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Modern halolites (halite oolites) in the Tuz Gölü, Turkey

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Abstract

Halite oolites (halolites) and pisoids (halopisoids) precipitate yearly (in summer) in the brine conduits of the saltpans in the Tuz Gölü saline lake (Central Anatolia, Turkey). These halolites are well rounded and spherical, ranging between 0.7 and 2 cm in size. They are composed of coarse-grained halite crystals as the nucleus, and by concentric halite laminae with a radial fabric as the cortex. The cortex is subdivided into inner, middle, and outer zones, each zone showing different mineralogical and morphological features. These features include the presence of: organic matter particles, native sulphur globules, gypsum–anhydrite–calcite laminae, quartz–chlorite–celestite–thermonatrite laminae, submicroscopic halite crystals, and microborings, cavities and corrosion-like structures.

Our observations in the Tuz Gölü saltpan environment and in the halolite fabrics suggest that (1) an intermittent supply of heavy brines from the saline lake into the saltpan conduits, which occur under agitated conditions during pumping operations, is the main genetic reason for the halolite formation; and that (2) physical, chemical and biological factors exert a significant influence on the mineralogical–textural complexity of the cortex.
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Keywords: Halite oolites (halolites); Saline lake; Modern sedimentation; Tuz Gölü; Central Anatolia; Turkey

1. Introduction

In contrast to common, well-documented occurrences of carbonate oolites (Bathurst, 1968), there are few studies on halite oolites or ooids (halolites, halooids) and halite pisoids (halopisoids). Halolite and halopisoid occurrences are generally observed in Holocene saline lakes and in playa complexes, and in modern evaporative saltworks (Weiler et al., 1974; Eugster and Hardie, 1978; Sonnenfeld, 1984; Warren, 1989; Handford, 1991; Castanier et al., 1992; Perthuisot et al., 1993; Castanier et al., 1999).

There are scant references in the literature to halolite findings interpreted as inorganic precipitation from brines, i.e., particles formed mechanically from high-energy environments. One case is that of the Dead Sea (Israel), where halolites have been attributed to combined rolling transport and crystal growth in halite-oversaturated, agitated brines (Weiler et al., 1974; Sonnenfeld, 1984). Another case is that of the evaporative saltworks in Bonaire Island (Netherlands

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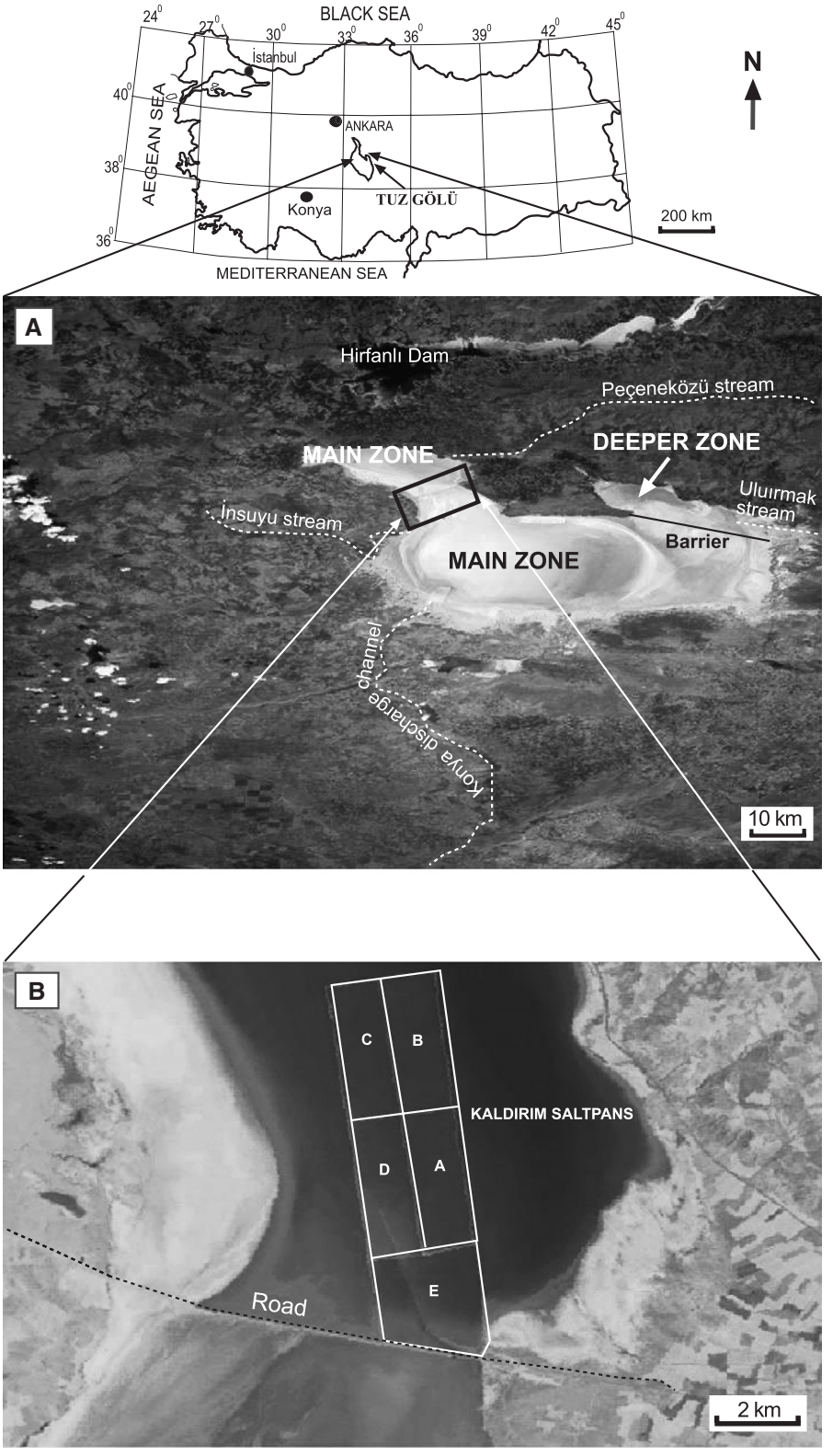

Fig. 1. Location map and remote sensing image of the Tuz Gölü in Central Anatolia. (A) View of the main zone and the deeper zone. (B) Enlarged view of the Kaldırım saltpan area (saltworks A to E).

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