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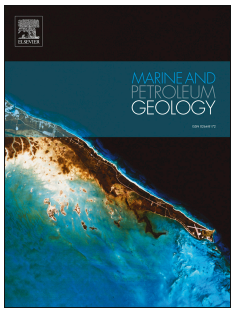

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Drones in Carbonate Geology: Opportunities and Challenges, and Application in Diagenetic Dolomite Geobody Mapping

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ABSTRACT

Unmanned aerial vehicles (UAVs) or drones have become widely available for use in a broad range of disciplines. Despite the decreased cost and technological developments of platforms, sensors and software, the use of drones in carbonate geology has yet to be exploited. Nevertheless, drones offer multiple advantages over traditional field work or high-altitude remote sensing techniques, in that they enable the reconstruction of three dimensional models of inaccessible or unsafe outcrops, and can bridge the spatial scale gap in mapping between manual field techniques and airborne, high-altitude remote sensing methods. In this contribution, we present our methodology of structure from motion photogrammetry on drone-captured images and highlight opportunities and challenges of using drones in carbonate geological studies. Moreover, we apply this method to document the spatial distribution and dimensions of diagenetic dolomite geobodies in Carboniferous limestone host rock of the Picos de Europa, northern Spain. The results of our study indicate that dolomite geobodies occur preferentially near to strike-slip faults, rather than thrust faults or specific types of limestone host rock lithology, in the study area. The geobody dimensions appear to be related to the strain magnitude of the strike-slip faults. We propose that these identified links and controls are applicable to structurally-controlled dolomitization on a more general basis. Our study has demonstrated the potential for using drones in carbonate geological studies.