

Temporal dynamics of the geographic differentiation of Late Devonian palmatolepis assemblages in the Prototethys

Girard C., Phuong T.H., Savage N., Renaud S.

Université Montpellier 2, CNRS: UMR 5554, Institut des Sciences de l'Evolution, C.C. 64, Place Eugène Bataillon, 34095 Montpellier Cedex, France; Hanoi University of Science, Faculty of Geology, No334 Nguyen Trai, Thanh Xuan, Ha Noi, Viet Nam; Department of Geology, University of Oregon, Eugene, OR 97403, United States; Université Lyon 1, CNRS: UMR 5125, PEPS, 69622 Villeurbanne, France

Abstract: Throughout their history, species had to face environmental variations spatially and temporally. How both levels of variation interact will be of key importance in conditioning their response to major perturbations. We addressed this question by focusing on a period in Earth's history marked by dramatic environmental and faunal changes, the Late Devonian Frasnian/Famennian boundary. From a paleogeographic point of view, this period is characterized by a cosmopolitanism of the faunas across a large ocean, the Prototethys. We considered the biotic reaction at a seldom considered scale, namely within a single subgenus of conodont, *Palmatulepis* (*Manticolepis*). Patterns of spatial and temporal differentiation were quantified using morphometrics of its platform element. The recognized cosmopolitanism of the faunas was confirmed at this scale of variation since temporal records gathered in distant areas around the Prototethys, including the seldom documented regions located nowadays in South-East Asia, displayed similar morphological trends in response to the major F/F crisis. Beyond this overall cosmopolitanism, subtle geographic structure was evidenced but was not stable through time. Geographic differentiation was maximal shortly before the F/F crisis, suggesting that despite high sea-level, tectonics led to complex submarine landscapes promoting differentiation. In contrast any geographic structure was swamped out after the crisis, possibly due to a global recolonization from few favorable patches.

Author Keywords: Conodonta; Frasnian/Famennian; geographic differentiation; mass extinction; morphometrics; Prototethys

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Correspondence Address: Girard, C.; Université Montpellier 2, CNRS: UMR 5554, Institut des Sciences de l'Evolution, C.C. 64, Place Eugène Bataillon, 34095 Montpellier Cedex, France; email: Girard@univ-montp2.fr

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Authors with affiliations:

- Girard, C., Université Montpellier 2, CNRS: UMR 5554, Institut des Sciences de l'Evolution, C.C. 64, Place Eugène Bataillon, 34095 Montpellier Cedex, France
- Phuong, T.H., Hanoi University of Science, Faculty of Geology, No334 Nguyen Trai, Thanh Xuan, Ha Noi, Viet Nam
- Savage, N., Department of Geology, University of Oregon, Eugene, OR 97403, United States
- Renaud, S., Université Lyon 1, CNRS: UMR 5125, PEPS, 69622 Villeurbanne, France

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