

NA2RE is reliable but aims for improvement: an answer to Vamberger and Fritz (2018)

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Abstract:

Recent work suggested that NA2RE, the New Atlas of Amphibians and Reptiles of Europe, can be not reliable for ecological niche modelling because errors in introduced data labelling and missing data in native ranges. NA2RE platform only hosts the data compiled in 2014, following the taxonomy proposed by the Societas Herpetologica Europaea in 2010 with some modifications. We defend here the reliability of the NA2RE platform and propose to publish new additions following the last taxonomical changes in order to improve it.

Keywords: Chorological data, ecological niche modelling, citizen data, online atlas

NA2RE is the online-distributed database system (Sillero et al. 2014a) which hosts the data presented in the New Atlas of Amphibians and Reptiles in Europe (Sillero et al. 2014b). Both contributions were published in the same year to provide an overview on the geographic distribution of 211 taxa (species and species-complexes) in Europe. This collaborative effort was conceived to highlight gaps in species distribution ranges, while acknowledging the need for progressive updating to include new described taxa and occurrence records. On the basis of the analysis of the distribution of *Emys orbicularis*, Vamberger & Fritz (2018) recommended not to use the online version (the NA2RE platform; Sillero et al. 2014a) of the New Atlas of Amphibians and Reptiles of Europe (Sillero et al. 2014b) for ecological niche modelling because of errors in labelling of data related to introduced populations and because of missing data within the native range. We hereby reply to their comments.

The NA2RE platform (Sillero et al. 2014a) only hosts the data compiled in 2014 for the atlas (Sillero et al. 2014b), following the taxonomy adopted by the Societas Herpetologica Europaea in 2010 with some modifications. Any atlas project is immediately outdated the day after publication. Indeed, the NA2RE platform was created with the aim to be a permanently updated system, and NA2RE is indeed in developing to make possible to integrate more detailed and recent data from local to global databases. We herein reaffirm the reliability of the NA2RE platform for the purpose to which it was built as described by Sillero et al. (2014a).

As with any biological data, all range maps have some level of measurement error. Producing the best distribution data requires continuous updates, both because our knowledge of species distribution and diversity continuously update, and because species range are not static, but can undergo fast modifications in response to global changes. Contrary to what is suggested in Vamberger & Fritz (2018), the NA2RE platform at present does not provide a direct downloading process. All data hosted in NA2RE are, however, freely available to the public as Supplementary Material in Sillero et al. (2014b). These data are a compilation of other published data, such as national atlases, websites, personal data kindly provided to the SEH, the 1997 European atlas (Gasc et al. 1997), and the Global Biodiversity Information Facility (GBIF). All maps were reviewed by a group of specialists before producing the published maps and then entering in the NA2RE platform, and at the moment of publication the dabases included >380,000 species records. Even though some missing data certainly exist, the NA2RE project is the largest validated collection of distribution data for Europe, and no better, more comprehensive data are available. Indeed, Kleewein (2016) and Raemy et al. (2017) cannot be considered to be previous reviews, as these works were published three years after Sillero et al. (2014b). We stress again that for now, the NA2RE platform is only presenting the data as compiled in Sillero et al. (2014b). Thus, NA2RE platform presents the knowledge up to 2014. Future mapping projects, either specific to some taxa or as in the framework of a full revision of the atlas will need to be included as updates, as already stated in the original atlas (Sillero et al., 2014b).

Large gaps remain in NA2RE for the Balkan countries, for example, but we are aware of recent publications for Albania (Szabolcz et al. 2017a, b) and a new mapping initiative for the entire Balkans which surely will result in important updates to the database. Fortunately, the NA2RE

platform was designed to allow future updates and incorporating these and other relevant records from local or global databases is perfectly possible and planned in the near future. As such, it is our vision that finding flaws such as those listed by Vamberger & Fritz (2018) on one (or two, per their take on *Emys* taxonomy) should lead to concerted improvement, rather than the discredit of an entire ongoing effort.

Vamberger & Fritz (2018) criticized the fact that some presence points of the Atlas actually are non-native populations. In Europe, humans perform translocations of amphibians and reptiles since centuries, and there are many species and populations for which the status (native / non-native) is debated since decades. Therefore, the correct definition of the status of populations was beyond of the aims of the atlas (as specified in Sillero et al. 2014). However, the presence of non-native records do not undermine the usefulness of the Atlas data for ecological analyses. In fact, the combination of native and non-native presence records allow a more complete description of the niche of the species, thus several studies advocated the integration of native and non-native presence records to improve the predictive performance of species distribution models.

One aim of the atlas was to encourage researchers to delineate ranges of recently or newly described species in Europe. Thus, mapping some species complexes together in a single map was a conscious choice, pending insight to be gained. As a consequence and positive follow-up of the release of the new atlas, several updates in the distribution of some groups of species have been presented after Sillero et al. (2014b), in order to correct or improve their distribution maps. Specifically, new maps have been published for the crested and marbled newt species *Triturus* (Wielstra et al. 2014), the smooth newt species complex *Lissotriton* (Wielstra et al. 2018), and the meadow and steppe vipers *Vipera partim* (Mizsei et al. in press). Therefore, a similar update could have been done for *E. orbicularis* and *E. trinacris* in order to delineate their respective distribution ranges. However, without providing any clear argumentation, Vamberger & Fritz (2018) simply dispose of Sillero et al.'s (2014b) taxonomy as being outdated because it would supposedly be based on the outdated understanding of *Emys* taxonomy of Speybroeck et al. (2010). While we regret that Vamberger & Fritz (2018) do not limit their critique to the mapping aspects of the atlas project and do not mean to dwell into the specifics of the taxonomy of the *Emys* genus, we stress that Sillero et al.'s (2014b) taxonomy was not a simple copy of that of Speybroeck et al. (2010), yet a discussed update of the latter year 2014. While several papers were published citing *Emys trinacris* as a separate species (e.g. Fritz et al. 2006, Fritz et al. 2007, Battisti & Luiselli 2011, Ficetola et al. 2013, Arizza et al. 2014, Marrone et al. 2016, Ottonello et al. 2016), none has provided new evidence supporting species status, nor rejecting the views presented in Speybroeck & Crochet (2007) and Speybroeck et al. (2010), and reassessed and adopted by Sillero et al. (2014b). Although the taxonomy of European amphibians and reptiles has not been updated, the availability of data for download allow users to easily modify the species data provided by Sillero et al. (2014b), to cope with any taxonomic revision.

Large distribution databases are not perfect. Nevertheless, it has been demonstrated that even coarse distribution data (e.g. IUCN maps, GBIF data) can provide very useful information, if the users exploit them at the appropriate resolution and keeping into account the biology of target species. The resolution and the accuracy of the Atlas are better than in most of broad-scale datasets, therefore we expect that analyses will provide better results compared to work performed with other resources. Given its current resolution (50x50 km), the Atlas is not intended for fine-scale ecological modelling as it stands, as detailed locality data should be used for this. In contrast, the atlas makes it possible to present distribution ranges based on datasets rather than approximative contours, which should give a precise delineation of species ranges. More detailed geographical scales and support from taxon specialists are therefore applauded and necessary. The recent works by Wielstra et al. (2017, 2018) and Mizsei et al. (in press) are a good example of improvements of distribution maps following the atlas initiative.

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Compliance with ethical standards

Conflict of interest: The authors declare that they have no conflict of interest.

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