

## **The Echinoid Faunas of the Lower Cretaceous in the Atlantic High Atlas Region (Morocco): Paleontological and Stratigraphical Interest**

**Moussa Masrour<sup>1</sup>, Mohamed Aoutem<sup>1</sup>, and Francois Atrops<sup>2</sup>**

1 Universite Ibn Zohr, Faculte des Sciences, Departement de Geologie, BP 8106, Agadir (Maroc)

2 Universite Lyon 1, UFR Geologie, UMR 5125, 2, rue Dubois, 69622 Villeurbanne cedex (France)

The echinoid fauna from the Lower Cretaceous of the High Atlantic Atlas is one of the richest in the southern Tethyan area. The echinoids are widely represented on thick and continuous sections without important gaps. So, it is easy to follow, in detail, the evolution of this group, from Berriasian to Aptian with a good biostratigraphical control by ammonites which are also abundant in the same levels.

The rich echinoid fauna from the Lower Cretaceous of the Agadir, Haha and Essaouira basins has been revised taxonomically, based on new and abundant collections. Fortyseven species have been identified, of which 20 are reported for the first time from this region and a further three represent new species left in open nomenclature. Their stratigraphical ranges have been determined accurately by reference to the regional ammonite zonation. So, it is possible to use a local biostratigraphical scale based on the echinoid succession, when ammonites are rare. The Toxasteridae, which are very abundant and underwent rapid evolution, are the most useful biostratigraphically. The genus *Toxaster* appears in the Lower Berriasian and continues until Gargasian passing through the following succession: *T. africanus*, *T. granosus*, *T. kiliani*, *T. lorioli*, *T. obtusus*, *T. exilis*, *T. retusus*, *T. maurus*, *T. peroni*, *T. collegnoi*.

Moreover, the presence of *Echolaster*, *Macraster*, *Douvillaster*, *Palhemiaster*, *Heteraster* and *Pygopyrina* is signaled for the first time in the Atlantic High Atlas region.

The impact of the sedimentary conditions on the settlement and morphology of primitive Spatangoid by analysis of *Toxaster* isochronous populations is in progress.

Keywords: Echinoids, Spatangoida, Lower Cretaceous, High-Atlas, Morocco.

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