



## **Karstic hazard assessment combining geomorphological and geological data in the region of BOUKADIR (Chlef, Algeria)**

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In 1988, a large collapse crater of 60m in diameter and 35m of deep occurred in the national road RN4 linking the wilaya of Algiers to Oran, exactly in the region of Boukadir located in the northern piedmont of Ouarsenis in Algeria. The cover collapse sinkhole is located in the Boukadir plain, where the Chlef river is running, at the foot of the 723m high Oursenis Mt, composed of Lithothamnion limestones of the Messinian (uppermost stage of the Miocene). In Algeria, there are many karst areas like Tlemcen (karstification well developed at depth), Saida (karstification well developed at the surface), or the calcareous ridge of Djurdjura, Jijel... But the area of Boukadir has never been defined as a karstic region despite the 1988 sinkhole and the various karstic forms that we mapped in Oursenis Mt at the surface. We focus in this study on the Boukadir plain at the foot of the Oursenis range, where the carbonate rocks are covered by younger sediments, and where the infrastructures (RN4, highway from the east of Algeria to the West) and villages (Boukadir, 41,655 inhabitants) are located.

To assess karstic hazard and related risk for the two major infrastructures running at the foot of the Ouarsenis Mt, we combine geological, geomorphological and hydrological data. The examination of the geomorphology using aerial photographs, DEM and satellite images reveals the absence of any subsidence sinkhole, which is related to the fact that the covering sediments contain a significant amount of clay. Indeed the Lithothamnion limestones are covered by the marine marls of the Astien deposited during the Pliocene and clayey continental deposits of the Villafranchien formation (Upper Pliocene). The combination of surface geology with boreholes in the Boukadir plain reveals that the reef Lithothamnion limestones does to extend across the Boukadir plain. The karstic hazard is thus restricted to a  $\sim 2$ km wide narrow band at the foot of the Oursenis Mt.