Iberian Ordovician and its International Correlation

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The regional chronostratigraphy of the British Ordovician, established mainly for shelly facies, is hard to correlate in the Iberian Peninsula, especially after the separation and drift of Avalonia from Gondwana by the early Middle Ordovician. The same applies to the Ordovician global scale, whose stratotypes involve deeper-water facies and faunas not recorded in the high-paleolatitudinal settings of southern peri-Gondwana. In order to solve the problem, an alternative regional scheme for the “Mediterranean” Ordovician was proposed in the 1970s. This comprises five regional stages plus the global Tremadocian and Hirnantian, which are largely based on the distribution of endemic shelly fossils combined with some graptolites and a good palynological record. This Ordovician scale presents precise correlation potential for southwestern and central Europe (Ibero-Armorica, Sardinia, Bohemia, Bulgaria) and the vast area from northern Africa to Saudi Arabia and part of the Middle East. Sporadic occurrences of graptolites and shelly faunas of Baltic or Avalonian affinities allow for indirect correlation with the global stages through their own regional scales. Despite the advantages of such a regional “Mediterranean” scale, the terms “Ordovician Odyssey” and “Quo vadis Ordovician?”, used as titles for the books that arose from the Ordovician symposia of 1985 (Las Vegas) and 1990 (Prague), are still applicable to the Iberian Ordovician chronostratigraphy. Some authors prefer to use the global scale directly, without valid references to precise correlation, whereas others use the old British scale without acknowledging the redefinition by British authors between 1972 and 2010.

In Iberia, as well as in other peri-Gondwanan areas lying in high paleolatitudes close to the Ordovician South Pole, the general scarcity of graptolites and conodonts in the Lower and Middle Ordovician, and the largely endemic nature of the shelly faunas, impose serious difficulties for correlating the successions in this region with the new global chronostratigraphy. This is illustrated by the fact that only two of the taxa used for the definition of the global stages and series have been recorded in paleogeographically southern
peri-Gondwana (*Levisograptus austrodentatus* in Turkey and *Metabolograptus extraordinarius* in Bohemia). The situation is similar with the taxa defining the base of the stage slices, were only Dw2’s (*Didymograptus artus*) and Ka3’s (*Amorphognathus ordovicicus*) diagnostic species are recognizable where appropriate litho- and biofacies are developed, and may be distant from their respective FADs. Single records of the graptolites *Tetragraptus azkharensis* (a form closely allied to *T. approximatus*, Fl1) and *Dicellograptus complanatus* (Ka4) are known from France, but come from Ordovician olistoliths within Carboniferous mélanges in Montagne Noire and south Armorican Massif.

The paleontological record from the Iberian Ordovician includes low diversity benthic assemblages of trilobites, ostracods, brachiopods, echinoderms, molluscs, etc., regarded as cold-water faunas, later shifting to more temperate types, and even relatively warm-water faunas due to the Boda event that preceded the Hirnantian glaciation. Faunal affinities suggest strong links within a single paleogeographical realm (equivalent to the “Mediterranean”, “*Selenopeltis*” or “Calymenacean-Dalmanitacean” provinces of previous authors). Within this common scenario, faunal differences are strongly conditioned by the development of different biofacies defined by the type of substrate, inshore-offshore gradients and even paleocurrents.

The Ibero-Bohemian Ordovician scheme allows regional correlations within the southern peri-Gondwanan areas and can be regarded of similar rank and suitability as other regional scales used in Australasia, Baltoscandia, Avalonia, North America or China. According to the current policy of the International Ordovician Subcommission, a fundamental contribution to the development of a global chronostratigraphy will be the detailed cataloguing of as many as possible of these commonly distinctive regional Ordovician sections.

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