Origin and evolution of poljes in the Sivas gypsum karst, Turkey

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Poljes, characterized by extremely flat floors, are the largest depressions that develop in karst terrains. Although there has been much research about poljes in carbonate karst settings, references to these landforms in evaporite areas are anecdotic. This work documents poljes developed in the Sivas gypsum karst of Turkey, describing their neotectonic context and characteristics, and inferring their variable origins and evolutionary paths. Two different morphostructural zones can be distinguished in the area related to differential uplift associated with the active Sivas Thrust: (1) a more rapidly rising ridge associated with the thrust front, corresponding to a hanging-wall antiform controlled by an inferred footwall ramp; and (2) a low-lying area in the trailing zone of the antiformal ridge that controls the path of the Kızılırmak River, and where the poljes are located. Detailed geomorphological mapping revealed 13 flat-floored poljes with areas ranging from 1 to 8 km\textsuperscript{2} and variable geometries in plan (i.e. elongated, subcircular, irregular). The bottom of the depressions is situated within the water-table oscillation zone (epiphreatic zone), locally lying below the floodplain of the Kızılırmak River, and typically host permanent or ephemeral lakes. Therefore, these basins can be considered as active base-level poljes. The poljes are mostly drained by ponors or swallow holes that commonly correspond to floodwater caves, generally with entrances at the foot of retreating gypsum scarps. Cartographic relationships indicated that poljes in the region can be initiated from: (1) flat-bottom and low-gradient relict valleys; (2) abandoned valley sections; and (3) coalescing bedrock collapse sinkholes. The evolution and enlargement of the poljes is mainly related to solutional undercutting and slope retreat, notably at lake margins, together with corrosional lowering controlled by the regional base level. In contrast with most of the poljes described in carbonate karst regions, the gypsum poljes of Sivas do not show any control by tectonic structures.