

## **Skeletonized microfossils from the Lower-Middle Cambrian transition of the Cantabrian Mountains, northern Spain**

Sébastien Clausen and J. Javier Álvaro

*Acta Palaeontologica Polonica* 51 (2), 2006: 223-238

Two different assemblages of skeletonized microfossils are recorded in bioclastic shoals that cross the Lower-Middle Cambrian boundary in the Esla nappe, Cantabrian Mountains. The uppermost Lower Cambrian sedimentary rocks represent a ramp with ooid-bioclastic shoals that allowed development of protected archaeocyathan-microbial reefs. The shoals yield abundant debris of tube-shelled microfossils, such as hyoliths and hyolithelminths (*Torelrella*), and trilobites. The overlying erosive unconformity marks the disappearance of archaeocyaths and the Iberian Lower-Middle Cambrian boundary. A different assemblage occurs in the overlying glauconitic limestone associated with development of widespread low-relief bioclastic shoals. Their lowermost part is rich in hyoliths, hexactinellid, and heteractinid sponge spicules (*Eiffelia*), cancelloriid sclerites (at least six form species of *Allonnia*, *Archiasterella*, and *Chancelloria*), cambroclaves (*Parazhijinites*), probable eoconchariids (*Cantabria labyrinthica* gen. et sp. nov.), sclerites of uncertain affinity (*Holoplicatella margarita* gen. et sp. nov.), echinoderm ossicles and trilobites. Although both bioclastic shoal complexes represent similar high-energy conditions, the unconformity at the Lower-Middle Cambrian boundary marks a drastic replacement of microfossil assemblages. This change may represent a real community replacement from hyolithelminth-phosphatic tubular shells to CES (cancelloriid-echinoderm-sponge) meadows. This replacement coincides with the immigration event based on trilobites previously reported across the boundary, although the partial information available from originally carbonate skeletons is also affected by taphonomic bias.

**Key words:** Skeletonized microfossils, cambroclavids, cancelloriids, hyoliths, hyolithelminths, sponges, benthic replacement, Cambrian, Cantabrian Mountains, Spain.

Sébastien Clausen [ [Sebastien.Clausen@univ-lille1.fr](mailto:Sebastien.Clausen@univ-lille1.fr) ] Laboratoire de Paléontologie et Paléogéographie du Paléozod'que, UMR 8014 CNRS, Université des Sciences et Technologies de Lille, UFR Sciences de la Terre, 59655-Villeneuve d'Ascq, France; J. Javier Álvaro [ [Jose-Javier.Alvaro@univ-lille1.fr](mailto:Jose-Javier.Alvaro@univ-lille1.fr) ] Laboratoire de Paléontologie et Paléogéographie du Paléozod'que, UMR 8014 CNRS, Université des Sciences et Technologies de Lille, UFR Sciences de la Terre, 59655-Villeneuve d'Ascq, France; and Departamento Ciencias de la Tierra, Universidad de Zaragoza, 50009-Zaragoza, Spain.

This is an open-access article distributed under the terms of the Creative Commons Attribution License (for details please see [creativecommons.org](https://creativecommons.org)), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

 [Full text \(1,113.7 kB\)](#)