

Crosses on peaks in protected areas: a functional mapping from the Apennines to the Italian Alps by altitude bands

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Abstract

This article examines crosses and other religious symbols on summits in the Apennines and the Alps, mapped by altimetric bands. These anthropic signs have different causes and effects on the cultural and environmental levels. Using citizen science models, after mapping the 2,000-metre peaks in the Apennines, we conducted surveys of those of 3,000 metres in the Dolomites, and of 4,000 metres in Protected Areas within the Italian Alps. We suggest that our mapping of these cultural sites should be exported as a shared practice with other Italian and cross-border Alpine associations to preserve the historical memory of the signs on the peaks. In the light of the quantitative and qualitative results, and considering the impact of the symbols on the landscape and ecosystems, it is recommended that no new artefacts should be built, in order to transmit the concepts of restraint and naturalness to future generations; the sustainable use of stone cairns should be preferred. An ecological re-purposing of some summit crosses as temporary high-altitude meteorological stations is suggested, with the aim of collecting data and increasing our knowledge of climate change.

Introduction

Crosses and other religious symbols on mountain peaks are a complex phenomenon with historical, geographical, social, anthropological and, last but not least, ecological implications. However, the phenomenon has so far not been systematically studied, because it is a sensitive topic on religious and cultural levels (Salsa 2011), and therefore divisive and potentially polarising. The phenomenon has grown considerably in the last twenty years (Corvi 2005; Dal Mas 2013; Huarte 2014; Arnu 2016; Montagna.tv 2017; Gogna 2023; Montanaro 2023), but only recently has the topic entered scientific debate and aroused keen interest (Rech 2022, 2023). From the point of view of safety (Il Messaggero 2014) and compliance with current regulations, the consequences of placing a symbolic artefact on a summit have led to a renewed interest that attempts to break out of previous conditioning, overcoming prejudices, dualisms and stereotypes. In Italy and Austria, there has recently been heated debate about the appropriateness of installing new mountain-top crosses. However, there is general agreement that existing crosses should be preserved for their cultural value and historical importance (Ardito 2023; Tirol.ORF.at 2023).

Our culturally more mature times favoured by inter-faith dialogue and a multi-ethnic society, as well as the decision to use a transdisciplinary scientific, secular and non-ideological approach, have resulted in the first mapping of summit crosses in the Apennines (Millesimi 2022). Data, observations and photographs were collected and organized into altitude bands, and the incidence of Christian symbols both within and outside Protected Areas (PAs) was assessed.

The research was carried out with the help of a team of volunteers using a citizen science approach

(Vohland et al. 2021). Since 2004 in Italy, the Cultural Heritage and Landscape Code (Legislative Decree 42/2004) has been protecting mountains of 1,200 m a.s.l. and above in the Apennine chain and the islands, and of 1,600 m and above for the Alpine chain, as assets of landscape (art. 142, paragraph d). Summit crosses are psychologically significant: they mark the highest point, beyond which one can only descend. Crosses appear not only on the actual summits of mountains, but also along the ascent and access routes, on passes and hillocks, and even at the bottom of the sea. These crosses are associated with tourist visits and popular celebrations. The principal aim of this article is to assess, through the quantitative and qualitative analysis of the sacred signs on the 2,000 m Apennine mountains falling within PAs, what the erection of new markers might imply for integrated ecological conservation and protection of the landscape, one of the fundamental principles enshrined in Article 9 of the Italian Constitution. In addition to confessional (religious) symbols, secular temporal symbols at the summit also cause concern, as is the case with the 100 metal panels advertising the Graubünden cantonal bank (Switzerland), which are being dismantled (Lacrux.com 2022).

This contribution also proposes a standard classification method that can be exported to other mountain contexts, initiating new research with a citizen science approach. The hope is to involve various Alpine associations and communities in collecting data in order to learn more about the historical significance of the summits to human societies. Finally, an attempt is made to answer whether some of the existing summit crosses in PAs could be given new ecological functions.

State of the Art

In the past, summit crosses have been studied and photographed as religious, historical and ethnographic artefacts, while the ecological dimension has largely been absent. In August 2023, a sociological study was published: here, the summit cross was interpreted “as an example of culturalized religion, where this cultural object can become a passive religious symbol polarizing claims for the defense of the natural environment and the sustainability of religion in the mountains” (Rech 2023). The Austrian Alpine Club (ÖAV) decided not to erect new mountaintop crosses between 1980 and 1990, in order to conserve the already heavily anthropized alpine environment (Di Blas 2023). In Austria, where the topic is perceived in relation to the prevailing Catholic faith, the pioneering study published by Innsbruck University (Eppacher 1957) was followed by a book documenting the summit crosses in Bavaria and Tyrol, which included transcriptions of the comments left in the summit books (Mathis 2002). Some years later, a rich photographic record was published illustrating the human stories relating to one hundred of the most beautiful summit crosses in the South Tyrol and transalpine areas (Löwer 2019). In Switzerland, an article (Anker 2012) was published about Zumstein Peak (4,563 m), the third highest peak in Monte Rosa and Switzerland, where a thermometer was fixed to the cross in 1822 to record air temperatures. In Spain, 495 artefacts have been archived as a database on the Internet, with photographs and data of crosses on peaks and in public spaces (Observatorio del Laicismo 2022). The aim was to document the numerous crosses found across the country that are deemed undesirable as they were erected by Franco, making them carriers of the regime’s message (Chiappalone 2022). In Italy, mapping the summit symbols of the Waldensian Lands (Valle Pellice and Germanasca, Piedmont) produced a list of crosses, bells, Marian figures and faces of Christ, with the aim of quantifying the many specifically Catholic symbols in contrast to the negligible number of signs from the Protestant tradition (Fraschia 1997). In addition, the identity and political motivation of the *conquest* in the late 19th and early 20th centuries, and the anthropic marking of the Alpine peaks in the struggle between State and Church have been examined in depth (Cuaz 2005). The Jubilee of Pope Leo XIII in 1900 was celebrated with an expensive project funded entirely by local communities: twenty monuments and crosses (one for each century since Christ’s birth), some of them colossal, were erected on prominent and accessible hills and mountains. This initiative was in line with the objectives of the Catholic movement that arose after the Unification of Italy, aiming to convey a message of unity and communal identity. It also aimed to give greater importance to the more marginalized foothill regions, thus fostering their development (Gaspari 2021). One global study of sacred mountains (Mathieu 2023) has allowed fur-

ther historical insight into the erection of Christian crosses, the Christianization of summits, iconoclastic controversies, and recent criticism of summit crosses. In France, inventories have been made in specific areas up to 3,000 m in altitude (Jouty 2020). Jouty has proposed their conservation because of their value as cultural heritage in Catholic Alpine areas and because of their potential artistic values (Jouty 2020).

Historical and conceptual context

Religious summit symbols are a modern anthropic phenomenon. They became widespread in the Alpine region in the early 19th century. After the Council of Trent (1563) and the debate on the didactic function of sacred images, crosses and crucifixes spread from the confines of medieval abbeys and monasteries to alpine pastures and crossroads for the protection of village communities. Mountain summits were still considered inaccessible places, spaces of the magical, the chaotic and the evil, and the first monuments were ones of the passes and waysides. Chapels, shrines and crosses came to the peaks much later, when they were Christianized at the urging of an “enlightened Catholic clergy and religiously oriented Enlightenment thinkers” (Mathieu 2023: 70), as attested in the accounts of early summit climbers and by the paintings of the Romantic artist Caspar David Friedrich (1774–1840). In France, however, the first record of as many as three wooden crosses dates back to 1492: these were on the summit-plateau of the Mont Aiguille in the Vercors Massif (Briffaud 1988). These crosses have been interpreted as the first evidence of thanks to God for the success of a climb, but also as a message of political propaganda (Briffaud 1988: 40–41, 59). An inscription on an ex-voto on the summit of Rocciamelone (3,538 m, Graian Alps, Italy) depicting a Madonna Regina with Child, in a triptych, attests to the fact that it was brought to and placed on the summit in 1358 (Camanni 2013). The earliest summit crosses for which there is documentary evidence were erected only a few centuries later, in Austria. These are crosses on the Kleinglockner (3,770 m), a cross erected in 1799, and one erected in 1800 on the Großglockner (3,798 m). The latter peak is the highest mountain in the Hohe Tauern National Park in Austria, and the cross here had both religious and practical functions, as a sign of devotion and as a support for bulky scientific instruments (Löwer 2019). It was later replaced by the imperial cross.

With the advent of the Enlightenment, the *Weltanschauung* changed: scientific interest in altimetric measurements and the first meteorological and naturalistic investigations turned to the peaks (Cittadella 2019). Crosses, as an indirect remnant of pagan ideas (Mathis 2002: 12), could have had a magical or ritual purpose on the *Wetterberge* (mountains where thunderstorms gather), as hypothetical lightning chasers: these are patriarchal-type crosses, with two crossbars. The original wooden crosses are generally no longer found on the

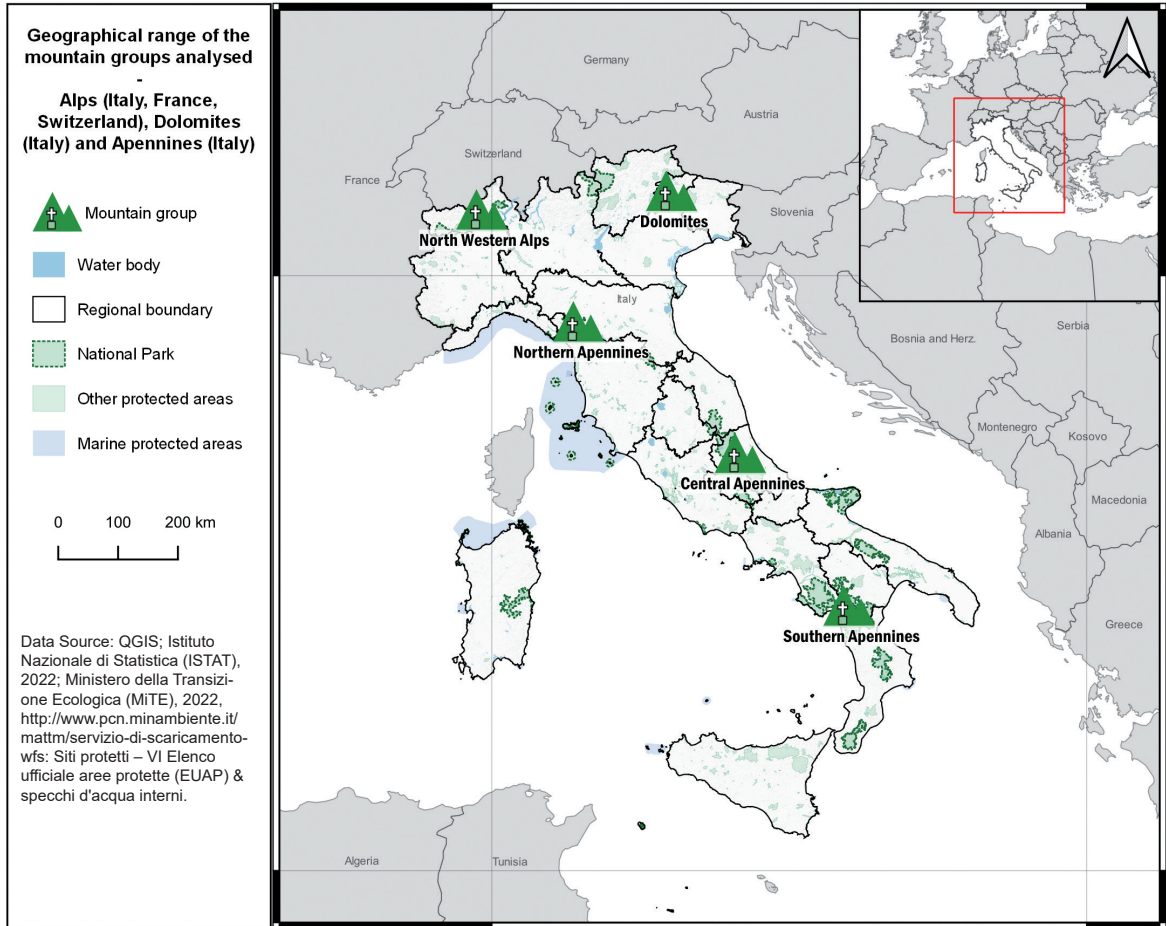


Figure 1 – Geographic area of the research in the Alps (Italy, France, Switzerland) and Apennines (Italy).

peaks, but some are preserved in Cadore in the Messner Mountain Museum Dolomites-Monte Rite (Veneto, Italy). In the wake of Nazi mysticism, there was a controversial attempt in Germany to replace summit crosses by swords. This was followed between 1933 and 1945 by the first acts of vandalism, when crosses were replaced by swastikas (Löwer 2019). However, the first criticism of mountain-top crosses came as early as 1928 from Eugen Guido Lammer, an Austrian mountaineer and journalist, who wondered what such man-made things as memorial stones, flags and crosses had to do with the wilderness. In the Alpine region, the number of summit crosses is currently estimated at several thousand, peaking in the last four decades with the spread of mountaineering. In theory, erecting crosses and other markers of a religious nature is “a dynamic tradition in a confessional environment” (Mathieu 2023: 71). However, it is limited by and large to periodic pilgrimages or tourist walks at lower altitudes, and the religious significance is becoming less important (Mathieu 2023). At higher altitudes, the practice is very sporadic. In France, despite the secularist impulse of the French Revolution of 1789, summit crosses spread in the northern Alps, with renewed vigour from 1950 onwards, followed by critical reactions since then. This topography of the Catholic faith in the mountains of France, or aspiration to the sacred mountain and its

myth, covers the Chablais massif in the north, the Vercors, Dévoluy, Écrins and Queyras in the south, les Bornes-Aravis, les Bauges and the Chartreuse in the west, and the national borders with Italy and Switzerland to the east (Jouty 2020).

Materials and methods

The search for summit crosses (Figure 1) started from central Italy (from Monti Reatini), for peaks over 1,200 m and situated less than 120 km from both Rome and the Vatican City. The search then followed the Apennine ridge, for peaks over 2,000 m. All symbols of the Christian tradition (crosses, statues of the Virgin Mary and Christ, and shrines, Figure 2) were catalogued. This article outlines our search, which was carried out with the cooperation of mountain-

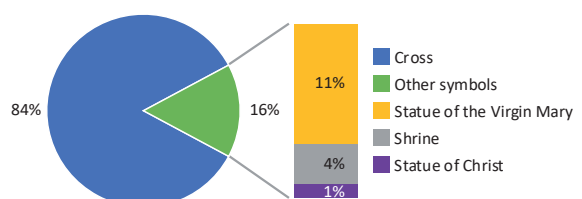


Figure 2 – Typologies of religious symbols found on Apennine peaks of over 2,000m a.s.l.

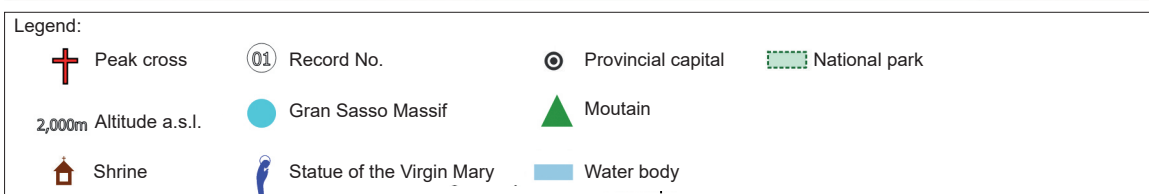
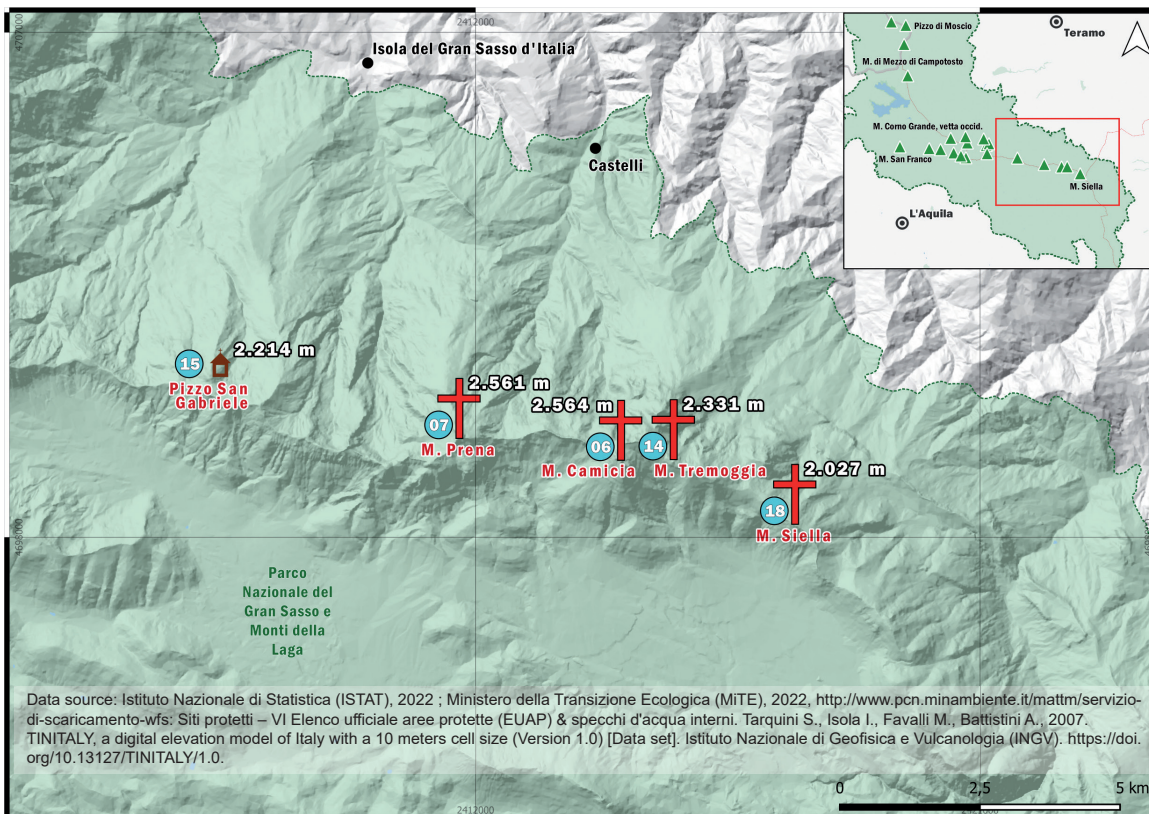
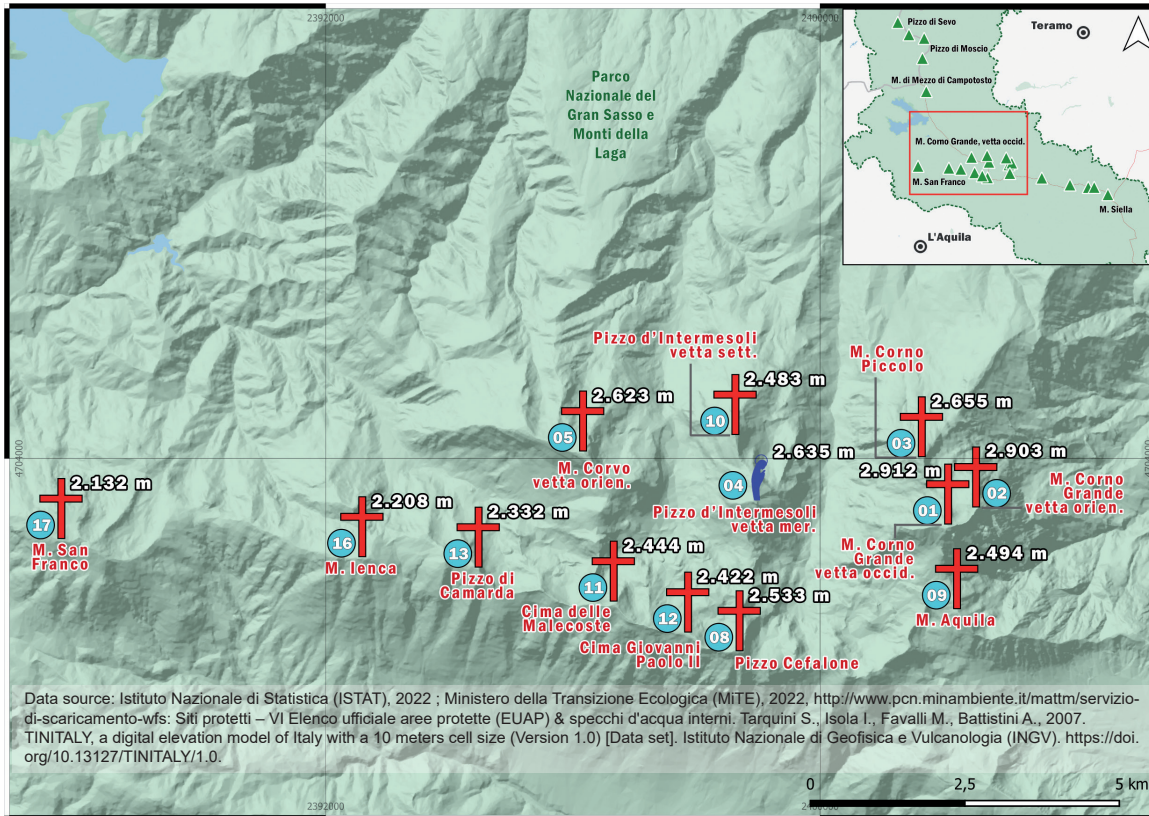


Figure 3 – Peak crosses at over 2,000 m in the western and eastern Gran Sasso Massif (central Italy), see Millesimi & Pica (2022).

eeing groups and clubs (Club 2000m, Club 4000m, Club Alpino Italiano, Gruppo Dolomiti 3000m), and based on the official lists of all Alpine and Apennine peaks according to altitude and mountain group (Club 2000m 2015; Romelli & Cividini 2019; Ciri & Bernardi 2022). The study of the summits' symbols was carried out between November 2021 and August 2022. For the collection of data on the 2,000 m summits in the Apennines (Millesimi 2022) and those of 3,000 m in the Dolomites, we used the unpublished lists of identified symbols obtained from relevant associations. The extremely hot dry summer of 2022 made it impossible to complete and update the list of summits over 4,000 m due to the fast melting of ice and the danger of landslides. Currently, mountain environments and peaks represent climatic hotspots where temperature increases are occurring at almost twice the global rate (Notarnicola 2020). Our observations for the highest mountains were therefore derived from photographic evidence dating from the immediately preceding years.

In order to catalogue the crosses and other summit symbols in the Apennines, each sampler used field cards (paper and digital) to collect the necessary information, including the coordinates (WGS84) of each symbol, acquired by GPS. Collaborators involved in the data collection became co-authors of the cards (Millesimi 2022); they were recruited among experienced hikers and passionate mountaineers. This created a cooperative team of 'mountaineering scientists', who gave their services for free and responsibly provided useful information for scientific and environmental research in the mountains. The survey cards include information about: the type of symbol (cross, statue of the Virgin Mary or of Christ, shrine) and its georeferenced position in relation to the summit; measurements (height, width and thickness expressed in cm, or thickness of each arm in mm in the case of a cross); measurements of any base, together with its characteristics; material used; year erected (when specified); state of preservation; year of any restoration or modification (when specified); if plaques were present, how many, and a full transcription and photograph of each. The photographs had to document the relationship between the symbol, summit and backdrop of the

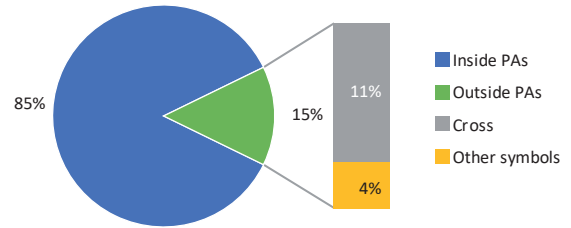


Figure 4 – Religious symbols in protected areas (PAs) found on Apennine peaks of over 2,000m a.s.l.

mountain landscape in isolation, without people. If the dating of the symbol could not be inferred, it was deduced from documentary research (bibliographical analysis, consultation of photos in the archive or available on the web, an *ante quem-post quem* year interval, or local oral sources).

Both direct and indirect measurements of the symbols were taken. For the highest crosses, the width of the arms was measured by placing a stone on the ground corresponding to the end of the arm and measuring the projection on the ground; for the height of the tallest iron lattice crosses, the pole was climbed, a stone was used to mark a point 2 metres from the top, then the height from the bottom to the marked point was calculated, and the two were added together. For the state of conservation of the crosses, three categories were used, based on direct observation: very poor (broken, crooked, unsteady, uprooted; illegible plate); poor (abraded paint; very rusty; badly deteriorated wood; damaged but readable plaque); good (good visible state or signs of maintenance; well embedded in the ground or anchored in concrete or with ropes; straight, recently painted; clearly readable plaque). Later on, the data card was completed with additional information: the mountain group in which the cross is situated, the province and municipalities in which the peak falls (it is common for a peak to fall within several municipalities), historical information on the position of the symbol, analytical description of the symbol, and recent bibliography on the mountain. The digitized cards and photographs were organized into folders by volunteer trekkers, mountain guides, and climbers from the Clubs. We then validated the data with the cooperation of experts, by comparison with

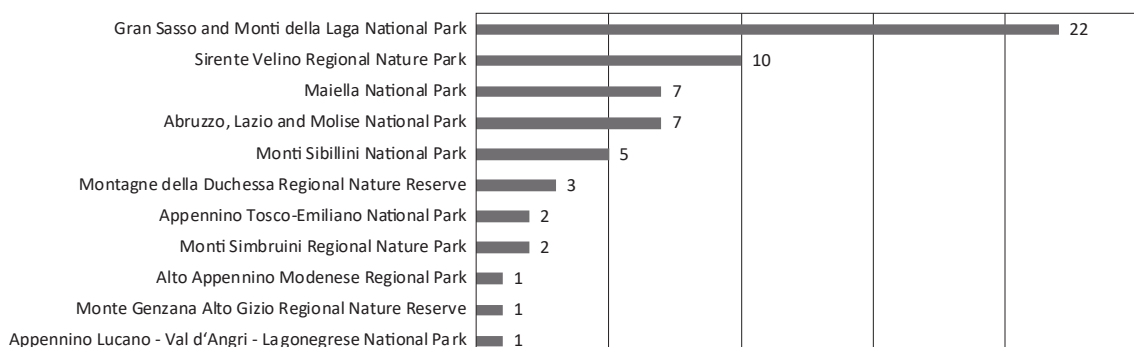


Figure 5 – Number of crosses found on peaks of above 2,000m a.s.l. in protected areas in the Apennines.

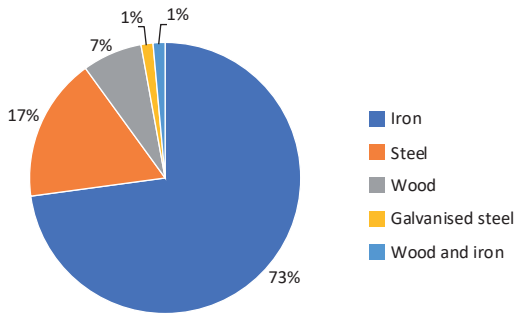


Figure 6 – Construction materials of crosses on Apennine peaks of more than 2,000m a.s.l.

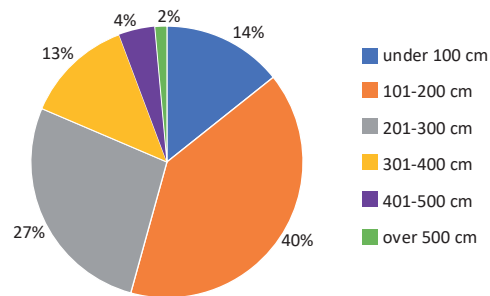


Figure 8 – Height of peak crosses in the Apennines above 2,000m a.s.l.; small (under 100 cm), medium (101–200 cm); large (from 201 cm to over 500 cm).

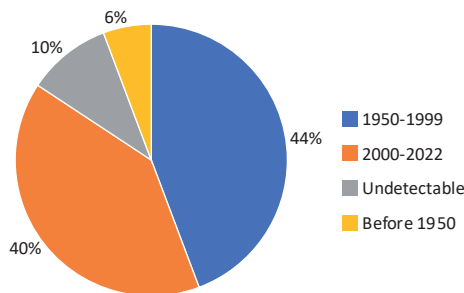


Figure 7 – Dates of earliest crosses on Apennine peaks of over 2,000m a.s.l.

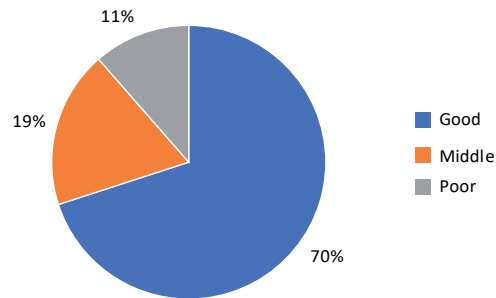


Figure 9 – Conservation status of Apennine peak crosses above 2,000m a.s.l.

already-existing data. The experts were long-term frequenters of the peaks in question, and members of the Italian Alpine Club (CAI) local to the summits where the symbol was found. All data were then organized in a database. Multiple site visits and field verifications took place to verify and validate the information given in forms that were incorrectly filled out. Finally, maps (Figure 3) were produced according to the methodology adopted in Millesimi & Pica (2022).

Results

How far back do the summit crosses in the Apennines date? The first was set in place in 1935, on the highest peak of the Central Apennines, Corno Grande of Gran Sasso (western summit, Abruzzo), on the occasion of the XI National Eucharistic Congress, at the same time as the bronze statue of the Virgin Mary in the same area (at Arapietra 2,028 m). Many other symbols followed, resulting in a stratification of anthropic signs that were sometimes removed and replaced, renewed, modified or shortened. At times, symbols were found alongside each other (e.g. cross and statue of the Virgin Mary) or were duplicated (e.g. two crosses on the northern and southern summits, or on a summit and sub-summit). The historical crosses found in situ were made of iron. In addition to the one on Corno Grande, we catalogued the following iron crosses: 1950–60, on Monte Cusna (Tuscan-Emilian Apennines, northern Apennines); 1955, on Monte Velino (Sirente-Velino Group, Central Apennines, after the destruction of two earlier crosses there); 1965–66, on

Monte Prena (Gran Sasso, Central Apennines); 1967, on Monte Miletto (Matese Mountains, Southern Apennines), and on Pizzo Deta (Ernici Mountains, Central Apennines). These are all summit crosses, erected prior to the creation of the relevant PAs. (For their geographical distribution, see the maps in Millesimi & Pica 2022.)

The summit crosses database offers interesting data regarding their number, geographical distribution in PAs, materials used, state of preservation and size. In total, 68 peaks out of 236 official peaks over 2,000 m (Club 2000m 2015) were found to have religious symbols (Table 1). Of these, 85% fall within PAs (Figure 4). The average for each PA is 5.5 summit crosses. Both before and after the establishment of the PAs, new symbols, and symbol restorations and renewals have occurred. The PA with the highest number of crosses is the Gran Sasso and Monti della Laga National Park (see Figure 5), with 22 crosses: 17 in the Gran Sasso Massif, 5 in the Monti della Laga. The most recent cross was placed in the Montagne della Duchessa Regional Natural Reserve in 2022.

Overall, iron crosses prevail on the 2,000 m peaks of the Apennines (73%) (Figure 6). The coexistence of crosses with Marian figures was also recorded (8 co-occurrences, the majority of which are within PAs). Only one statue of the Risen Christ was found alongside a cross (Sirente Velino Regional Nature Park, Monte di Sevice). Three shrines were found (Gran Sasso and Monti della Laga National Park: Pizzo di Moscio and Pizzo San Gabriele; Sirente Velino Regional Nature Reserve: Monte Orsello), as well as 2 isolat-



Figure 10 – Summit cross as climate hotspot, Alphubel (4,206 m, Alps, Eastern Pennine group, Switzerland). The photo shows the consequences of melting snow in a particularly dry summer with high temperatures. The cross's supporting column, embedded in the rock, is almost completely exposed, whereas in past summers only the wooden cross itself was visible. August 2022. © W. Scarpellini.

ed Marian statues (Gran Sasso and Monti della Laga: Pizzo di Intermesoli, southern summit; Regional Park of the Modenese High Appennines: Monte Cimone). No instances of a crucifix were found. Over the years, plaques have been placed on many of the symbols in memory of the mountaineers who died making the ascent. Additionally, on some peaks, the symbol is situated next to a trigonometric or geodetic survey marker. These summit trigonometric points, also known as topographic or geodetic vertices, consist of structures such as short columns, pillars, or metal markers on the ground, and are part of the triangulation network of the national IGM (Istituto Geografico Militare), which is instrumental in accurately referencing the geographical position of a location.

The single largest group of crosses (44%) date from between 1950 and 1999 (Figure 6), are of medium height (101–200 cm) (Figure 8), and are in good condition (70%) (Figure 9).

The origins of the crosses are as follow: created anonymously (15), on the initiative of parishes and Catholic associations (13), on personal initiative (12), or on the initiative of local branches of the Italian Alpine Club (11); created by sports associations (8) and

groups of friends or families in memory of individuals (5). Finally, we have those erected on the initiative of local divisions of the Alpine troops (4), local authorities (3), or others (3).

Of the 86 officially recognized 3,000 m Dolomite peaks (Ciri & Bernardi 2022), 33 have religious symbols: 30 summit crosses (of which 4 coexist with a statue of the Madonna, and 1 with another summit cross), 2 isolated statues of the Madonna, 1 statue of a Ladin deity. In total, 21 religious symbols, of which 17 are crosses, are located within National or Regional Parks (Table 2). As for the crosses, most are of average height and their state of preservation is good, because metal is the most common material. The oldest datable cross is on the summit of Catinaccio dell'Antermoia (1958), but others bear references to the First World War in the Dolomites.

Of the 82 peaks of 4,000 m in the Alps certified by the International Climbing and Mountaineering Federation (UIAA) (Romelli & Cividini 2019), 30 host symbols (Table 3): 21 summit crosses, 8 statues of the Madonna (including one bas-relief), and 1 bust of a saint (Don Bosco). Most are recent artefacts (from c. 2000 or later) or have been restored since 2000, and are therefore in a good state of preservation. The restored historical symbols are located on the summit of the Matterhorn (a cross built in 1902) and on the summit of Gran Paradiso (a statue of the Madonna, 1954), the latter being in the National Park. It is only in the Alps that crucifixes are found – either as bas-reliefs or in full relief (5). Seven of the peaks with symbols are located in two border countries (France, Italy, Switzerland); 2 symbols fall in National Parks; 8 are found in the Natura 2000 network and UNESCO World Heritage sites.

The three tables of the Apennines and Alps show the peaks identified by mountain group, the altitude above sea level, the types of religious symbols present, and their respective PAs.

Discussion

In terms of iconography, from a strictly numerical point of view crosses are more prevalent than Marian images. It appears that historically, in addition to their mystical, political and ritual aspects, crosses had scientific functions (Millesimi 2022), related to altimetry and accessibility of the summit, sometimes serving as a support for instruments for the first air-temperature measurements (Anker 2012).

The proliferation of anthropic signs on peaks, at both low and high altitudes, and well beyond the Catholic tradition, although tolerated by most people (Millesimi 2022), can have a deep impact on the landscape, especially if the symbol is disproportionately large or in some way inadequate in terms of its iconography, materials, building techniques and state of preservation. In addition, summit crosses are potentially dangerous for climbers because they pose problems of

criminal liability, and of safety if maintenance and repairs are not carried out regularly. Finally, if metal crosses are abandoned or destroyed, whether by vandalism or storms, they become non-biodegradable solid waste that needs to be disposed of.

In cases of intrusive or excessively large projects on summits, the construction work itself would have unsustainable environmental impacts, including impacts on the surface and soil, on plant communities or vegetation, loss of shelter and food sources for animals, and phototaxis of nocturnal insects' behaviour in the case of artificially illuminated crosses. The partial reshaping of the summits and the widening of paths for religious or other forms of tourism would have further negative impacts. In all these cases, the summit would lose its natural character. In order to mitigate the impacts, restraint should be recommended instead of the ostentation of messages inappropriate to the context, especially within or close to National or Regional Parks, and signs should be limited to those that identify official trails. In line with these considerations, two official documents have been issued in recent years: a note from the *Pastorale del Turismo* of the Archdiocese of Trento, which suggests parameters of restraint and invites people to seek the message of the mountain in natural signs (Andreatta 2009); a document from the mountaineering community (Mountain Wilderness Italia 2013) calling for greater control and binding regulations on crosses and other artefacts on Italian summits, especially within PAs.

The proposed cultural-lay-spiritual project to establish a *Sacred Mountain* in the Gran Paradiso National Park, with the freedom to choose not to climb to the symbol-free peak of Monveso di Forzo (3,322 m), fits into this perspective. The main goals are to contain human invasiveness in a PA and to encourage reflection on limits (both personal physical limits and the limits of humans as a species) while refraining from *conquering* the mountain (Comitato di Promozione *Una Montagna Sacra* per il Gran Paradiso 2021). The intention, influenced by ideas found in Asian culture or spirituality (Tibetan Buddhism has offered itself as a mountain religion worldwide), contains a broader ecological message – of greater respect for nature and its habitats, recognizing mountains for their intrinsic sacredness rather than as there to be exploited or consumed.

Conclusion

In order to pass peaks on to future generations in a more natural state, preference should be given to simple manmade artefacts that do not change the quality of the landscape or summit. As already happens in many cases, when suitable stones can be found and positioned a dry-stone stone cairn (about 40–50 cm high, visible even in fog) would be sufficient. This practice, already used in the 19th century, allows a natural, discreet and inexpensive way to mark the highest point. Based on the relationship between perceived landscape

and cultural landscape (Ferrari & Pezzi 2013), the proposal is to stop the creation of any additional summit artefacts and instead to conserve the historical signs, which in Italy include the IGM trigonometric points. If they understood the cultural significance and history of the existing signs, and the transformations they have undergone, alpine communities and associations would be motivated to take better care of them. It could be an educational choice to value the summit as an experience and reaching it as a *journey*, rather than focusing on the cross as a destination to be attained on foot or by cable car. In contemporary culture, the cross has become an increasingly polysemous symbol, one that can help overcome dualisms and divisions. Due to its basic shape, which can be seen as referring to orientation in space, and because the cross as a symbol is far more ancient than Christianity, today the summit cross can be considered through a different, modern, lens.

The surveying and mapping of these signs carried out by interested parties (ideally in the form of a digital project in collaboration with the Club Arc Alpin) could lead to a reflection on their impacts, and to a proposal, for the existing summit crosses, for a potential new ecological function. They could serve as indicators of climate change, making the extent of ice-melt and snow accumulation on the peaks visible (Figure 10). In cases identified as suitable and in agreement with park authorities and local communities, lattice iron summit crosses (over 2 m in height) could be fitted with temporary Automatic Weather Station equipment, following the guidelines of the World Meteorological Organization (WMO 2018). This would reinforce the role of mountain summits as *sentinels of climate change* (Quaglia et al. 2020: 12) and promote a new ecological function for the peak crosses, especially at high altitudes.

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Table 1 – Peaks above 2,000 m a.s.l. in the Apennines, Italy. PA – Protected area, NP – National Park, RNR – Regional Nature Reserve, RNPa – Regional Nature Park, "-" – peak not situated in a PA.

N°	Group / Mountain range	Name of peak	Elevation (m a.s.l.)	Symbol	Protected area
1	Tosco-Emiliano	Alpe di Succiso	2,017	†	Appennino Tosco-Emiliano NP
2		M. Cusna	2,121	†	
3		M. Cimone	2,165		Alto Appennino Modenese Regional Park
4	Sibillini	M. Vettore	2,476	†	Monti Sibillini NP
5		Cima del Redentore	2,448	†	
6		M. Priara	2,332	†	
7		M. Sibilla	2,173	†	
8		Pizzo Tre Vescovi	2,092	†	
9	Laga	M. Gorzano	2,458	†	Gran Sasso and Monti della Laga NP
10		Cima Lepri	2,445	†	
11		Pizzo di Sevo	2,419	†	
12		Pizzo di Moscio	2,411	† □	
13		M. di Mezzo	2,155	†	
14	Reatini	M. di Cambio	2,081	†	-
15	Gran Sasso	M. Corno Grande, western peak	2,912	†	Gran Sasso and Monti della Laga NP
16		M. Corno Grande, eastern peak	2,903	†	
17		M. Corno Piccolo	2,655	†	
18		Pizzo d'Intermesoli, southern peak	2,635		
19		M. Corvo, eastern peak	2,623	†	
20		M. Camicia	2,564	†	
21		M. Prenna	2,561	†	
22		Pizzo Cefalone	2,533	††	

N°	Group/Mountain range	Name of peak	Elevation (m a.s.l.)	Symbol	Protected area	
23	Gran Sasso	M. Aquila	2,494	†	Gran Sasso and Monti della Laga NP	
24		Pizzo d'Intermesoli, western peak	2,483	†		
25		Cima delle Malecoste	2,444	†		
26		Cima Giovanni Paolo II	2,422	†		
27		Pizzo di Camarda	2,332	†		
28		M. Tremoggia	2,331	†		
29		Pizzo San Gabriele	2,214	■		
30		M. Ienca	2,208	†		
31		M. San Franco	2,132	†		
32		M. Siella	2,027	†		
33	Montagne della Duchessa	M. Costone, eastern peak	2,271	†		Montagne della Duchessa RNR
34		Murulungo	2,184	†		
35		M. Cava	2,003	†		
36	Sirente Velino	M. Velino	2,486	† ?	Sirente Velino RNaPa	
37		M. Cafornia	2,409	† ?		
38		M. di Sevice	2,355	† P		
39		M. Sirente	2,348	†		
40		M. della Magnola	2,220	†		
41		M. Ocre	2,209	†		
42		Capo di Pezza	2,177	†		
43		M. Puzzillo	2,174	†		-
44		M. Cagno	2,153	†		Sirente Velino RNaPa
45		Cima del Morretano	2,098	†		-
46		M. Rotondo	2,062	†		Sirente Velino RNaPa
47		M. Orsello	2,043	■		-
48		M. San Nicola	2,012	†	Sirente Velino RNaPa	
49	Maiella	M. Amaro	2,793	†	Maiella NP	
50		M. Acquaviva	2,737	†		
51		M. Sant'Angelo	2,669	†		
52		Cima delle Murelle	2,596	†		
53		M. Porrara	2,137	†		
54		M. Rotella	2,129	†		
55		M. Morrone	2,061	†		
56	Simbruini Ernici	M. Viglio	2,156	† ?	Monti Simbruini RNaPa	
57		M. del Passeggio	2,064	†	-	
58		Pizzo Deta	2,041	† ?	-	
59		M. Cotento	2,015	†	Monti Simbruini RNaPa	
60	Gruppo del Monte Genzana	M. Genzana	2,170	†	Monte Genzana Alto Gizio RNR	
61		M. Rognone	2,089	†	-	
62	Marsicani	M. Greco	2,285	†	-	
63		La Meta	2,242	††	Abruzzo, Lazio and Molise NP	
64		M. Calanga	2,168	†		
65		M. Argatone	2,149	††		
66	Le Mainarde	M. Forcellone	2,030	††	-	
67	Matese	M. Miletto	2,050	††	-	
68	Sirino	M. del Papa	2,005	†	Appennino Lucano – Val d'Angri – Lagonegrese NP	

Table 2 – Peaks above 3,000 m a.s.l., in the Dolomites and the Italian Alps. NaPa – Nature Park, "-" – peak not situated in a PA.

N°	Group/Mountain range	Name of peak	Elevation (m a.s.l.)	Symbol	Protected area
1	Dolomiti di Brenta	Cima Tosa	3,173	?	Adamello Brenta NaPa
2		Cima Brenta	3,151	†	
3	Catinaccio	Catinaccio d'Antermoia	3,002	†	Sciliar – Catinaccio NaPa
4	Sassolungo	Sassolungo	3,181	†	-
5	Odle	Sass Rigàis	3,025	†	Puez Odle NaPa
6		La Furcheta	3,025	†	
7	Pale di San Martino	Cimon de la Pala	3,181	† ?	Paneveggio – Pale di San Martino NaPa
8		Cima della Vezzana	3,192	?	
9		Cima del Focobòn	3,054	†	
10	Sella	Piz Boè	3,152	† ?	-
11	Marmolada	Cima dell'Uomo	3,010	† ? (both fallen in situ)	-
12		Sasso di Valfredda	3,003	†	-
13		Cima Ombreta Orientale	3,011	†	-
14		Punta Penia	3,343	†	-

N°	Group/Mountain range	Name of peak	Elevation (m a.s.l.)	Symbol	Protected area
15	Sasso Croce-Lavarella-Fanes	Sasso delle Dieci	3,026	†	-
16		Lavarella de fora	3,034	††	-
17		Piz de Lavarella	3,055	†	Fanes – Sennes and Braies NaPa
18		Piz Conturines	3,064	§	-
19	Civetta	Monte Civetta	3,220	†	-
20	Tofane	Tofana di Rozes (I)	3,225	†	Dolomiti d'Ampezzo Regional NaPa
21		Tofana di Dentro (III)	3,238	†	
22		Tofana di Mezzo (II)	3,244	†	
23	Pelmo	Monte Pelmo	3,168	†	-
24	Dolomiti di Braies	Croda Rossa d'Ampezzo	3,146	†	Dolomiti d'Ampezzo Regional NaPa
25	Cristallo	Cristallo di Mezzo	3,154	†	
26		Monte Cristallo	3,221	†	
27	Sorapis	Croda Marcora	3,154	†	-
28		Sorapis	3,205	†	-
29	Antelao	Antelao	3,264	†	-
30	Dolomiti di Sesto e Auronzo	Punta dei Tre Scarperi	3,145	†	Dolomiti di Sesto NaPa
31		Croda dei Toni	3,094	†	
32		Cima Undici Sud	3,092	†	
33		Monte Popera	3,046	†	

Table 3 – Peaks over 4,000 m a.s.l., in the French, Italian and Swiss Alps. PA – Protected Area, NP – National Park, "-" – peak not situated in a PA.

N°	Group/Mountain range	Name of peak	Elevation (m a.s.l.)	Symbol	State and/or Protected area
1	Massiccio des Ecrins	Barre des Écrins	4,101	†	Écrins NP (FR)
2	Gran Paradiso	Gran Paradiso	4,061	Ⓜ	Gran Paradiso NP (IT)
3	Mont Blanc	Mont Blanc du Tacul	4,248	†	- (FR)
4		Dente del Gigante/Dent du Géant	4,014	Ⓜ	- (IT, FR)
5	Pennine Occidentali	Combin de Valsorey	4,184	†	- (CH)
6		Monte Cervino/Matterhorn	4,478	†	- (CH)
7		Dent Blanche	4,357	†	- (IT, CH)
8		Weisshorn	4,506	†	- (CH)
9		Zinalrothorn	4,221	Ⓜ	- (CH)
10		Pollux/Polluce	4,092	Ⓜ	The symbol of the Virgin Mary is located along the Italian normal track on the pre-summit at 3,991 m, Natura 2000 network: Aosta Valley (IT)
11		Castor/Castore	4,228	Ⓜ	The symbol is located at about 20 m under the peak. Natura 2000 network: Aosta Valley (IT, CH)
12	Lyskamm/Lyskamm vetta orientale	4,527	†	Natura 2000 network: Aosta Valley (IT, CH)	
13	Pennine-Monte Rosa	Punta Giordani	4,046	Ⓜ	Natura 2000 network: Aosta Valley/Alta Val Sesia and Alta Val Strona Natural Park (IT)
14		Corno Nero	4,322	Ⓜ	
15		Punta Gnifetti/Signalkuppe	4,554	Ⓜ	
16		Zumsteinspitze/Punta Zumstein	4,563	Ⓜ	- (CH)
17		Dufourspitze/Punta Dufour	4,635	†	- (IT, CH)
18	Pennine Orientali	Strahlhorn	4,190	†	- (CH)
19		Rimpfischhorn	4,199	†	
20		Allalinhorn	4,027	Ⓜ	
21		Alphubel	4,206	Ⓜ	
22		Täschhorn	4,491	Ⓜ	
23		Monte Dom	4,545	Ⓜ	
24		Lenzspitze	4,294	Ⓜ	
25		Nadelhorn	4,327	†	
26		Stecknadelhorn	4,241	†	
27		Dirruhorn	4,035	†	
28		Lagginhorn	4,010	†	
29	Oberland	Aletschhorn	4,195	†	UNESCO-Welterbe Swiss Alps Jungfrau-Aletsch (CH)
30		Finsteraarhorn	4,274	†	
Not officially listed					
31	Pennine-Monte Rosa	Balmenhorn	4,167	Ⓜ	- (IT)

Key to symbols used in the tables:

†	Cross	Ⓜ	Risen Christ	Ⓜ	Crucifix
Ⓜ	Virgin Mary	§	Ladin deity		
Ⓜ	Shrine	Ⓜ	Bust of a Saint (Don Bosco)		