

The Relationship Between Shallap Glacier — Cordillera Blanca and King George Island — Antarctic Peninsula

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The main goal of this study is to determine the relationship between Shallap Glacier (SG) — Cordillera Blanca and King George Island (KGI) glaciers — Antarctic Peninsula and describe their features. Multi-temporal analysis with satellite imagery from 1989 to 2019 was made. The SG and KGI glaciers seem to be quite different. Nevertheless, preliminary results, in this research, show that approximately 74% of KGI glaciers have reduced their areas (below 20%) as same as the SG in the last 30 years. Indeed, SG (6 Km²) represents only 0.6% of the KGI glaciers (993.6 Km²), but each zone's different own factors seem to be shrinking glacier coverage at about similar proportions.

The SG retreat is around 20% at a general rate of 0.05 Km²/year. The glacier cover is strongly controlled by the bedrock topography, the aspect for the lost glacier area is west and northwest, predominantly, and has strong slant (over 15°) since the whole studied area is featured mainly by strong to very strong slopes and most glaciers front toward south, southwest and west. Meanwhile, KGI glaciers, as a whole, underwent a decrease of 10% concerning its initial area at 3.5 Km²/year. The glacier cover is controlled by the bedrock structure in the northeast, north and south direction. From 70 KGI glaciers assess, about 40% of glaciers have lost under 10% of their glacier coverage and 34% of glaciers, below 20%; this includes the melting of glacier margins and retreat of ice shelves. KGI glaciers mostly placed in Admiralty Bay with comparable features to SG are (GLIMS code) G301446E62190S (8.2 Km²), G301703E62111S (5.6 Km²), G301512E62184S (4.6 Km²), G301389E62243S (4.0Km²); which have lost 7%, 9%, 24% and 35% respectively regard to their initial area. Thus, this fact requires comprehension of many factors. Highlights, KGI Glaciers located in North are bigger and lose less ice-covered area. Moreover, most glaciers in south are smaller and have higher recession rates. In contrast, there are also medium-area glaciers located in south and on the continent that are losing as little as the bigger ones of north.

Hence, it is important to identify which are the factors that most modulate glacier retreat in each zone; in addition to the aforementioned, it is recommendable to consider climatic variability, ice Calvin effect, etc. and/or a combination of several of them, respectively.

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