The Pleistocene sedimentary record of karst poljes in the Balkans

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Poljes are a distinctive feature of limestone karst landscapes in the eastern Mediterranean. The mountains of the Balkan Peninsula were extensively glaciated during the cold stages of the Pleistocene so that many of the large poljes contain thick sequences of Pleistocene fluvial sands and gravels. These were deposited by glacial meltwater streams. Investigating these alluvial sedimentary archives is important for our understanding of long-term landscape dynamics in the Mediterranean. What is more, these large wetland basins were often favoured sites for resource exploitation by Palaeolithic humans and may provide valuable archaeological records. The long-term tectonic controls on polje formation are fairly well understood, but their Pleistocene sedimentary fills have not yet been investigated in detail.

This study presents the first systematic investigation of the Pleistocene alluvial records of karst poljes using six field sites surrounding the Orjen massif close to the Adriatic coast of Montenegro. The plateau was glaciated on at least four occasions during the Pleistocene (MIS 12, 6, 5d-2 and the Younger Dryas). Detailed stratigraphical and sedimentological investigations supported by 35 U-series ages demonstrate that the poljes were filled with large volumes of coarse-grained alluvial sediment prior to 350 ka. This corresponds to the major glaciation of Orjen and other Balkan Mountains during MIS 12. Ice extended down to 500 m a.s.l. on Orjen at this time. There is limited evidence of fluvial aggradation in the poljes during MIS 6 or 5d-2. This suggests that since MIS 12 sediment supply was much reduced and meltwater was increasingly channelled into the subterranean karst network. The Orjen poljes contain one of the best preserved records of Middle Pleistocene river activity in the Mediterranean. It is likely that the other karst poljes of the Balkan region, and elsewhere, also contain valuable records of Pleistocene landscape processes.