

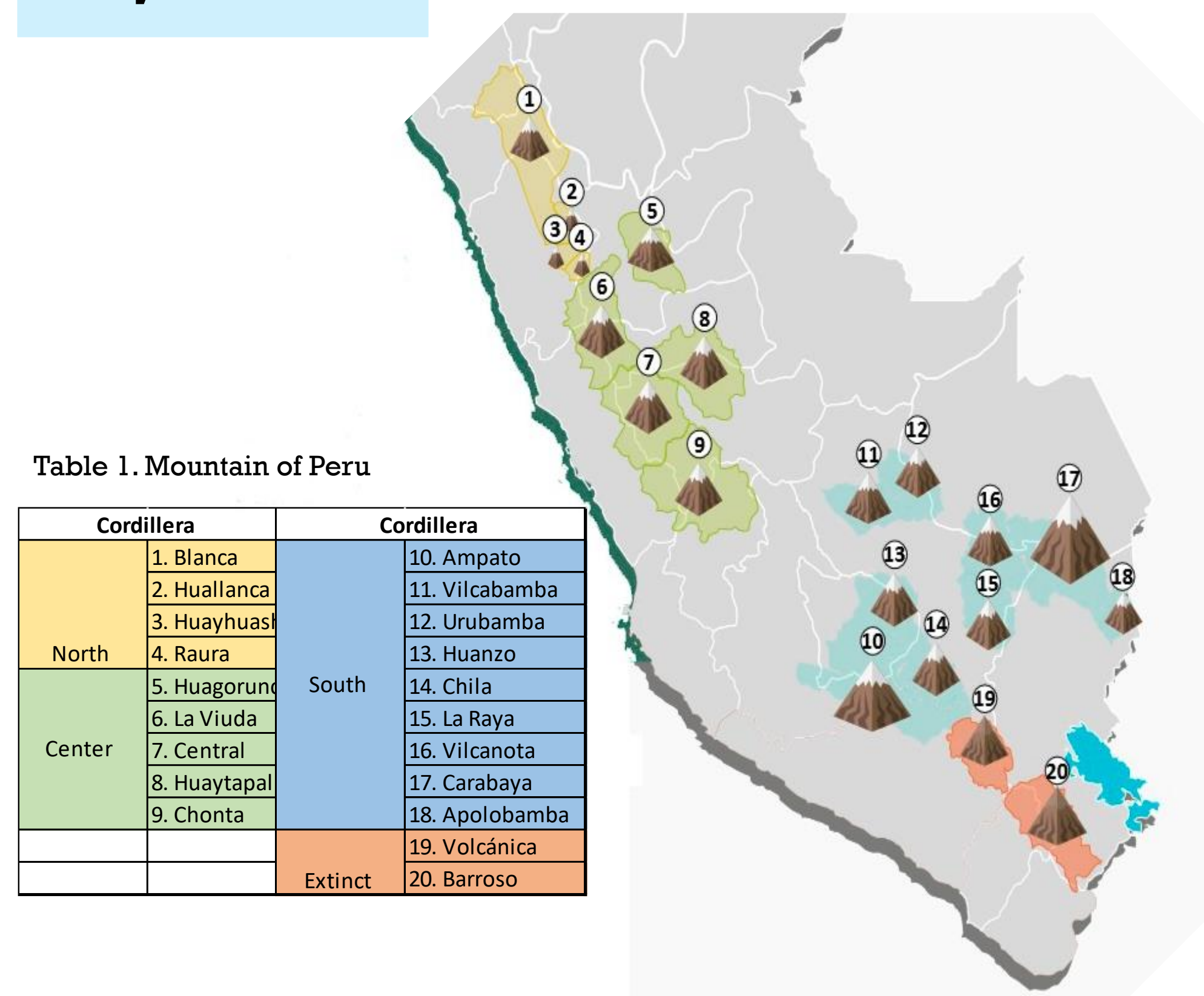
Introduction

The objective of the national inventory of glaciers and lagoons is to know the situation of glaciers and lagoons of glacial origin, in order to provide updated information on these resources and that in turn can serve as an instrument for decision-making regarding their conservation, use and management by the competent authorities and the population.

The importance of the inventory lies in identifying, characterizing and monitoring the state of glaciers and lagoons, since the accelerated retreat of glaciers and consequently their loss, has a significant impact on the availability of water resources. Likewise, these changes influence the characteristics of the lagoons, varying their size and volume, which in many cases can represent a risk for the population. The inventory was developed at the national level, and considers 20 mountain ranges (two of them extinct), which are distributed in 13 departments (Ancash, Lima, Huánuco, Pasco, Apurímac, Junín, Arequipa, Puno, Cusco, Huancavelica, Ayacucho, Moquegua and Tacna).

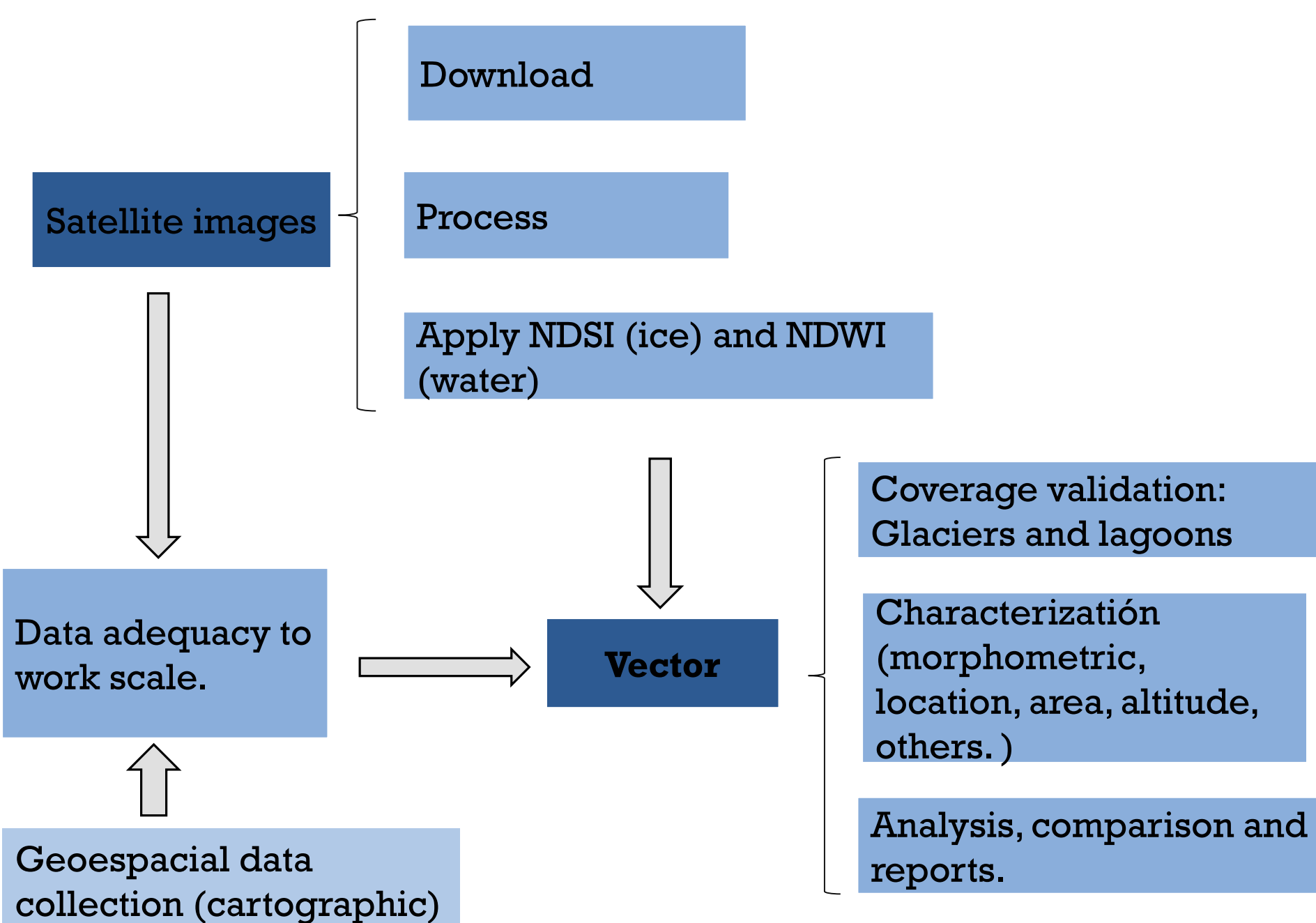
The results of the national inventory of glaciers and lagoons of glacial origin show 2,259 glaciers with a surface area of 1,118.11 km²; and 8,577 lagoons with a surface area of 1022.30 km².

Study area

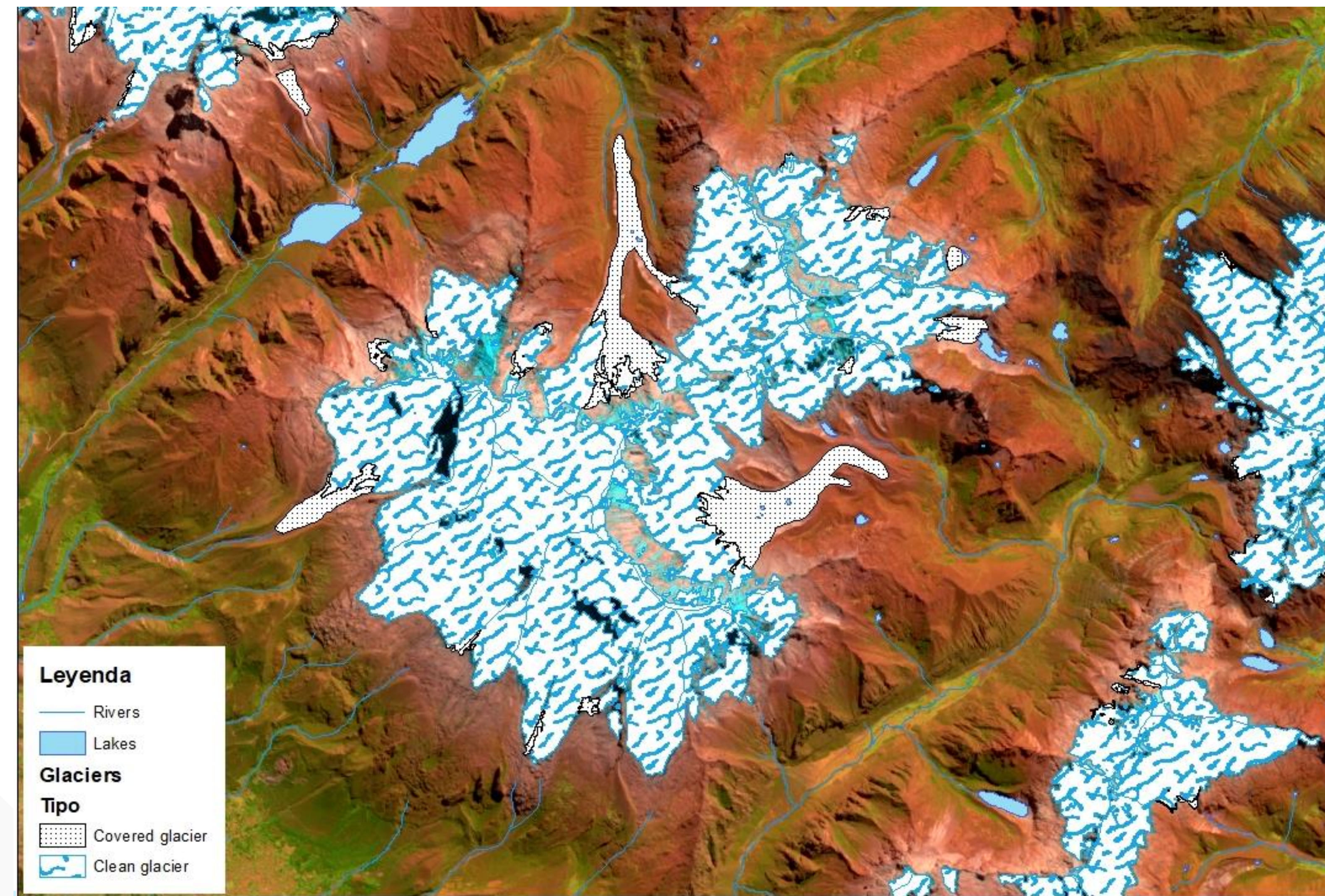


Methodology

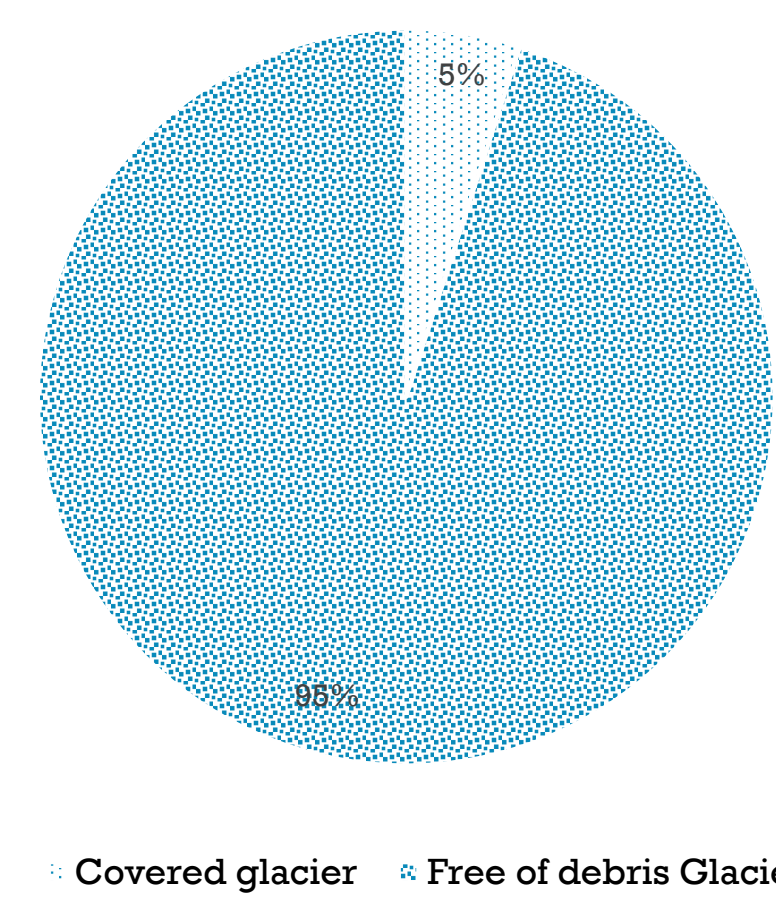
This inventory has been worked in detail at a 1:25 000 scale, which allowed us to better represent the surfaces of glaciers and lagoons of glacial origin, for this the following process was followed:



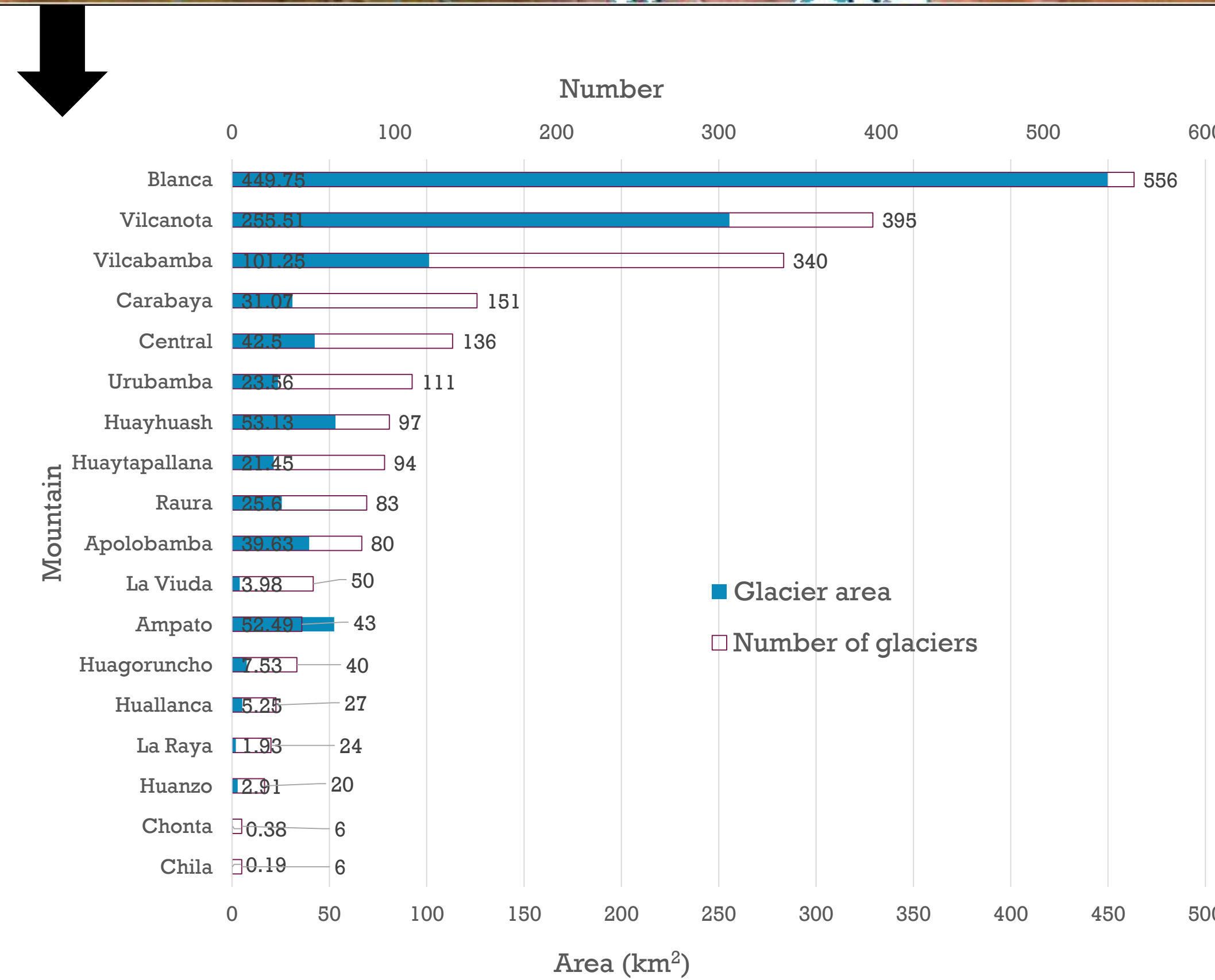
Results



Glaciers



Graphic 1. Type of glacier



Graphic 2. Number and area of glaciers for every mountain

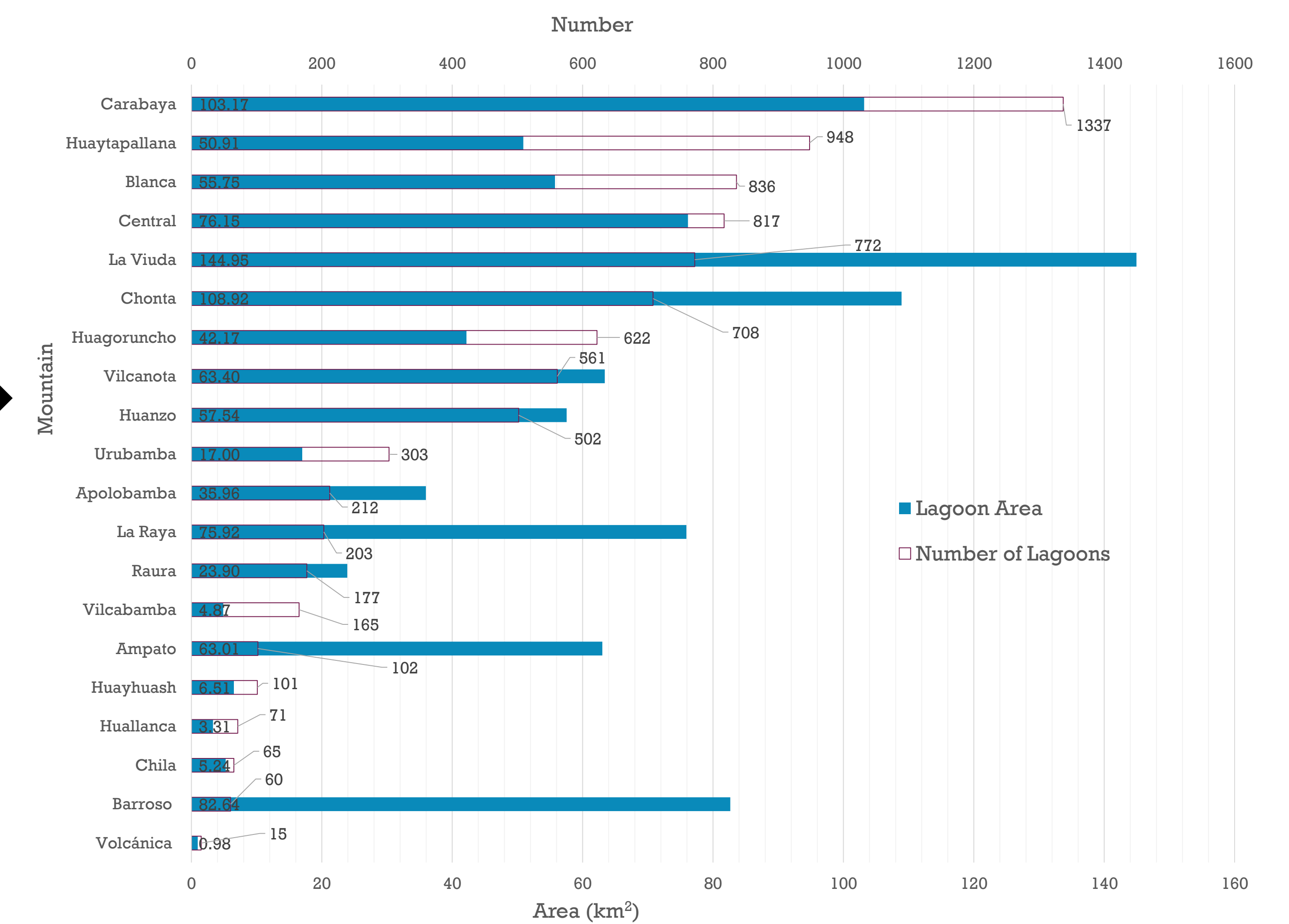
95% of glaciers in Peru are glaciers free of debris; and 5% are glaciers covered by debris and debris (Graph 1). The Cordillera Blanca contains the largest quantity and surface of glaciers with 556 glaciers and 449.75 km², followed by the Vilcanota mountain range with a surface of 255.51 km² and 395 glaciers, likewise, the mountain ranges with the smallest glacial surface are observed, which are La Raya, Huanzo, Chonta and Chila (Graph 2).



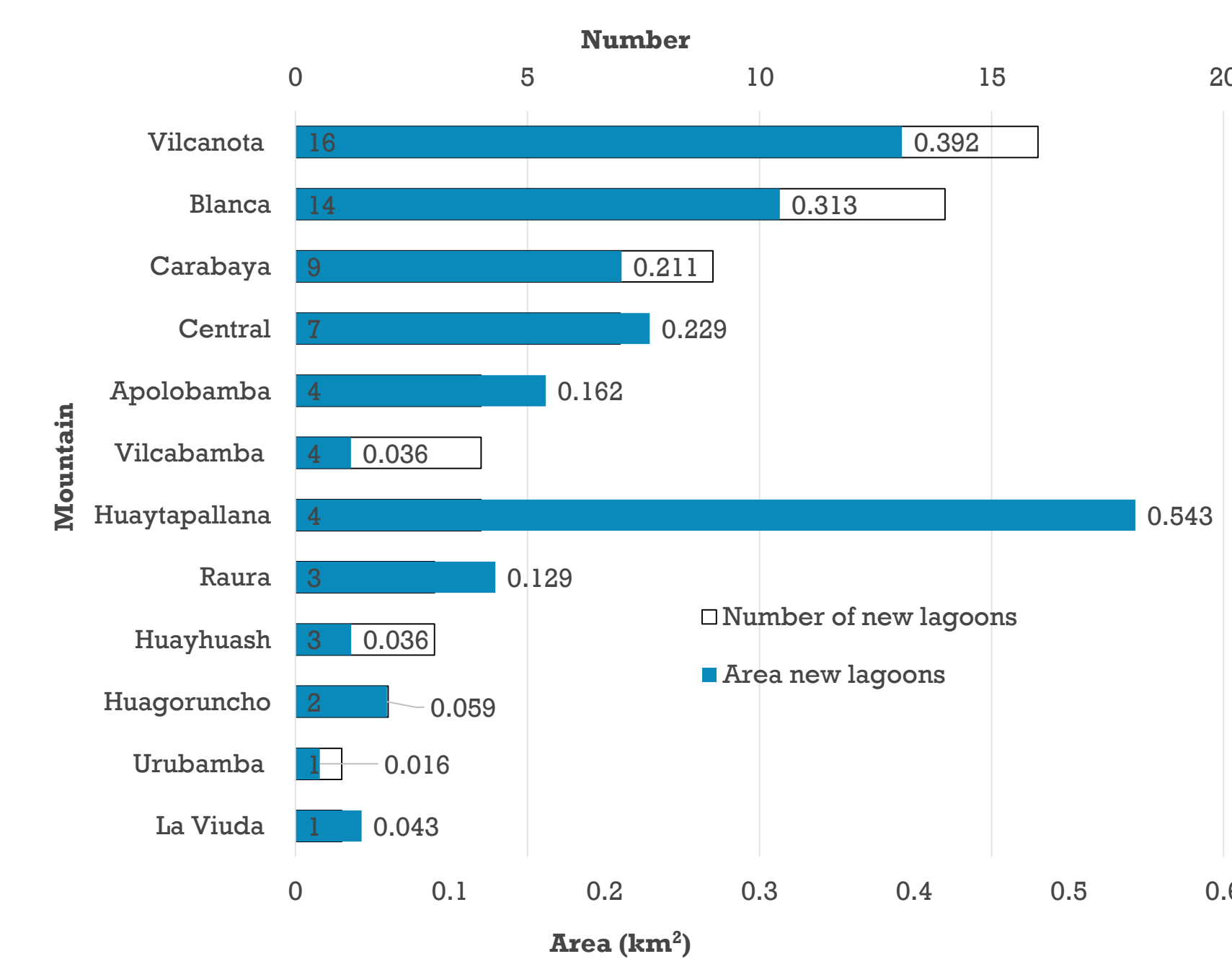
Photograph 1. Panoramic view of the water outlets of Sullcon glacier for both basins (Mantaro y Rimac) - march 2016 (Photo: Torres L.)

Photograph 2. Panoramic view of the water outlets of Sullcon glacier for Mantaro basin only - June 2018 (Fotografía: Torres L.)

Lagoons



Graphic 3. Number and area of lagoons for each mountain



Graphic 4. Number and area of new lagoons



Photograph 3. The Vizcachani lagoon is increasing its volumen and surface (Photo: Vilca O.)

The Carabaya mountain range contains the largest number and surface area of lagoons, followed by the Huaytapallana and Blanca mountain ranges (Graph 3). Likewise, as a result of the inventory, new lagoons that are close to the glaciers were identified; and some of them present favorable conditions for their growth both in surface area and in volume. The highest number of new lagoons is observed in the Vilcanota mountain range with 16 lagoons, followed by the Blanca mountain range with 14 lagoons, however, the Huaytapallana mountain range has the largest area of new lagoons with 0.5 km² (Graph 4).

Conclusions

- The national inventory of glaciers and lagoons of glacial origin was developed at a work scale of 1:25 000, which made it possible to identify and characterize the glaciers and lagoons in detail.
- The La Raya, Huanzo, Chonta and Chila mountain ranges show the least glacial surface, and are the most susceptible to losing their entire surface in a short term.
- The lagoons of glacial origin are found in greater quantity in the Carabaya mountain range with 1,337 lagoons, on the other hand, more new lagoons are observed in the Vilcanota mountain range.
- The results of the national inventory of glaciers and lagoons of glacial origin are available in the INAIGEM geoportal, which can be used for management and research purposes.