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PROPOSTA PER LA REALIZZAZIONE DI UN CATALOGO AEROFOTOGRAFICO DEI GHIACCIAI ITALIANI

ABSTRACT: GIARDINO M., MORTARA G. & BONETTO F., *Proposal for the realization of an inventory of aerial photographs of glaciological interest in Italy.* (IT ISSN 0391-9838, 2001).

Photography is an important tool to study the glacierized areas of the Alps and to monitor glacier changes: since 1979, members of the Comitato Glaciologico Italiano collect and catalog in special archives photographic images of Italian glaciers taken during annual field-trips or researches. Another important iconographic heritage on Italian glaciers has been made up during last decades, due to the still more frequent use of remote sensing imagery for scientific and applied studies of the Earth's surface. We refer to images from aerial photography, which proves itself as an irreplaceable tool for several reasons:

- 1) it allows an unitary and homogeneous view of extended parts of an area, included those of difficult accessibility on the field;
- 2) if several aerial photographs of the same area are spread over a period of time, multitemporal photo-interpretative analysis are possible;
- 3) coheval images of an extended portion of a region allow to carry out evaluations concerning climatic changes;
- 4) high-definition remote sensing is a primary tool in the evaluation of hazard and risk connected to dynamically very active physiographic units such as glaciers.

On the basis of the above mentioned considerations a project has been elaborated to perform an inventory of aerial photographs of glaciological interest in Italy: they constitute a conspicuous and valuable heritage, sometimes difficult to be utilized because of images' dispersion and disorganization.

The recording form of the data base has been drawn up to collect either technical data concerning the aerial photographic shots (*Dati sul volo* = flight data; *Caratteristiche dell'immagine* = image's characteristics), either useful informations to reconstruct the morphological evolution of the glacier (= *Aspetti Morfologico-Ambientali*). A special atten-

tion has been devoted to the search of «objective» standards of description, in order to make easy survey and check of data and to allow comparison of data from different researchers.

Taking into account the considerable amount of available data, during the present experimental stage of the work, the «aerial photographic strip» has been chosen as the basic unit of cataloguing. This unit allows to differentiate series of aerial photographs by date, each series showing unique features, due to frequent changing meteorological and environmental situations in the glacierized areas. Extensive analysis of aerial photographs also enable to sort images by quality: under certain meteorological circumstances there are obstacles to aerial photography interpretation.

Aerial photographs of the Miage Glacier (a major glacier in the Western Alps, Mont Blanc Massif, Italy) have been collected and catalogued in order to check the operation of the data base (executed with Filemaker Pro by Claris Co.) and to show the functioning of the inventory of aerial photographs of glaciological interest in Italy. Browsing data from more than 250 photograms, related to 20 consecutive sets of aerial photographic shootings covering a 52-years time interval (1945-1997), resulted as a very useful tool to trace the recent dynamic evolution of the glacier. Variations in size and shape of the glacier (such as the remarkable advance of the '80s), emptying/filling episodes of the Miage Lake, and other glacial events relevant to geomorphological hazards evaluation in ice-marginal environments, have been singled out with great precision.

KEY WORDS: Aerial photography, Inventory, Glacier, Italian Alps.

RIASSUNTO: GIARDINO M., MORTARA G. & BONETTO F., *Proposta per la realizzazione di un catalogo aerofotografico dei ghiacciai italiani.* (IT ISSN 0391-9838, 2001).

La fotografia è uno strumento insostituibile per documentare le trasformazioni dei ghiacciai: sin dagli anni '70 il Comitato Glaciologico Italiano raccoglie e cataloga in uno specifico Archivio le immagini fotografiche a corredo delle campagne di rilevamento sul terreno. Un altro ricco patrimonio iconografico sui ghiacciai italiani è rappresentato dalla fotografia aerea che, in campo glaciologico, si rivela un insostituibile supporto di base per diversi motivi quali: 1) osservazione unitaria ed omogenea di estese porzioni di territorio, comprese quelle difficilmente accessibili sul terreno; 2) analisi comparate quando si disponga di riprese multitemporali; 3) considerazioni di ordine climatico; 4) valutazione, in chiave previsionale, dell'evoluzione di situazioni potenzialmente pericolose (es. fronti sospese).

Sulla base di queste considerazioni è stato elaborato il progetto di un catalogo ragionato delle aerofotografie di interesse glaciologico esistenti in Italia. Il modulo di archiviazione è stato concepito in modo da raccogliere sia i dati tecnici specifici della ripresa aerea, sia le informazioni utili per ricostruire l'evoluzione morfologica del ghiacciaio. Consi-

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