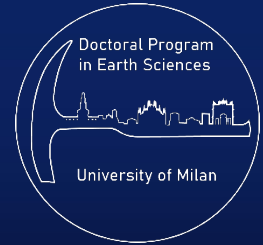




UNIVERSITÀ DEGLI STUDI DI MILANO

Corso di Dottorato in Scienze della Terra



9-11th January 2024 - Short course (3 cfu, 15 hours) - Room A and Stoppani
Dipartimento di Scienze della Terra "A. Desio", via Mangiagalli 34, Milano

Glacier monitoring: from in situ measurements to remote sensing techniques by Niccolò DEMATTEIS

MAIN TOPICS

- introduction to glacier geomorphology and physics
- phenomena of glacier instability and glacial hazard
- glacier monitoring: past and present (and future?)
- remote sensing techniques of glacier monitoring
- in situ techniques of glacier monitoring
- glacial risk evaluation and management



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Course description

This course aims to illustrate the evolution of the monitoring concept in glaciology, especially considering phenomena of glacial hazard.

In the past century, glacier monitoring concerned almost exclusively annual measurements – e.g., to survey mass balance, front retreat and glacier dynamics – during short in situ campaigns. With the advent of satellite observation, the extension of the surveyed areas has virtually increased at global scale, but the paradigm of a discontinuous monitoring has remained substantially unaltered, also considering the relatively coarse revisit time of satellites.

In the last decades, the sensitivity to glacial hazards has increased in the scientific community and, more recently, also in the population. Nevertheless, to deal with glacial hazards, the classical approach of discontinuous observations is no longer adequate, and permanent monitoring plans at high measurement rate are required. To this aim, an effective approach is to adapt to a glaciological context, well-established survey techniques already used in other fields of geo-hydrological risk. The necessity to measure processes at time scales of days or hours forces the adoption of in situ instrumentation, possibly low-cost, to realise monitoring networks distributed across the territory.

Since the global warming is provoking most serious changes on glacial environment, it is necessary to adopt survey approaches that allow to evaluate its impact and the possible variations of glacial dynamics into various sites. One of the challenges that the scientific community shall face is to create and disseminate competence to evaluate and deal with glacial risk correctly.

