Late Cretaceous to recent tectonic evolution of the Ulukisla Basin (Southern Central Anatolia)

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1. Outline and Motivation

The Ulukisla basin is located in the southern Central Anatolia, where Cretaceous to Recent tectonic evolution of the region is characterized by E-W extension. The basin is flanked by two major tectonic units: the Central Anatolian Crystalline Complex (CACC) to the north and the Ionian zone to the south. The basin sediments are mostly composed of marine and continental deposits, with evidence of volcanic activity and faults. The basin is part of the Hellenic-Adriatic subduction zone, which is characterized by high-pressure metamorphism in the basement rocks. The basin evolution is closely linked to the tectonic setting of the region, which is influenced by the closure of the Neotethys Ocean and the formation of the Mediterranean Sea.

2. Tectonostratigraphy

The tectonic setting of the Ulukisla basin is characterized by a sequence of sedimentary, volcanic, and metamorphic rocks. The basin sediments are composed of shallow marine limestones, marls, and sandstones, with evidence of fault-controlled deposition. The volcanic rocks are mostly rhyolite, dacite, and trachyte, with some evidence of trachytic basalt and andesite. The metamorphic rocks are composed of Plattenkalk, Ionian zone, and Tripolitza/Bey Dağları zone, with evidence of peak metamorphism at ~84 Ma. The basin is bounded by major faults, including the left-lateral Ecemis Fault.

3. Structural mapping

The structural setting of the Ulukisla basin is characterized by a series of west-verging normal faults, which are related to the tectonic setting of the region. The faults are bounded by the CACC to the north and the Ionian zone to the south. The faults are active and are responsible for the deformation of the basin sediments. The faults are also responsible for the distribution of volcanic rocks, which are concentrated along the fault zone.

4. Field relations

Field photographs of the southern basin margin, south of the contact with the CACC and the Ionian zone, show evidence of fault-controlled deposition and volcanic activity. The faults are active and are responsible for the deformation of the basin sediments. The faults are also responsible for the distribution of volcanic rocks, which are concentrated along the fault zone. The volcanic rocks are mostly rhyolite, dacite, and trachyte, with some evidence of trachytic basalt and andesite.

5. Paleomagnetic data

Paleomagnetic analysis of the basin sediments and volcanic rocks shows evidence of crustal rotation. The basin sediments show evidence of clockwise rotation, while the volcanic rocks show evidence of counterclockwise rotation. The rotation is related to the tectonic setting of the region, which is characterized by E-W extension. The rotation is also related to the tectonic setting of the region, which is characterized by E-W extension.

6. ID-TIMS U-Pb ages

ID-TIMS U-Pb dating of the basin sediments and volcanic rocks shows evidence of deposition during the Late Cretaceous to recent. The basin sediments are mostly composed of marine and continental deposits, with evidence of fault-controlled deposition. The volcanic rocks are mostly rhyolite, dacite, and trachyte, with some evidence of trachytic basalt and andesite. The basin is bounded by major faults, including the left-lateral Ecemis Fault.

7. Conclusions & Outlook

The Ulukisla basin is an important site for understanding the tectonic evolution of the region. The basin sediments are composed of shallow marine limestones, marls, and sandstones, with evidence of fault-controlled deposition. The volcanic rocks are mostly rhyolite, dacite, and trachyte, with some evidence of trachytic basalt and andesite. The basin is bounded by major faults, including the left-lateral Ecemis Fault.

8. Regional implications

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