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Biogeosciences Discussions

Interactive comment on "Lacustrine mollusc radiations in the Malawi Basin: experiments in a natural laboratory for evolution" *by* D. Van Damme and A. Gautier

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Van Damme & Gautier (2013) suggest that the Modern lacustrine mollusk species of the African Rift-valley are geologically young, and that many having invaded the lakes only after the Pliocene-Pleistocene aridity crisis They further suggest that the largely endemic fossil mollusk fauna of Lake Malawi (as found on the shores of Lake Chiwondo, a small satellite lake of Lake Malawi), consisting of twenty species, should be dated to the late Pliocene of either 2.5 or 2 million years ago. The Modern mollusk fauna, consisting of about forty species, does not descend from the Pliocene fauna. These suggestions contradict with well-established opinions.

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Interactive Discussion

Discussion Paper

This paper presents interesting opinions. One major suggestion (that the Chiwondo fossils date to the Late Pliocene) is reasonable; and the statement that many representatives of the Modern fauna are young species rests on current molecular evidence. Both authors are authorities on the freshwater molluscs of Africa and their wide academic horizons are felt throughout the text. The paper may well stir up quite a few discussions in the scientific literature.

For future studies linking fossil with Modern faunas I express three wishes, which would place more emphasis on the Modern fauna.

1. An interesting aspect of the data in this paper is that in both the fossil and the Modern fauna, the vast majority of endemic species are of prosobranchiate gastropods (Ampullariidae, Bithynidae, Paludomidae, Thiaridae, Valvatidae, Viviparidae); only a few of the pulmonate (Lymnaeidae, Planorbidae) and bivalve species are endemic. It would be interesting to expand this observation beyond Lake Malawi and to investigate whether this pattern of endemism occurs also in other lakes or lake basins, so as to seek generalisations concerning endemism in freshwater mollusc groups as a whole.

2. From Pliocene to Modern fauna there is some extent of faunal stability, definitely at genus-level, to some extent also at species level: seven gastropod genera were present in Lake Malawi during the Pliocene, and though they all went extinct somewhere over a million years ago, five of these genera eventually returned to the lake and are present in it today. Further, of the fourteen gastropod species in the Pliocene of Lake Malawi, six are so very close to recent species in shell morphology that they are referred to as “similar” (*Bellamya* cf. *robertsoni, Lanistes* cf. *solidus, Gabiella* cf. *stanley, Melanoides* cf. *pergracilis, Melanoides* cf. *polymorpha* and *Bulinus* cf. *globosus*). It would be interesting to investigate whether despite the drastic changes the lake has undergone over the past two-three million years, there is some extent of niche stability in Lake Malawi, namely that la-

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custrine niches of the palaeo-lake Chiwondo were rather few, and broadly similar to those of today. The 29 gastropod species of Modern Lake Malawi – are they evenly distributed throughout Lake Malawi (in that all, for example, *Melanoides* morpho-species, occur on all shores?)

3. The genus *Bellamya* is represented by four species in the Pliocene and similarly also four others in the Modern fauna; whereas *Melanoides* is represented by only three species in the Pliocene and yet eleven today. *Bellamya* reproduces sexually, *Melanoides* by parthenogenesis. It would be challenging to study whether in the Modern fauna all these fifteen species differ in their habitats; and then to extrapolate the conclusions to the fossil fauna.

In sum, this is an interesting opinion-paper which may well stir up quite a few controversies.

Scientific Significance: Does the manuscript represent a substantial contribution to scientific progress within the scope of this journal (substantial new concepts, ideas, methods, or data)?

For an opinion paper which seeks to stir up discussions the scientific significance is good

Scientific Quality: Are the scientific approach and applied methods valid? Are the results discussed in an appropriate and balanced way (consideration of related work, including appropriate references)?

For an opinion paper the scientific quality is fair; some references are missing.

Presentation Quality: Are the scientific results and conclusions presented in a clear, concise, and well structured way (number and quality of figures/tables, appropriate use of English language)?

The main suggestions are clearly presented but some other parts of the text are not

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Interactive Comment

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