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PROBABILISTIC BASED-ROCKFALL RISK ASSESSMENT FOR A COASTAL CLIFF IN NORTHERN ALGERIA

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Abstract

Rockfall hazards significantly threaten rocky slopes, often leading to severe consequences. The Cap Oukass cliff in Northeast Algeria is particularly prone to recurrent rockfalls, which have resulted in the loss of human lives. Our research integrates probabilistic, structural, and photogrammetric techniques to comprehensively evaluate the rockfall risk in this area and identify contributing factors. The adopted methodology combines kinematic analysis and the Matterock method to pinpoint zones susceptible to rockfall mobilization. Additionally, we conduct 3D trajectory simulations to understand the behavior of individual rockfall blocks. A key aspect of our study is the examination of fault sets and their influence on the cliff's instability. Using the energy-return period couple, we generate a hazard map categorizing the RN9 road as within the medium to high hazard range. Our qualitative assessment of rockfall risk considers various predisposing and triggering factors. The findings of this study not only provide valuable insights into the rockfall risk at Cap Oukass cliff and suggest effective mitigation strategies. Furthermore, our approach can be extrapolated to assess and categorize rockfall hazards and risks in other rocky slopes with similar characteristics. These results contribute to developing effective management strategies to mitigate the associated risks of rockfall hazards.

Key words: failure mechanisms, fault, hazard, risk, Rock fall, 3D simulation

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