

New Ways of Mapping: Using GPS Mapping Software to Plot Place Names and Trails in Igloolik (Nunavut)

CLAUDIO APORTA¹

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ABSTRACT. The combined use of a GPS receiver and mapping software proved to be a straightforward, flexible, and inexpensive way of mapping and displaying (in digital or paper format) 400 place names and 37 trails used by Inuit of Igloolik, in the Eastern Canadian Arctic. The geographic coordinates of some of the places named had been collected in a previous toponymy project. Experienced hunters suggested the names of additional places, and these coordinates were added on location, using a GPS receiver. The database of place names thus created is now available to the community at the Igloolik Research Centre. The trails (most of them traditional, well-traveled routes used in Igloolik for generations) were mainly mapped while traveling, using the track function of a portable GPS unit. Other trails were drawn by experienced hunters, either on paper maps or electronically using Fugawi mapping software. The methods employed in this project are easy to use, making them helpful to local communities involved in toponymy and other mapping projects. The geographic data obtained with this method can be exported easily into text files for use with GIS software if further manipulation and analysis of the data are required.

Key words: Inuit place names, Inuit trails, mapping, Geographic Information System, GIS, Global Positioning System, GPS, Igloolik, toponymy

RÉSUMÉ. L'utilisation combinée d'un récepteur GPS et d'un logiciel de cartographie s'est révélée être une façon directe, souple et peu coûteuse de cartographier et de présenter (sous forme numérique ou imprimée) 400 lieux-dits et 37 pistes utilisés par les Inuits d'Igloolik, dans l'est de l'Arctique canadien. Les coordonnées géographiques de certains lieux-dits avaient été relevées lors d'un projet de toponymie précédent. Des chasseurs expérimentés ont suggéré les noms d'autres endroits, et ces coordonnées ont été ajoutées sur place, à l'aide d'un récepteur GPS. La banque de données des lieux-dits ainsi créée peut maintenant être consultée par la collectivité au Centre de recherche d'Igloolik. Les pistes (la plupart étant des itinéraires traditionnels bien courus, utilisés depuis des générations à Igloolik) ont été cartographiées surtout lors de voyages, en recourant à la fonction de trajectographie d'un appareil GPS portable. D'autres pistes ont été dessinées par des chasseurs expérimentés, soit sur des cartes imprimées, soit de façon électronique à l'aide du logiciel de cartographie Fugawi. Les méthodes employées dans ce projet sont faciles à utiliser, ce qui les rend utiles pour les collectivités de la région qui participent à des activités toponymiques et à d'autres travaux de cartographie. Les données géographiques obtenues avec cette méthode peuvent être facilement exportées en fichiers-textes pour être utilisées avec un logiciel SIG si l'on a besoin de procéder à d'autres manipulations et analyses des données.

Mots clés: lieux-dits inuits, pistes inuites, cartographie, système d'information géographique, SIG, système de positionnement global, GPS, Igloolik, toponymie

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INTRODUCTION

During my investigations of social and technological changes around wayfinding techniques among Inuit hunters of Igloolik (in the territory of Nunavut, Canada), the importance of place naming in the perception, narratives, and use of their territory became apparent. Between October 2000 and May 2001, I visited Igloolik twice, spending a total of six months in the community, during which time I accompanied hunters on several hunting and fishing trips. With the invaluable help of knowledgeable local hunters and other sources (see below), I plotted 400 local place names on digital maps and carried printouts of these

maps during trips with the hunters. Adults were especially satisfied to see their place names on maps, and younger hunters were eager to have paper versions to use as navigational aids on their trips. Maps are being used increasingly in Igloolik. Although knowledgeable elders usually travel without them, maps have become essential navigational aids to people who hunt part-time and to those who spend a good part of their formative years in formal schooling. The official topographic maps of the region, however, contain only a few Inuktitut place names, and it became clear that toponymic work leading to the immediate production of maps was highly appreciated. The importance of indigenous place names has been widely

¹ Postdoctoral fellow, Group d'études Inuit et Circumpolaires (GÉTIC), Université Laval, Pavillon Charles-De Koninck, Local 0450, Québec, Québec G1K 7P4, Canada; claudio.aporta@getic.ulaval.ca

recognized, as shown by the undertaking of several toponymy projects across North America. This paper describes the methods used to collect and plot place names and trails around Igloolik, analyzes the relationship between place names and trails, and provides information about the features of traditional trails in Igloolik.

The Challenge of Mapping Oral-Based Place Names and Land Use

Those who attempt to plot Inuit knowledge and use of the land on conventional paper maps face several challenges. One of the most important is the difficulty of mapping an approach to the landscape that has evolved through (and remains mainly as) oral knowledge. Another problem is the seasonal changing of the land, which requires a flexible sense of space. Trails on the sea ice, for example, change as the seasons progress, and place names are associated with temporary (if recurrent) features, such as ice formations and polynyas.

A common problem for communities attempting to map place names and land use is the complexity of Geographic Information Systems (GIS). They demand a higher degree of technical expertise than is usually available in small, geographically remote communities. Furthermore, GIS software frequently demands relatively expensive equipment, and the time-consuming processing of the data (linked to the need for external consultation) can be frustrating. An excellent overview of the problems facing those who map indigenous knowledge particularly stresses the conflicts between local knowledge and the need to represent it on maps, noting that “a large number of communities now possess GIS hardware and software but not the capacity to operate it well” (Tobias, 2001:20–21).

The following sections describe a methodology that can help communities to collect geographic data that can easily be converted for further GIS analysis and representation. Working with John MacDonald, director of the Igloolik Research Centre, I developed a simple, cost-effective way of plotting place names and recording trails. The use of a Global Positioning System (GPS) receiver and companion software simplified both the transfer of spatial information to topographic map displays and the creation of geo-referenced databases. The user-friendly *Fugawi 3* GPS Mapping Software (Northport Systems Inc., Toronto, Ontario) is designed to make full use of GPS: it allows data transfer between receiver and computer, creates digital maps, and permits some basic manipulation of the geographic data. One of its most interesting features is the capacity to convert waypoints and tracks into text files, making possible the creation of geo-referenced databases.

A Note on the Sources and the Maps

The interviews cited in this work (including those I collected during the present study) are part of the Igloolik

Oral History Project. They will be cited by name of interviewee, year, and an interview number beginning with “IE.” The Igloolik Oral History Project is a collaborative, ongoing project run by the Inullariit Society of Igloolik and the Igloolik Research Centre.

Throughout the paper, “Igloolik” is used in reference to the island of Igloolik and the current settlement, and “Iglulik” is used for the old campsite located several kilometres southeast of the present settlement.

Figure 1 shows the entire study area and indicates the zones covered by the smaller maps (Figs. 2–6). Since the density of the place names made it difficult to put them all on the maps without overlapping, some names have been omitted from the maps for clarity.

INUIT PLACE NAMES: AN ORAL TRADITION

The Inuit hunters of Igloolik have an intimate knowledge of the territory that surrounds them. Moving safely through this region requires the knowledge and experience of generations of travelers. The boundaries of the community are not defined by the boundaries of the town. Instead, the sense of belonging is gained through the shared knowledge of the territory that is constantly traveled.

The familiar territory is full of meaningful sights, stories, marks, events, and place names. Knowledgeable people remember even tiny landmarks along trails or hunting grounds. They remember ice formations, and they know how to read the snow, the winds, the currents, and the stars (MacDonald, 1998). The territory is populated by hundreds of trails and names that belong to the memory of the people. Dramatic changes in Igloolik since the late 1950s, including the creation of the town of Igloolik, schools, and new transportation and navigation technologies, threaten to weaken some of this oral knowledge. Until recently, government topographic maps largely ignored Inuit place names. Even in recent editions, most Inuit place names are missing, and trails are entirely absent.

Place names have been of broad interest to anthropologists since Boas (1888), and several studies have recorded Inuit place names. Beatrice Collignon, for instance, mapped 1006 place names in the communities of Holman and Coppermine and in Bathurst Bay (Collignon, 1996). Another excellent example of toponymic work is the *Gazetteer of Inuit Place Names in Nunavik* (Müller-Wille, 1987), undertaken with the cooperation of the Inuit elders of Nunavik and the Avataq Cultural Institute. For Igloolik, the accounts of the first European explorers to visit the region (Lyon, 1824; Parry, 1824), as well as the work of Mathiassen (1928) and Rasmussen (1929), contain several references to Inuit place names.

In Igloolik, a toponymy project in the mid-1980s collected about 350 place names, noting their coordinates, the features they refer to, and a short explanation of their meanings (SINT, 1993). This excellent work, compiled principally by Emile Imaruittuq and André Uttak, was part

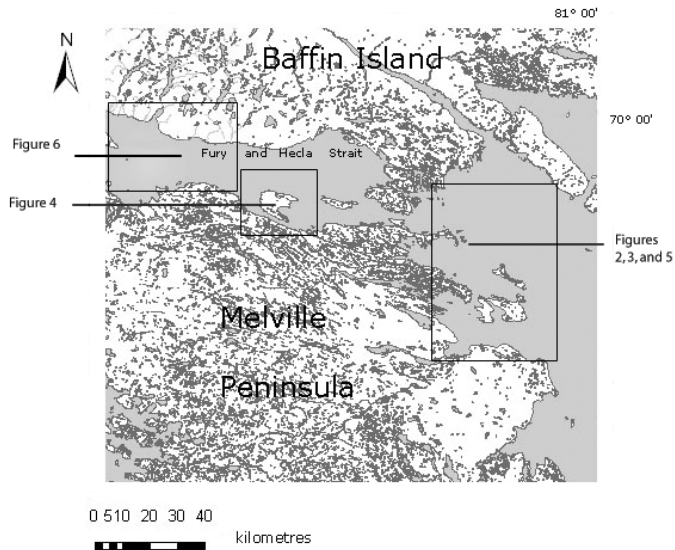


FIG. 1. Map of the study area, showing Fury and Hecla Strait, with Baffin Island to the north and the Melville Peninsula to the south. The rectangles indicate areas covered by Figures 2 to 6.

of the Government of the Northwest Territories' Geographic Names Program. At the time of the present research, however, no maps containing the results of that project were readily available or known to the community. When the maps produced from the present study were shown to the Inullariit Society of Igloolik in May 2001, the elders stressed that it was the first time they had seen their place names, in both roman and syllabic orthographies, so extensively used on topographic maps.

Database of Place Names near Igloolik

The 350 place names collected in the mid-1980s constituted the original source of a database built during the present study in Igloolik. About 30 names were added at the suggestion of hunters, who looked at the maps that I produced and pointed out missing names. With their assistance, some of the coordinates contained in the original database were also corrected. Finally, during the course of hunting and fishing trips, named features were pointed out and waypoints were created with a GPS unit. About 20 place names were added to the database through this method.

In total, 400 place names were plotted on 10 topographic maps (nine at 1:250 000 and one at 1:50 000) during this study. The resulting maps can be displayed and printed in any number of ways. For instance, in a presentation to the community, computer projections of the maps allowed zooming to provide detailed maps of specific places, a display of digital photographs, and information about those places. Hunters wanted maps to use when traveling. These were printed using a conventional color printer and then laminated for durability. With the support of the Igloolik Research Centre, the names were transcribed into the syllabic orthography, and a parallel data-

TABLE 1. Igloolik trails.

Trail	Variations
Igloolik-Saglarjuk	3
Saglarjuk-Majuqtulik	4
Igloolik-Naluqqajarviup Tasia	2
Igloolik-Kinguraq	2
Igloolik- Kangirsukutaap Qinngua	3
Kinguraq-Tasiujaq	1
Igloolik-Hall Beach	2
Igloolik-Alarnaarjjuk	2
Trails within the island of Igloolik	4
Igloolik to the floe edge	1
Fishing trails around Naluqqajarviup Tasia	5
Caribou hunts	4
Polar bear hunt	3
Seal hunt through breathing holes	1
TOTAL	37

base using syllabics was created. Figure 2 shows a map created from this database.

This paper is not intended to provide a detailed analysis of the place names database. Suffice it to say that the names refer to a variety of different features, including lakes, rivers, creeks, coastal features, hills, islands, camps, inuksuks (known as *inuksugait* in Igloolik), rocks, recurrent ice formations, and polynyas (polynyas are of utmost importance for Inuit hunters because they constitute a reliable source of marine mammals in winter).

Recording the Trails Used by Igloolik Hunters

Along with the 50 new place names, 37 trails were recorded during 2000–01 (Table 1). Two hunters produced 11 of these records, creating 5 electronically (using Fugawi software) and drawing 6 on paper maps, which were then digitized. I recorded 24 trails using a portable GPS unit while accompanying an experienced hunter on his fishing and hunting trips. The final two trails were reconstructed using geographic clues provided by two interviews in the Igloolik Oral History Project database.

The right column on Table 1 indicates the number of alternative routes for trails departing and arriving at the same locations. Of the 37 trails, 23 correspond to traditional, well-traveled routes, while the trail from Igloolik to the floe edge varies slightly from year to year. The rest of the trails were associated with caribou and polar bear hunting, as well as with fishing and sealing locations.

The Fugawi software proved both easy and intuitive for drawing trails. One of the two hunters who drew trails using this software was in his late forties and had basic computer skills, while the other, in his mid-fifties, had never used a computer. Both felt comfortable using the mapping software.

Twenty-four of the trails, totaling about 2000 km of tracked courses, were recorded with a GPS unit on snowmobile trips. A Garmin GPS III Plus was chosen, mainly for its map display capabilities, which permit users to see fairly detailed topographic maps, as well as their

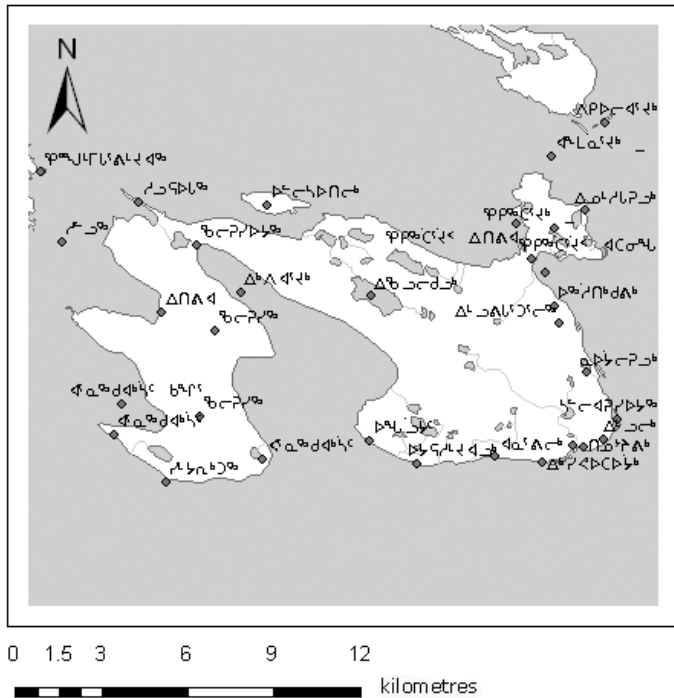


FIG. 2. Map of Igloolik Island, with place names in syllabic orthography.

current location and tracks (very useful features when discussing the characteristics of the recorded trails with hunters during the trips). Because of extreme cold temperatures and high winds, and considering that the GPS needed to be on during the trips, the unit was placed underneath the user’s clothing to keep the batteries warm, and the external antenna was attached outside the clothing to ensure clean reception during the trip. Satellite reception was tested several times. The unit nearly always showed three-dimensional navigation, an indication of excellent satellite signal reception. The tracking option of the GPS was set to record a track-point every 30 seconds, reproducing in fine detail the location of trails.

Characteristics of Long-Established Trails

The trails in Figure 3 are followed every year by Igloolik hunters, but they become visible only after dog sleds or snowmobiles have made the first tracks on the snow. About 30 hunters, consulted through formal interviews or informal conversations, agreed that the land portions of the trails are stable throughout time (see also MacDonald, 1998:188). Most of the trails to favorite hunting grounds or connecting to other communities have been used for generations, are maintained through the memory of the people, and are transmitted orally or while traveling. Louis Alianakuluk, a hunter in his mid-60s, assures that:

Land routes are really old, especially through isthmuses. All of these are the trails ever since they used to travel by dog team. People before us would have known all of these land routes. The people before us who traveled only by

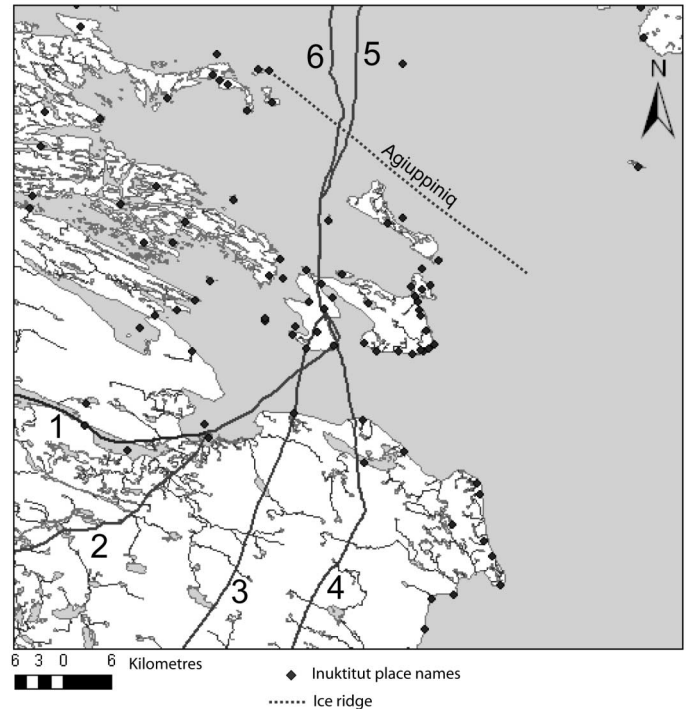


FIG. 3. Map of Igloolik Island, showing several trails. Most place names have been omitted for clarity.

dog team were really good at what they did, and knew that land. (Alianakuluk, 2001, IE-480)

All the land trails plotted onto maps during the course of this study share a common feature: they tend to avoid rocky ground and abrupt changes in altitude, and they favor frozen lakes and rivers, valleys, and coastal lines. As a result, trails often meander instead of following straight courses. Lakes and riverbanks often provide smooth travel conditions (see trails 1, 2, 3, and 4 in Fig. 3). Hills generally serve as reference points used to set or keep bearings when traveling on flat areas.

Some ice formations, namely ice leads and ice ridges, recur from year to year in the same locations (Aporta, 2002). These ice marks are so predictable that many are named, and some of them become important features in defining trails. *Agiuppiniq*, an ice ridge whose name implies “building up from above,” is one of the most important visual features of the area, despite the fact that it disappears as the ice melts. *Agiuppiniq*, drawn by Louis Alianakuluk as a line and registered with a GPS as a waypoint (see Fig. 3), can be spotted from far away, constituting a more visible feature in the winter than the entire, extremely flat island of *Nirlirnaqtuuq* (Neerlonakto Island). This ice mark establishes a turning point on routes between Igloolik and the western coast of Baffin Island (see Trails 5 and 6).

Trails 3 and 4 illustrate another pattern frequently seen on ice trails. On the smooth ice of Hooper Inlet, it is apparent that the two trails are not set haphazardly. On the contrary, they aim at visible, named landmarks on both

coasts. Although they may vary slightly from year to year because of changing ice conditions, they remain fairly fixed in terms of their general location and, especially, the spots where they reach the land. The crossing of the inlet is roughly 8 km in length, and in good weather, an experienced traveler can distinguish numerous landmarks from the opposite shore.

Trails, Place Names and their Role in Oral-Based Knowledge

Plotting the place names and trails on maps revealed the presence of numerous place names along trails. Figure 4, for instance, shows how several GPS-recorded trails going to or coming from the island of *Saglarjuk* (Amherst Island) merge at one particular spot on the coast of the Melville Peninsula, a small hill named *Qakkiaq* (which fittingly means “landing place”).

Some of the trails themselves have names, which correspond to a significant place name along the trail. For instance, in Figure 3, the route to *Alarnaarjjuk* (trail 1) in Melville Peninsula is known as *Alarnaarjulariaq*, but a variation of this route that goes through Inuksugalik is known as the *Inuksugalik* route (trail 2). Inuksugalik is the name given to an inuksuk along the trail. Both *Alarnaarjjuk* and *Inuksugalik* are located to the west of the portion of the map shown in Figure 3.

Igloolik travelers use place names in the narratives of their trips. Interviews suggest that these narratives usually unfold in strict chronological order: from the beginning to the end. Theo Ikummaq, for instance, pointed out that he spent two evenings on the local radio describing a 1987 trip from Igloolik to Greenland.

Actually we had a radio show, a local radio, where we spent a couple of evenings, just talking about the trip. One of the elders [was] doing the interview about the trip. And we didn't cover bits of pieces of the trip. We covered from day one, and we progressed. The way he asked the questions didn't allow us to jump from here to there. It made us talk from the day we left, the first few days, the next few days, and so on and so forth, to the point that half of the trip was covered one evening and the next half another evening. Again, it was a learning experience for the people who were listening. They would know what to expect if they were going to take some of that route. (Ikummaq, 2000, IE-478)

Place names are used not only to describe trips but also in other narratives. Most of the legends and life stories contained in the hundreds of interviews of the Igloolik Oral History Project can be fully appreciated only when accompanied by an understanding of their numerous spatial references, mostly in the form of place names. One of the most significant stories in Igloolik is the legend of *Unigumasuittuq* (“the woman who married a dog”). The main events take place at *Qikiqtaarjuk* (“small island”), a

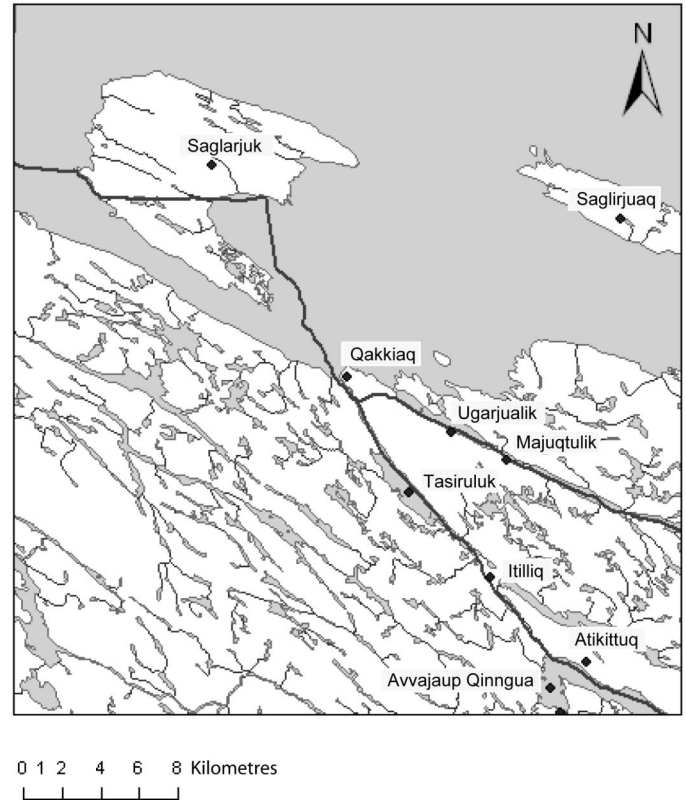


FIG. 4. Ice trails merging at Qakkiaq (‘landing place’), a small hill on the coast of the Melville Peninsula.

peninsula forming the northeastern tip of Igloolik Island (see Fig. 5) (Paniaq, 1990, IE-141). The story of Atanarjuat, as told by Michel Kopaq (1987, IE-017), refers directly or indirectly to eight place names: *Iglulik*, *Iksivautaujaq*, *Naggutialuk*, *Pingiqqalik*, *Qikiqtaarjuk*, *Siuraq*, *Tasiujaq*, and *Uglikuluk*. Atanarjuat escapes from his brother’s murderers running from *Qikiqtaarjuk* over the sea ice to *Siuraq* (Tern Island). On the way, he jumps across an ice lead locally known as *Naggutialuk* (see Fig. 5).

Both the role of place names in narratives and the relationship between place names and trails suggest that an Inuit traveler does not move through homogeneous, featureless space (as the Arctic environment is often pictured by outsiders), but through a homeland defined by the presence of hundreds of names, trails, personal and social memories, and stories transmitted from generation to generation.

Seasonal Variation of Ice Trails

Trails on the sea ice are not as stable as trails on the land: they vary with the seasons. The town of Igloolik is located on a small island with no game within its borders. All year round, the hunters of Igloolik must cross the bodies of sea water that separate them from the caribou hunting and fishing grounds on Baffin Island and the Melville Peninsula. A combination of patience, knowledge, and good judgment is necessary to attempt early crossings of

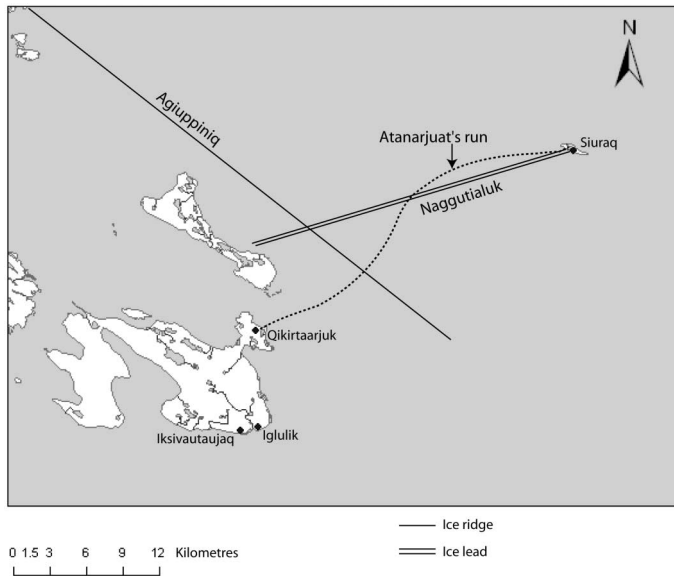


FIG. 5. Some of the place names mentioned in the story of Atanarjuat. Ice leads and ridges were drawn by Louis Alianakuluk. Atanarjuat's run was reconstructed after Kopaq (1987).

the frozen sea during the fall. The locations of these ice trails vary according to the patterns of the freeze until they reach a stable course that will be used until the thaw. Figure 6 shows the sequence of trails to the hunting ground of *Majuqtulik* from Melville Peninsula, across *Ikiq*, as the ice thickens.

From left to right, the first trail illustrates the first crossing of the year (15 November 2000) and was drawn by George Qulaut; the second shows Qulaut's return trail. The next two trails (recorded with the GPS) reproduce trips led by Maurice Arnatsiaq to *Majuqtulik* on December 1 and back on December 7. The location of the trails is related to the pattern of the freeze-up (from west to east, on that section of the strait). The first two trails required long detours, while the last, the most efficient, became the permanent trail until breakup.

ADVANTAGES OF THIS METHOD

Beyond the recording of place names and trails, the method used in this project is important in its own right. The ease and speed with which place names and trails were mapped and corrected and the ability of people with little previous experience to undertake this work successfully demonstrate the viability of this methodology for community-based toponymy projects. Such projects, by demonstrating the extent to which aboriginal communities still use their lands, will help justify their efforts to regain control over their territory.

Projects such as the *Nunavut Atlas* (Riewe, 1992) and the *Inuit Land Use and Occupancy Project* (Freeman, 1976), as well as toponymy projects such as the *Gazetteer of Inuit Place Names in Nunavik* (Müller-Wille, 1987),

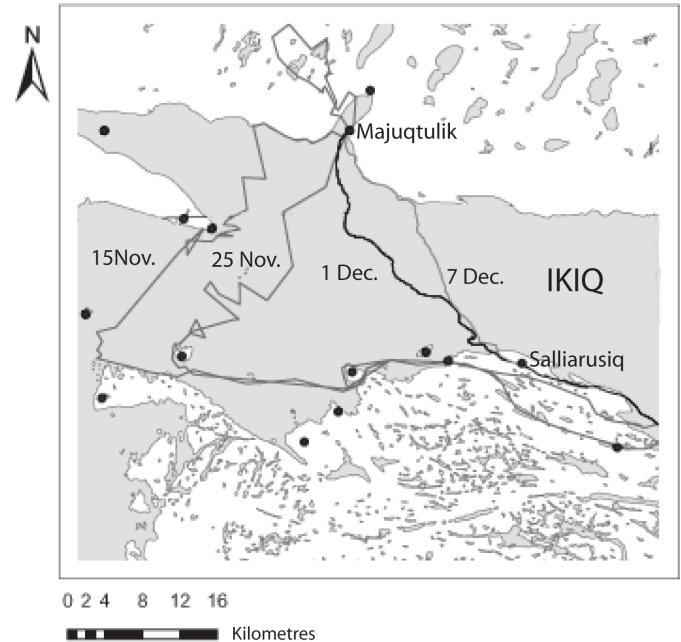


FIG. 6. Four ice trails crossing Fury and Hecla Strait.

have increased understanding and acceptance of the Inuit way of using and referring to the territory.

The mapping software used in this research (Fugawi) is intuitive and inexpensive, and it does not require expertise in Geographic Information System (GIS) programs. Fugawi's greatest strength as software may also be its greatest weakness: although it is simple to use, and produces maps that display reasonably accurate spatial plots, it is not a full-fledged geographic information system. Furthermore, place names can be recorded only as points because the software does not allow working with polygons. Much depends, of course, on what one wants. In the case of this project, the greater complication and expense of developing a spatially precise geographic information system was not warranted. Importantly, the approach presented here requires little outside expertise.

One of Fugawi's most important features is that the geographic data plotted on maps can be exported into text files. Those, in turn, can easily be converted into shape files for use with GIS programs such as ArcView and ArcInfo. A program similar to Fugawi is OziExplorer, which allows even easier communication with GIS software, since waypoints and tracks can be saved directly as shape files. With both Fugawi and OziExplorer, place names can be collected locally and maps produced quickly for community use. At the same time, databases containing geo-referenced information can easily be created. Further GIS analysis and manipulation may be required at later stages, but communities can have a tangible, visually attractive product available immediately. The methods used in this project were flexible enough to allow mapping of changing features, overlaying of place names and trails, creation of a database of place names, and production of maps for local use.

This software has other potential uses, including the design of interactive material for use in schools. During this particular study in Igloolik, a survey of place names on the island of Igloolik and surrounding territory recorded the location of 55 place names using a GPS receiver. Digital pictures were attached to the names, and now comments by knowledgeable elders can be converted into digital audio files and linked to the names on the maps.

Finally, since each place name is technically a waypoint, the coordinates corresponding to the names can easily be uploaded to a GPS unit and used for navigation. The database is now available to those who want to use it at the Igloolik Research Centre.

CONCLUSION

The mapping of place names, trails, and other relevant geographic information does not need to be an expensive, painstaking process. With the use of mapping programs and GPS receivers, mapping has become accessible (and affordable) for aboriginal communities.

This new technology is flexible enough to permit mapping of seasonal features, such as icemarks and trails. More importantly, the data collected through this method are geo-referenced, easily storable in a database, and, eventually, accessible through GIS software.

This project suggests that inexpensive and straightforward computer-based mapping methods can provide an appropriate way for communities to undertake toponymy or land-use and occupancy projects and to inaugurate, if necessary, more extensive mapping projects.

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