

## Depositional environment of the Qelli Formation in Alborz Basin (Robat-e-Qarabil Area), NE Iran

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### Abstract

In present research, depositional environment of the Qelli Formation (Late Ordovician) was investigated in NE Alborz Basin (Robat-e-Qarabil Area; Kuh-e-Kurkhud). This study was performed based on field observations, thin sections petrography, sedimentary structures and palynological studies. Utilizing this multidisciplinary approach, four lithofacies assemblages were recognized. The Qelli Formation in studied area comprises alternation of thick to thin shale beds, medium to thin bedded sandstones, sandy limestones, laminated siltstones and diabasic sill. These lithofacies assemblages consist of arkose-subarkose, sandy allochem limestone, siltstone and shale. According to the properties of lithofacies, sedimentary structures and vertical stacking of these lithofacies suggest a storm and wave dominated shelf, wherein the depositional setting evolved from lower shoreface with lower- middle lithofacies (with hummocky cross stratification, truncation surface, parallel lamination and cross lamination) that gradually changed into upper shoreface with upper lithofacies (with swaley cross stratification, wave ripple-mark, parallel lamination, normal grading, wedge-shaped and tabular cross-lamination) which storm and waves induced currents had important roles in sediment reworking and redeposition. Using the Tyson diagram, four palynological facies (III, IVa, V and VII) were identified. Meanwhile, statistical studies on the palynological parameters (percentage of phytoclast, amorphous organic matter and lability parameter) indicate a shallowing upward trend in Ghelli Formation. Comparison of the relative abundance of marine palynomorphs with terrestrial palynological elements indicate less abundance of acritarchs and chitinozoans in comparison with cryptospores and plant fragments which indicate that Qelli Formation is deposited in shallow marine environment.

**Keywords:** Qelli Formation, Alborz Basin, Depositional environment, Sedimentary structure, Lithofacies, Palynological facies.