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PALYNOSTRATIGRAPHY AND PALEO GEOGRAPHY OF UPPER ORDOVICIAN SEDIMENTS (GHELLI FM) IN KHOSHYEILAGH AREA, NORTHEASTERN ALBORZ MOUNTAIN RANGE (KOPET-DAGH REGION) OF IRAN

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The studied area is located in Khoshyeilagh (in the vicinity of Khoshyeilagh village), approximately 65 km northern Shahrud city. The Ordovician sediments are well-developed at this area (between Khoshyeilagh and Tilabad villages). A paved road from Shahrud to Azadshahr is the principle link to the studied area. The thickness of Ordovician sediments is 225m, outcropping near Khoshyeilagh village. The Ordovician sediments mainly comprise of alternation of sandstone, siltstone and shale. Igneous sills have intruded this sedimentary sequence at several horizons. Due to their lack of macrofossils (e.g. graptolite, and brachiopod), these Ordovician sediments had previously been assigned to Lashkarak Formation (Early Ordovician), or Ghelli

Formation (Late Ordovician) based on stratigraphical position. The Ordovician strata of the studied area were measured and sampled for palynological investigation by the author. Fifty surface samples were selected and treated in the palynological laboratory of the National Iranian Oil Company. All samples contained well-preserved palynomorph entities (e.g. acritarch, chitinozoan and cryptospore taxa as well as chitinous graptolite remains). In this study, 28 acritarch species assigned to 20 genera were encountered from the Ordovician strata of Khoshyeilagh area, consisting of *Baltisphaeridium perclarum*, *B. oligosakium*, *Dorsennidium undosum*, *D. hamii*, *Excultibrachium concinnum*, *Elektoriskos* sp., *Lophosphaeridium acinatum*, *L. varum*, *Multiplici-*



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sphaeridium irregulare, *M. bifurcatum*, *Orthosphaeridium insculptum*, *O. inflatum*, *Peteinosphaeridium* cf. *accinctulum*, *Polygonium gracile*, *P. polyacanthum*, *Veryhachium okahomense*, *Veryhachium* sp., *V. lairdii*, *Villosacapsolla setosapellicula*, *Actinotodissus crassus*, *Diexallophasis denticulata*, *Eupoikilofusa striata*, *Navifusa ancepsipuncta*, *Leiofusa fusiformis*, *Ordovicidium elegantulum*, *Poikilofusa spinata*, *Tunisphaeridium caudatum* and *Cornuferifusa* sp. The above-mentioned acritarch taxa are similar to those recorded from the Late Ordovician sediments in the United States, Canada, Europe, North Africa and the Middle East. Therefore, a Late Ordovician age (Caradocian-Ashgillian) is suggested for the Ordovician sediments of Khoshyeilagh area. These acritarch taxa are associated with

chitinozoan species such as *Armoricochitina nigerica*, *Ancyrochitina merga*, *Lagenochitina baltica* and *Plectochitina sylvanica*, also indicating a Late Ordovician age for the studied samples. Based on palynological and lithological data, the Ordovician sediments of the studied area are assigned to Ghelli Formation. It should be mentioned that though the encountered acritarch taxa of Late Ordovician are cosmopolitan, but the above-mentioned chitinozoan species represent a close affinity with those of North Gondwana. Furthermore, the presence of acritarch and chitinozoan taxa as well as a few chitinous graptolite remains suggests a low energy marine environment for the clastic sediments of Ghelli Formation in the Khoshyeilagh area.