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Mountain Cartography in Slovenia

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Abstract

Slovenia has a hilly character, and a high percentage of the population participates in mountaineering as an outdoor sport. Mountaineering enthusiasts produced the first mountain maps. It wasn't until 1969, however, that official mountain maps were published under the auspices of the National Mountaineering Association of Slovenia. The official mountain maps were initially in high demand because topographic maps produced by the military were generally unavailable throughout Slovenia – a situation that has completely changed since then. Today, the use of mountain maps is in decline because of competition from other high-quality topographic maps that are more readily available. The future viability of Slovenian mountain mapping as a separate program depends on the implementation of new technology and the development of new products that are relevant to mountaineers.

Introduction

Slovenia lies at a juncture of four great geographical units: the Alps, the Dinaric Mountains, the Pannonian Plain, and the Adriatic Sea. Four-fifths of Slovenia consists of hilly and mountainous land. The average height above sea level is 557 metres, with slopes averaging 13 degrees (Perko and Orozen Adamic, 1998). The highest peak in Slovenia, Triglav (Figure 1), in the Julian Alps in the northwest part of the country, reaches 2864 metres above sea level. The Alps and their foothills cover most of northern Slovenia, while the southern half of the country, including the Adriatic coast, is dominated by the Dinaric Mountains. Limited flat areas are found only in the easternmost parts of the country. Given the mountainous topography, it is only natural that the pre-historic inhabitants of Slovenia followed a mountain-centric way of life. Archaeological evidence found in caves and overhangs at sites above 1000 metres above sea level indicates that people lived in the Slovenian mountains

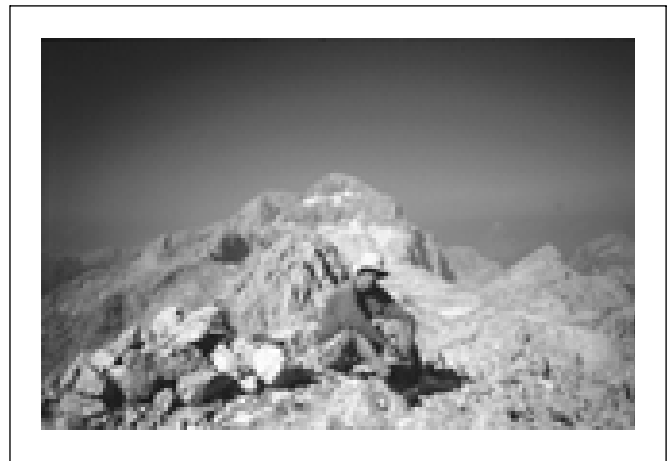


Figure 1. View from the Rjavina toward Triglav, Slovenia's highest peak (2864 m).

during the Ice Age, more than 30,000 years ago. Since that early time, hunters, miners, and herdsman also frequented the mountains, and the mountain passes served as important traffic corridors during the Roman Empire.

Facilitated by improved transportation, mountaineering as a sport developed in Slovenia during the second half of the eighteenth century, roughly coinciding with the development of mountaineering in other Alpine areas. Among the first people to undertake ascents were botanists, geologists, and other scientists. The first ascent of Triglav was documented in 1778. In the nineteenth century, mountaineering became increasingly popular, resulting in the founding of the National Mountaineering Association in 1893. Membership in the Association now stands at approximately 75,000 members. Additionally, each summer an estimated one million Slovenians – incredibly, half the national population – visit our mountains. Informal tradition holds that each “proper” Slovenian should at least once in a lifetime stand on top of Triglav. A negative consequence of burgeoning mountain visitation is the destruction of delicate high-mountain ecosystems, particularly during the vulnerable summer season.

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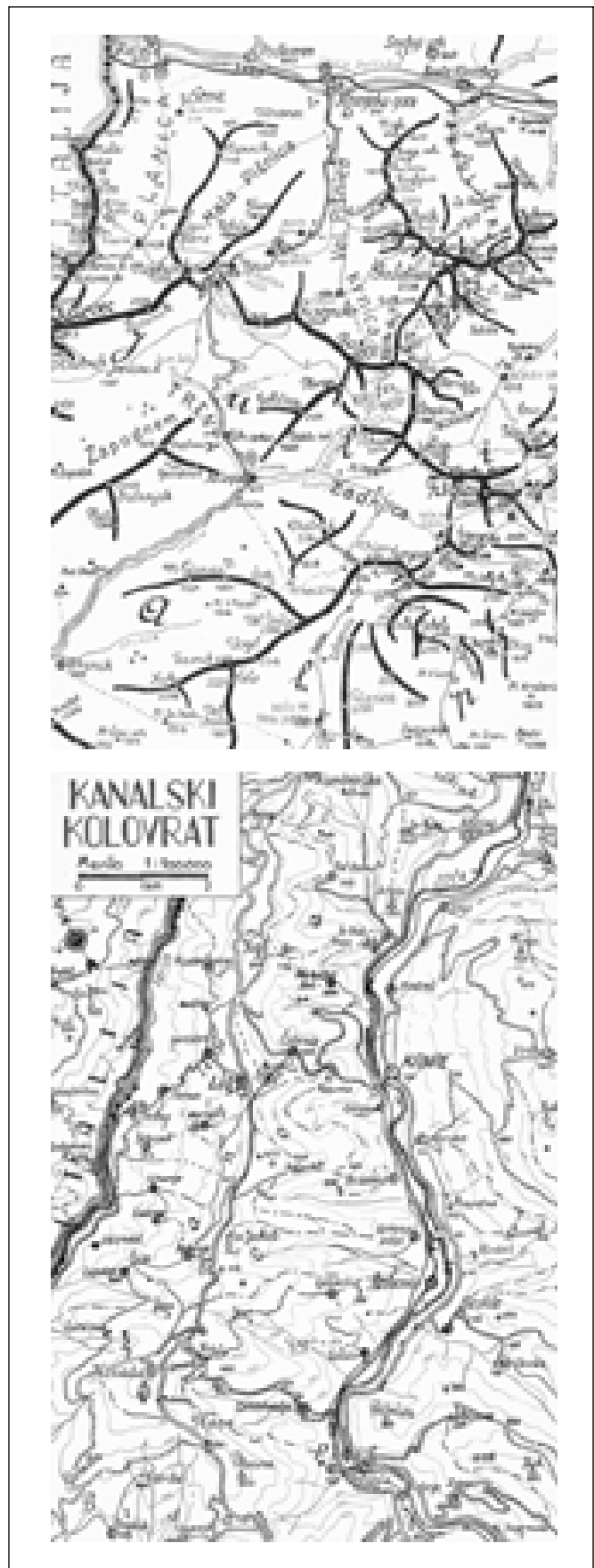
The Beginnings of Mountain Cartography

Little is known about the first mountain maps. Two hundred years ago, a Slovene, Mr Valentin Stanic, carried out geodetic measurements throughout the Alpine region of Europe. In 1800, he was one of the first men to climb Grossglockner, the highest summit in Austria, and he measured its height. He was also the first to ascend several other significant peaks and is credited with being the first sports mountaineer in the Alps (Kmecl and others 1982). Nevertheless, the first documented mountain maps of Slovenia were not made until the first half of the twentieth century. Produced by Messrs. Alojz Knafeljc, Ivan Selan, Vlasto Kopac, and Vilko Mazi, they employ hand-drawn ridge lines to depict the mountainous topography. Figures 2 and 3 show two examples of the early mountain maps, made by Vilko Mazi prior to 1950. The map on the top shows the Julian Alps with the Triglav area at a scale of 1:180,000. Many topographic names and a rather dense mountain track network are clearly visible. The map on the bottom shows the Kolovrat Mountain and the Soca Valley at a scale of 1:100,000. The relief is represented by contour lines at 100-metre intervals (Brilej 1951).

After the end of World War II, the development of civilian cartography was restricted in the former Yugoslavia, which then encompassed present-day Slovenia. The official state and military topographic map system was produced and maintained by the Military Geographic Institute of Belgrade. The military also restricted civilian map production: grid coordinates were forbidden, the maximum allowable scale was 1:50,000, and contour intervals were restricted to 50 metres or higher. Furthermore, features such as power lines and underground caves could not be shown. Facing such limitations, civilian cartography in Slovenia developed slowly during the 1960s. The first modern maps – a road map of Yugoslavia and a mountain map of the Julian Alps – were produced by the Institute of Geodesy and Photogrammetry of Ljubljana (IGP), the organization first responsible for introducing modern map-production methods in Slovenia (IGP 1998). This era also saw the beginning of institutional cartography in Slovenia, intended for the public education. New methods of map design were developed, including cartographic generalization based on scientific findings; the negative scribing technique, first on glass and later on plastic film; photographic methods for producing map labels; and bichromatic copying. Figure 4 shows a portion of the first modern Slovenian mountain map of the Julian Alps at 1:50,000-scale, produced in 1969. Relief was presented with 100-metre contours and generalized pictograms for rocky areas. The map is most noteworthy for its detailed and distinct presentation of mountain tracks, a needed quality that was appreciated by Slovenian mountaineers.

Two Map Series

Based on the pioneering work described previously, CARTOGRAPHICA, VOLUME 38, # 1&2, SPRING/SUMMER 2001



Figures 2 and 3. Early Slovenian mountain maps.

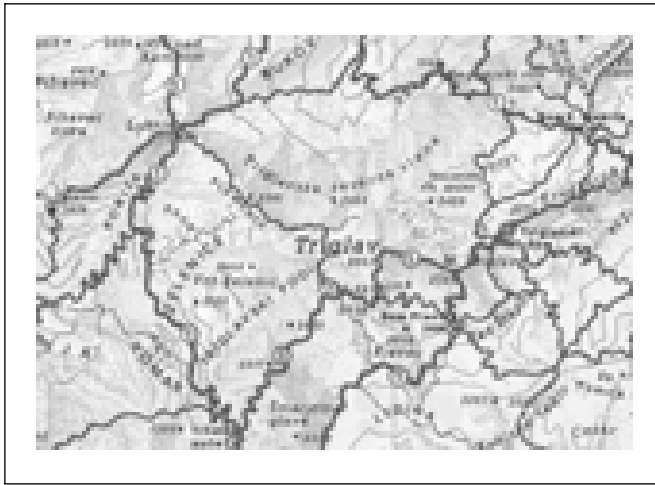


Figure 4. The first modern Slovenian mountain map of the Julian Alps, IGP, 1969.

mountain maps at 1:50,000-scale became the standard, and the Slovenian Mountaineering Association took great pride in them. The maps covered all mountain areas of major importance. The design and content of this map series changed as a result of the abolition of the former restrictions. The latest mountain map at a scale of 1:50,000 is shown in Figure 5. The contour interval has been improved to 20 metres, and mountain tracks are divided into categories. The 1:50,000 series now includes 12 maps.

The need for even more accurate and detailed mountain maps resulted in a new 1:25,000-scale map series in the late 1980s. These maps show some of the most attractive and most rugged mountain areas. An example is shown in Figure 6. Mountain tracks are divided into three categories according to difficulty of access, and alpine ski routes are depicted. At present, the 1:25,000-scale series consists of nine mountain maps.

In addition to the standard series described above, mountain maps at 1:20,000, 1:40,000, 1:75,000, and 1:100,000 have been produced – the non-standard choice of scale depending on the size of the area to be presented. All official mountain maps since 1969 have been produced by the two cartographic institutions found in Slovenia: the Geodetic Institute of Slovenia (the former IGP), and the private company Geodetski Zavod Slovenije (GZS). The mountain maps produced by these institutions are exclusively published by the Slovenian Mountaineering Association. In addition to cartographic content, textual information about mountain huts and natural and historic points of interest are printed on the verso of the maps.

Other Presentations of Mountain Data

The production – and revision – of official mountain maps in Slovenia is economically hampered by a small market. Map revisions are rare, production is still based on traditional cartographic technology, and print runs

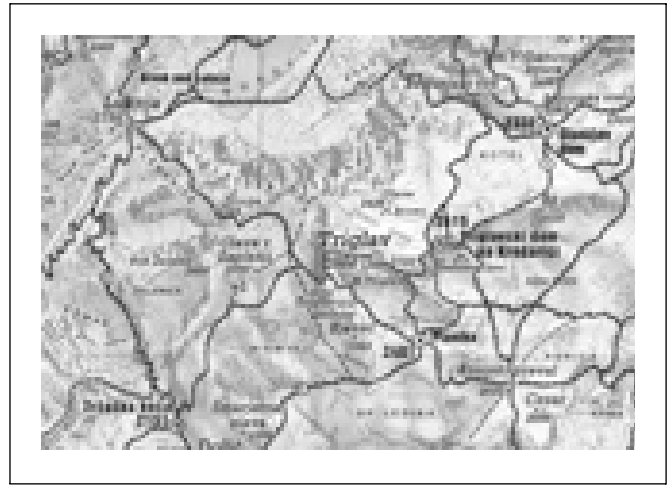


Figure 5. The standard mountain map of the Julian Alps at a scale of 1:50,000, GZS, 2000.

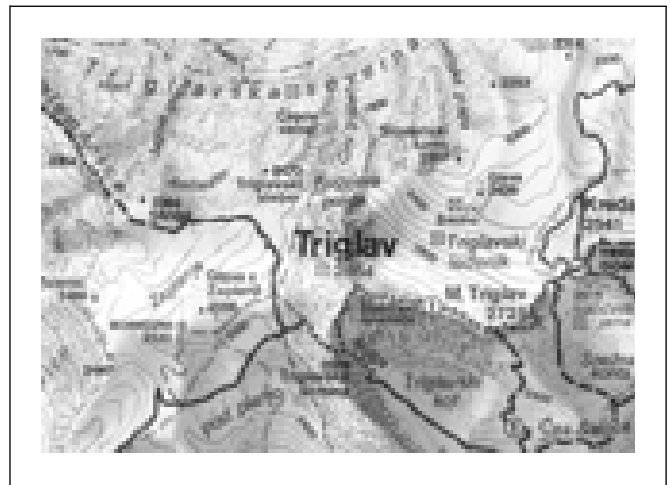


Figure 6. The standard mountain map of the Triglav area at a scale of 1:25,000, IGP, 2000.

are limited to a mere 5000 copies. Meanwhile, the production of official topographic maps and the majority of tourist and thematic maps in Slovenia have become fully computerized. One of the chief reasons for the slow sale of mountain maps in Slovenia is the existence of competing tourist maps published by local communities and regions, and very detailed and accurate national topographic maps. The contents of tourist maps in Slovenia differ only slightly from those of dedicated mountain maps. For example, tourist maps typically show marked mountain tracks, as mountaineering is considered an important part of local tourism. Many tourist maps published by communities are prepared at 1:25,000 or 1:30,000-scales, a perfect substitute for the officially published mountain maps. Even the road map of Slovenia depicts the Slovenian Mountaineering Route, a major trail that spans the country linking the local trail systems. Over 20 maps of different areas of Slovenia are pub-

lished each year, saturating the relatively small market supported by only two million people. Local communities are better financed and much more adept at marketing their cartographic products than is the Slovenian Mountaineering Association. Figure 7 shows a typical local tourist map at 1:25,000-scale.

In general, Slovenians like maps and use them regularly. Many are amateur collectors. Nevertheless, map-reading skills could be improved overall, particularly for mountain maps. Many mountaineers travel unfamiliar and potentially dangerous routes, where insufficient knowledge of map-reading may prove to be fatal. To lessen the possibility for tragedy, new ways of presenting mountain data for less adept map users are being explored. One such experiment is the preparation of a profile showing the mountain ridge route in the southern Julian Alps (Figure 8). The source data for the profile was DEM with 100-metre grid. The profile has been printed on the back side of the mountain map of the area to better illustrate the challenging vertical relief encountered along the route.

Additional methods for bringing mountain data closer to users are likely to take advantage of technological developments on the Internet, mobile telephony, and 3-D maps based on terrain modelling (Figure 9). Naturally, the successful introduction of these technologies is dependant on the critical issue of user acceptance. User-friendliness and readability are essential requirements for their success (Petrovic 2001).

Conclusion

It is evident from the preceding discussion that mountain cartography in Slovenia faces a minor crisis. Until

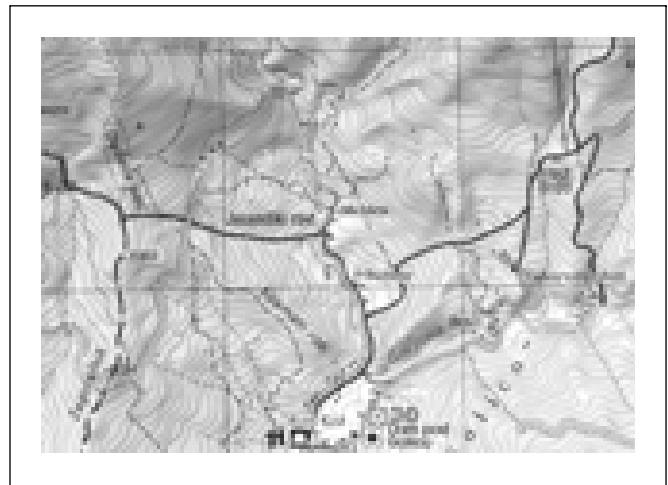


Figure 7. A tourist map of the community of Jesenice, IGP, 1999.

1993, official civilian and military topographic maps were unavailable to the public. This situation provided an important niche for mountain maps, which were then the only large-scale maps accessible to everyone. However, upon the lifting of map restrictions, and the subsequent flood of new high-quality maps, the demand for mountain maps has declined. The dramatic changes to the cartographic industry in Slovenia have necessitated a rethinking of the venerable mountain map. New opportunities abound. In the future, mountain maps could be prepared as a variant of national topographic maps, in digital format, containing supplemental mountaineering information. A mountain route database will need to be established with appropriate links to the national topo-

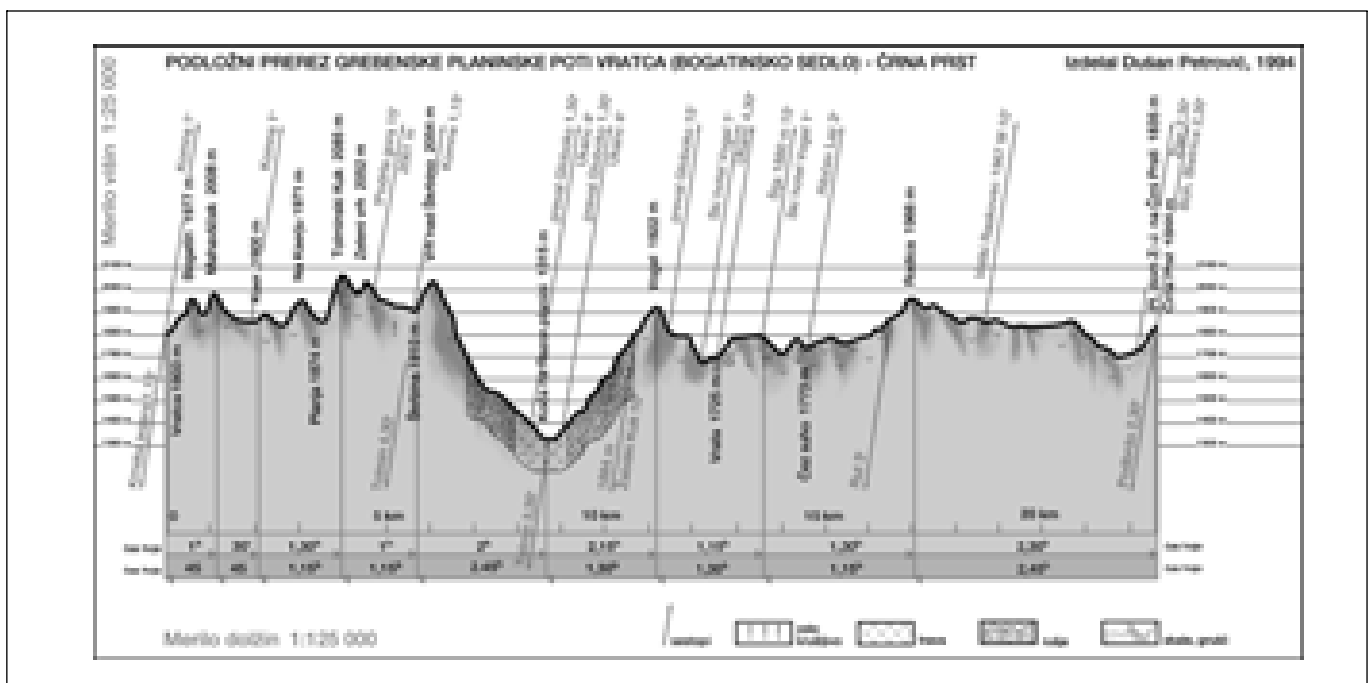


Figure 8. Profile of the mountain route Vratca (Bogatinsko sedlo) – Crna prst, 1994.



Figure 9. Prototype of 3-D mountain map of the area in Kamnik's Alps, 2001.

graphic database. The rapid developments in technology will undoubtedly enable diverse new methods of spatial data presentation. Nevertheless, paper maps will remain an indispensable aid to Slovenian mountaineers for years to come.

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Résumé Slovénie a un caractère vallonné et une bonne proportion de la population fait de l'alpinisme comme sport extérieur. Les passionnés de l'alpinisme ont produit les premières cartes des montagnes. Les cartes officielles de montagne n'ont été publiées sous les auspices de l'Association de l'Alpinisme Nationale de Slovénie que depuis 1969. Les cartes officielles de montagne étaient en

grande demande, initialement, parce que les cartes topographiques militaires produites n'étaient généralement pas disponibles en Slovénie, une situation qui a changé complètement depuis lors. Aujourd'hui, l'usage de cartes de montagne est en déclin à cause de la compétition provenant de cartes topographiques de haute qualité qui sont facilement disponibles. La survie du programme de cartographie montagnaise dépend de l'implémentation de nouvelles technologies et du développement de nouveaux produits qui sont pertinents aux fervents de l'alpinisme.

Zusammenfassung Slowenien hat einen hügeligen Charakter und ein hoher Prozentanteil der Bevölkerung praktiziert Bergsteigen als sportliche „Outdoor“-Aktivität. Bergsteigerenthusiasten produzierten die erste Gebirgskarte. Es dauerte immerhin bis 1969, dass offizielle Gebirgskarten unter der Schirmherrschaft der „National Mountaineering Association“ von Slowenien produziert wurden. Anfangs waren die offiziellen Gebirgskarten stark nachgefragt, da topographische, vom Militär hergestellte Karten, normalerweise innerhalb Sloweniens nicht verfügbar waren – eine Situation, die sich seit damals völlig verändert hat. Heutzutage ist der Gebrauch von Gebirgskarten rückläufig, da sie mit anderen, hochqualitativeren topographischen Karten in Konkurrenz stehen, die ohne weiteres verfügbar sind. Die zukünftige Realisierbarkeit der Slowenischen Kartenproduktion als

gesondertes Programm hängt von der Umsetzung der neuen Technologie und der Entwicklung neuer Produkte ab, die für Bergsteiger relevant sind.

Resumen Eslovenia posee un relieve accidentado y un alto porcentaje de su población practica el montañismo como actividad deportiva al aire libre. Los primeros mapas de montaña fueron publicados por los aficionados al montañismo, y no fue hasta el año 1969, en que los mapas oficiales de montaña se empezaron a publicar bajo los auspicios de la “National Mountaineering Associa-

tion” de Eslovenia. Inicialmente estos mapas tuvieron una gran aceptación, ya que los mapas topográficos publicados por los organismos militares no estaban disponibles – una situación que ha cambiado completamente desde entonces. Actualmente, su uso está en declive a causa de la existencia de otros mapas topográficos de alta calidad y fácil lectura. La viabilidad de la publicación de mapas de montaña en Eslovenia, como una estrategia de producción independiente, depende de la implementación de nuevas tecnologías y del desarrollo de nuevos productos que sean relevantes para los montañeros.