A laboratory for the integration of geomatic, geophysical and geomechanical data: the «Campanile della Val Montanaia» (Cimolais, PN)

#AltaBadia2022

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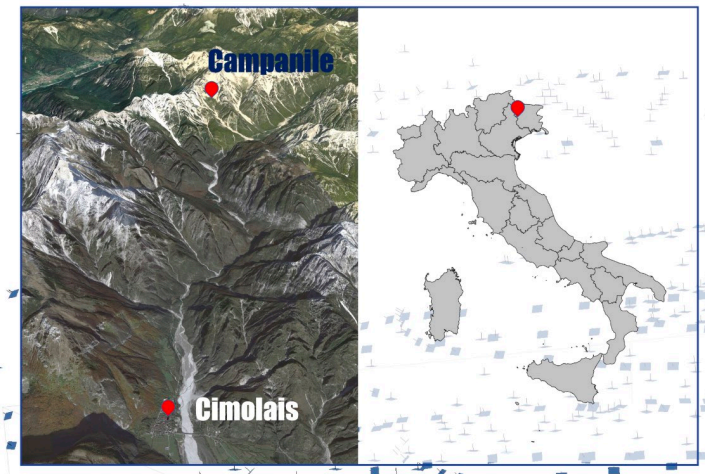


RESEARCH OBJECT

The «Campanile della Val Montanaia», a 280-m-high rocky pinnacle in the western sector of the Friulian and Oltre Piave Dolomites system. Located in the centre of a glacial cirque, its origin is related to the progressive erosion of the surrounding deposits of Dolomia Principale, the geological formation that characterizes the entire area of interest.

THE SURVEY

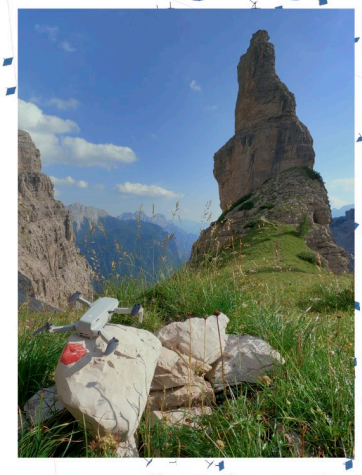
Performed in July 2022 by combining multiple geomatic techniques to accurately reconstruct its dimensions and geometry of the pinnacle, and passive geophysics techniques aimed at defining its dynamic response. In particular, a photogrammetric survey was carried out from UAV (Unmanned Aerial Vehicle) acquiring a total of 2500 images that were used as the input for SfM (Structure From Motion) reconstruction of the Campanile. In parallel, a GNSS support survey was performed on 10 GCPs (Ground Control Points), for 3D coordinates were measured with decimetre accuracy. Dynamic characterization was performed using a portable seismometer (TROMINO®) capable of measuring ambient seismic noise in the frequency bands of interest.

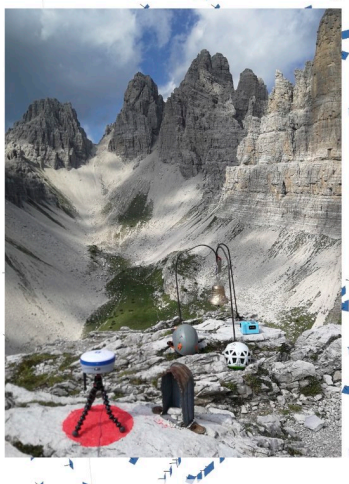
MODEL APPLICATIONS

The 3D model will be used together with geophysical data to conduct numerical analyses relating to the response and dynamic behaviour of the geological object. The model will also be used, together with the high-resolution images, to characterize the rock mass through the systematic mapping of the discontinuities, and to conduct slope stability analyses, also through advanced numerical simulations.

OBJECTIVES AND PRELIMINARY RESULTS

a) the analysis of the static, dynamic, geomechanical and stability characteristics of the «Campanile della Val Montanaia»;
b) the creation of a model that serves as a reference for geomatic monitoring of the Campanile;
c) demonstrate the benefits of a multidisciplinary analysis, capable of combining multiple datasets for the purpose of a more complete characterization of the site.





DRONE (UAV)

GNSS SURVEY

TROMINO®

GEOPHYSICAL DATA

3D MODEL

FEM MODEL

Z
Y
X