UNIVERSITÀ DI PAVIA
DIPARTIMENTO DI SCIENZE DELLA TERRA E DELL'AMBIENTE
DOTTORATO DI RICERCA IN SCIENZE DELLA TERRA E DELL'AMBIENTE

FORM PER PROGETTI BANDO DOTTORATO

1. Project title

Climate-driven evolution of high-altitude Alpine cryosphere dynamics: insights from Hanging Glaciers, Ice Aprons and Accumulation Zones of Polythermal Glaciers.

2. Proposer

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4. Key words
(Max. 5 – at least 2)

Cryosphere, Glaciers, Climate Change, Ice Aprons, Hanging Glacier

5. Abstract
(Max.1.500 characters with spaces)

High-altitude ice bodies: Hanging Glaciers (HGs), Ice Aprons (IAs) and the Accumulation Zones of Polythermal Glaciers (AZPGs), are rapidly transforming under current climate change but remain poorly measured mainly due to their extreme environment. This project aims to improve their characterisation by addressing three key aspects: (i) HGs stability, essential for managing glacier-related hazards; (ii) the accelerated degradation of IAs, recognised as sensitive climatic indicator of these ice bodies once considered stable, and valuable paleo-climatic archives; and (iii) the poor quantification of high-elevation snow accumulation, and thermal state of AZPG, which is a critical component for constraining glacier mass balance and future modelling of evolutive scenarios. **HGs** stability evolution will be examined through the unique decadal dataset of the Whymper Serac, integrating GB-SAR and DIC velocities to better assess the evolution of its dynamics and with thermistor chains and geophysical surveys to assess thermal structure evolution. **IAs** will be studied using satellite remote sensing: stereo-DEM differencing will be used to track thinning and long-term geometric evolution, complemented by UAV and in-situ data for fine-scale mapping. **AZPGs** will be analysed through UAV surveys and geophysical measurements to refine internal and surface characterization. High-elevation snow accumulation will be quantified via in-situ measurements: snowpack coring, UAV DTMs, etc. Together, these methods will build a coherent multi-scale framework to understand how warming reshapes high-altitude Alpine ice bodies and affects glacier-related hazards.