

Interactive comment on “A conservation palaeobiological approach to assess faunal response of threatened biota under natural and anthropogenic environmental change” by Sabrina van de Velde et al.

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Received and published: 4 March 2019

This paper addresses the effects of natural and human environmental modifications during the last 2000 years in an area in the southern Danube river delta and to its endemic so-called Pontocaspian species. The study highlights how such modifications, and especially the most recent human-induced ones, are causing the local eradication of these species. Given that their distributional area is very restricted, the loss of this habitat and its endemic species is of major conservation concern. By highlighting the historical causes of habitat modification, the study offers practical solutions fitting the

C1

growing need of conservation studies based on baseline data and understanding of the area temporal dynamics and puts paleoecological data into an effective framework for conservation decision making.

I have few comments mostly to invite the Authors to discuss the uncertainties implied by some of the limitations of their approach.

- line 58-59: as it is written, the sentence suggests that conservation paleobiology studies like those cited do not bear a policy relevant conservation message; I assume that this is unintentional, because in my opinion those papers do offer a practical conservation message. Some rewording may be necessary.

- line 130: please specify the core diameters. Please provide more details on how the cores (especially the long ones) were collected.

- line 135: the Authors should be very careful in using the date of first occurrence of a non-indigenous species to date an horizon in a core because time lags in first detection are the norm (Crooks 2005). Due to such time lags, the first occurrence in a core may indicate a time which is considerably before the first published record, as demonstrated for the invasive bivalve *Anadara transversa* in the Adriatic (Albano et al 2018): the introduction history reconstructed from cores was three times longer than based on the first published occurrence report. This uncertainty must be acknowledged. Moreover, the Authors should write in greater detail the introduction history of *Potamopyrgus* in the studied region (rather than in Europe in general) providing the year of first report for the site closest to the study area. Crooks JA (2005) Lag times and exotic species: the ecology and management of biological invasions in slow-motion. *Ecoscience* 12 (3): 316-329. Albano PG et al (2018) Historical ecology of a biological invasion: the interplay of eutrophication and pollution determines time lags in establishment and detection. *Biological Invasions* 20 (6): 1417-1430.

- The number of ¹⁴C dated samples is really small and, according to S5, is limited to one sample per core (generally at the bottom, I assume to constrain the maximum

C2

age). However, there is no reference to time averaging and mixing when interpreting the results of this approach. Please, also specify which species you 14C dated and provide greater detail the calibration procedure.

- line 173: please define "GeoEcoMar"

- line 180-182: apparently there is no reference to the confounding factors such as time-averaging and mixing-bioturbation when interpreting the results. Please note that focusing on specimens poorly affected by taphonomic processes (lines 180-182) does not provide any guarantee against their effects because shells which get quickly buried may display very low taphonomic damage and be mixed in the sediments due to e.g. bioturbation. See also Tomasovych et al (2018) for an example of species co-occurrence in a core which mask differential variation of production in time. Tomasovych et al (2018) A decline in molluscan carbonate production driven by the loss of vegetated habitats encoded in the Holocene sedimentary record of the Gulf of Trieste. *Sedimentology* 10.1111/sed.12516

- line 354: please specify if the Pontocaspian species you did not encounter alive survive elsewhere.

- Fig. 6: I appreciate this figure which shows the studied organisms.

- Supplements: please list the species in systematic (and not alphabetic) order (e.g. in S2, S7). Note that the file and sheet naming sometimes do not match (e.g. S2 and S3, S7).

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2019-6>, 2019.