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INVENTORY, DISTRIBUTION AND TOPOGRAPHIC FEATURES OF ROCK GLACIERS IN THE SOUTHERN REGION OF THE EASTERN ITALIAN ALPS (TRENTINO)

ABSTRACT: SEPPI R., CARTON A., ZUMIANI M., DALL'AMICO M., ZAMPEDRI G. & RIGON R., *Inventory, distribution and topographic features of rock glaciers in the southern region of the Eastern Italian Alps (Trentino)*. (IT ISSN 0391-9838, 2012).

A GIS-based rock glacier inventory was conducted in a region of about 6200 km² located in the southern sector of the Eastern Italian Alps (Trentino). The five major mountain groups of the region were investigated and a total of 705 rock glaciers, 25% of which are intact (i.e. containing permafrost), were identified. Their spatial distribution is rather inhomogeneous, which suggests that, in addition to climate, the bedrock lithology and structure are among the key factors controlling their genesis and development. The lowest density of rock glaciers was associated with carbonatic rock outcroppings (e.g. in the Brenta Group and in the Dolomites), whereas the highest density was observed in areas dominated by metamorphic rocks (e.g. Ortles Cevedale group). The rock glaciers cover a total area of 33.3 km², which is more than 1.4% of the area located above 1600 m a.s.l. and is comparable to the area covered by glaciers (38.3 km² in 2003). The rock glaciers are located at a

mean elevation of 2282 ±289 m a.s.l. and are distributed in an elevation range of about 1440 m. Considering separately the two classes of intact and relict (i.e. with no permafrost) rock glaciers, the mean elevation is 2632 ±205 m a.s.l. and 2169 ±211 m a.s.l. respectively. Relict rock glaciers are found between 1650 and 2700 m a.s.l., whereas above 2800 m a.s.l. only intact rock glaciers exist. The mean aspect of all the inventoried rock glaciers is 43°. A dominant northern orientation does not emerge in the class of the intact forms, whereas the relict rock glaciers show a predominant northern orientation with a mean aspect of about 30°. According to the mean elevation of the intact rock glaciers, the lower boundary of permafrost in the studied region would be located at an elevation of approximately 2630 m a.s.l. This boundary varies significantly when considering the different exposures, and ranges from about 2510 m a.s.l. on north-facing slopes to about 2690 m a.s.l. on those exposed to the south. The lower boundary of permafrost existence in the past, as marked by the mean elevation of the relict rock glaciers, was located about 450 m lower than the modern one with variations included in a range of 230 m according to the exposure. This provides a rough estimation of the shift in elevation of the lower permafrost boundary between the present-day and the time when the relict rock glaciers were active. Accordingly, a MAAT increase of about 2.9°C can be calculated applying a standard vertical lapse rate (0.65°C/100 m) to this shift.

KEY WORDS: Rock glacier inventory; GIS; Rock glacier distribution; Permafrost; Eastern Italian Alps.

RIASSUNTO: SEPPI R., CARTON A., ZUMIANI M., DALL'AMICO M., ZAMPEDRI G. & RIGON R., *Catasto, distribuzione e caratteristiche topografiche dei rock glaciers nella regione meridionale delle Alpi orientali italiane (Trentino)*. (IT ISSN 0391-9838, 2012).

Questo articolo presenta un catasto dei rock glacier realizzato nel settore meridionale delle Alpi orientali italiane (Trentino). Sono stati studiati i cinque principali gruppi montuosi ivi presenti, individuando e descrivendo un totale di 705 rock glacier, il 25% dei quali intatti (contenenti permafrost). La distribuzione spaziale dei rock glacier tra i cinque gruppi montuosi studiati è piuttosto disomogenea, suggerendo che, oltre al clima, la litologia e la struttura del substrato siano tra i fattori determinanti nel controllare la loro genesi e il loro sviluppo. La densità più bassa è stata osservata nelle aree dominate dall'affioramento di rocce carbonatiche (ad esempio nel Gruppo di Brenta e nelle Dolomiti s.s), mentre la densità più elevata è caratteristica delle aree dove affiorano

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