

## Biostratigraphic significance of the Uppermost Cambrian-Lowest Ordovician agnostoid trilobites from northwestern Argentina: a review

TORTELLO M. F.

The trilobite *Parabolina* (*Neoparabolina*) *frequens argentina* Biozone (Harrington and Leanza, 1957) is widely represented in northwestern Argentina (Jujuy, Salta and La Rioja Provinces). Although this unit was originally assigned to the Lower Tremadoc, recent analyses have demonstrated that its Lower part is assignable to the Uppermost Cambrian (e.g. Aceñolaza, 1983; Salfity *et. al.*, 1984). Current interdisciplinary studies aim to determine the exact position of the Cambrian-Ordovician boundary within the Biozone, as well as to reconsider the biostratigraphic significance of its abundant trilobite faunas.

According to Aceñolaza (1983), the first appearances of the trilobite *Jujuyaspis keideli* Kobayashi and the graptolite *Rhabdinopora flabelliformis* (Eichwald) indicate the Lowest Tremadoc in South America. In addition, the conodonts *Cordylodus lindstromi* and *Iapetognathus* are worthy references of the Lowest Ordovician (e.g. Ortega and Rao, 1995; Rao, 1999; Albanesi *et. al.*, 1999). These valuable biostratigraphic criteria have proved useful in several sections from northwestern Argentina. For example, Sierra de Cajas (Lampazar and Cardonal Formations) and Río Volcancito (Volcancito Formation) constitute appropriate type sections for the Cambrian-Ordovician transition in Eastern Cordillera and Famatina System, respectively (Tortello and Aceñolaza, 1993; Ortega and Rao, 1995; Rao, 1999; Tortello *et al.*, 1999; Tortello and Esteban, 1999; Albanesi *et al.*, 1999).

Biostratigraphic significances of the Uppermost Cambrian-Lowest Ordovician trilobite agnostoids from northwestern Argentina are summarized here. Stratigraphic position of each agnostoid species from the *Parabolina frequens argentina* Biozone are up-to-dated. Based on information from Sierra de Cajas, Río Volcancito and some other punctual localities of Eastern Cordillera (e.g. Santa Victoria, Cerro Colorado, Purmamarca - Santa Rosita Formation; Angosto de Lampazar - Lampazar Formation), a characterization of the faunas recognized below and above the Cambrian-Ordovician boundary is presented.

According to these data, Argentina appears to have the richest Uppermost Cambrian agnostoid faunas from the Baltic Province. The lower part of the *Parabolina frequens argentina* Biozone is characterized by a remarkable agnostoid assemblage composed of *Lotagnostus* (*Lotagnostus*) *sp.*, *Lotagnostus* (*Semagnostus*) *suninoi* (Harrington and Leanza), *Micragnostus vilonii* Harrington and Leanza, *Micragnostus calviformis* Harrington and Leanza, *Strictagnostus? micropeltis* (Harrington and Leanza), *Pseudorhaptagnostus* (*Machairagnostus*) *tmetus* Harrington and Leanza, *Pseudorhaptagnostus* (*Machairagnostus*) *cf. tmetus* Harrington and Leanza, *Pseudorhaptagnostus* (*Machairagnostus*) *sp.*, *Gymnagnostus bolivianus* (Hoek), *Gymnagnostus perinflatus* Harrington and Leanza, and *Leiagnostus turgidulus* Harrington and Leanza. This particular fauna, associated with conodonts from the *Cordylodus proavus* Biozone (Rao, 1999; Albanesi *et al.*, 1999), is recorded with olenid trilobites that are also represented in Ordovician levels of the Biozone (e.g. *Parabolina frequens argentina* (Kayser), *Parabolinella argentinensis* Kobayashi, *Angelina hyeronimi* (Kayser)).

On the other hand, agnostoid diversity drastically declines in beds very close to the Cambrian-Ordovician boundary. *Trilobagnostus chiusbuensis* (Kobayashi) crosses the boundary in the classic section of Sierra de Cajas. Besides, in the Lowest Tremadoc (characterized by the olenid *Jujuyaspis keideli*) agnostoids are restricted to *T. chiusbuensis*, (?) *Gymagnostus bolivianus* (Hoek) and some forms described in open nomenclature (*Anglagnostus?* sp., *Micragnostus* sp.). This faunal impoverishment could be attributed to world-wide regressive-transgressive events that characterized the Cambrian-Ordovician transition interval.

### References:

Aceñolaza, F. G. 1983. The Tremadocian beds and the Cambrian-Ordovician boundary problems in Latin America. In: *Papers for the Symposium on the Cambrian-Ordovician and Ordovician-Silurian, Boundaries: 88-93*, Nanjing Institute of Geology and Palaeontology, Academia Sinica.

Albanesi, G. L., Esteban, S. B. and Barnes, C. R. 1999. Conodontes del intervalo del límite Cámbrico Ordovícico en la Formación Volcancito, Sistema de Famatina, Argentina. *Temas Geológicos Mineros ITGE*, 26: 521-526.

Harrington, H.J. and Leanza, A. F. 1957. Ordovician trilobites of Argentina. *Department of Geology University of Kansas Special Publication, 1*: 1-276.

Ortega, G and Rao, R. I. 1995. Nuevos hallazgos de graptolitos (Ordovícico Inferior) en la sierra de Cajas, Departamento Humahuaca, Provincia de Jujuy, Argentina. *Boletín de la Academia Nacional de Ciencias*, 60 (3-4): 293-316.

Rao, R.I. 1999. Los conodontes Cambro-Ordovícicos de la sierra de Cajas y del Espinazo del Diablo, Cordillera Oriental, República Argentina. *Revista Española de Micropaleontología*, 31 (1):23-51.

Salfity, J. A., Malanca, S., Moya, M. C., Monaldi, C. R. and Brandán, E. M. 1984. El límite Cámbrico Ordovícico en el norte de la Argentina. *Noveno Congreso Geológico Argentino, Actas, 1*: 568-575.

Tortello, M. F. and Aceñolaza, G. F. 1993. Trilobites agnóstidos del límite Cámbrico-Ordovícico de la Formación Lampazar, sierra de Cajas, Provincia de Jujuy, Argentina. *Revista Española de Paleontología*, 8:177-184.

Tortello, M. F. and Esteban, S. B. 1999. La transición Cámbrico-Ordovícico en la Formación Volcancito (sierra de Famatina, La Rioja, Argentina). *Ameghiniana*, 36(4):371-387.

Tortello, M. E., Rábano, I., Rao, R. I. and Aceñolaza, F. G. 1999. Los trilobites de la transición Cámbrico-Ordovícico en la quebrada Amarilla (sierra de Cajas, Jujuy, Argentina). *Boletín Geológico y Minero*, 110-5: 555-572.