temporal aspect is to be implemented correctly, however, it is necessary to add columns for the dataset source (here: Source) as well as a date column (here: Date). Depending on the type of source, the date should represent either that of the source or that of the individual entry. More importantly, however, it is also necessary to add a control column, stating the temporal status of the entry (here: Status), that is whether the entry is current or historical. This should help avoid any mixing-up of historical and existing place-name expressions. As an additional control, note that Table 5 does not give a date if place-name expression has the status “current”.

8. Conclusions

There are obvious benefits of implementing place-name concept variables in geodata. The NameID offers unprecedented control, transformability, and scalability of geodata-datasets, at the same time liberating place-name data from the straight-jacket of geolocation. Admittedly, such an implementation presupposes knowledge of the *essence* of place names, but the extra effort in the acquisition of onomastic knowledge is easily offset by the increased usability of datasets across domains, time, and foci.

Some research fields and governmental agencies will be able to reap considerable benefits, such as onomastics, place-name management, place-name standardization, corpus research, etc. By introducing onomastic principles to a geodata model, we can move away from a strictly geo-oriented view of toponymic geodata. By combining the traditional locality-centric geodata perspective with a name-centric one, it is possible to see what place names really are – multi-faceted representations of location and communicative information.

One thing not touched upon, and which is outside of the scope of this paper, is its applicability across database systems. The data model concept here is inspired by web-semantic data modelling, but it can equally well be used with either a traditional relational database system or in a hierarchical database environment. In either model, the addition of ID variables is a simple process and introducing a unique cross-feature place-name concept variable is an effective way to link across features and between datasets. This is a component much needed in digital and computational humanities, as it will enable the coordination between multiple features with same name-origin and more exactly represent place-name data across time, space, and usage. Most importantly, however, it will enable a more flexible integration of place-name data into other data infrastructures – spatial as well as non-spatial.

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