

Interactive comment on “Global distribution of pteropods representing carbonate functional type biomass” by N. Bednaršek et al.

N. Bednaršek et al.

nina.bednarsek@ung.si

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We are grateful to Referee#1 for their valuable comments and suggestions towards the improvement of our manuscript. We detail our response below:

Firstly, as recommended, we have now differentiated between shelled and non-shelled pteropods. Moreover, taxa in the database have been documented down the lowest feasible taxonomic level, sometimes to subspecies and/or even formae. There was no data available on Pseudothecosomata.

Secondly, we have greatly improved our methodological approach for the conversion of abundance to biomass. This now involves a number of different length-weight conversion equations corresponding to different pteropod groups, including separate conver-

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sions for shelled and non-shelled taxa. Our initial difficulties in this regard stem from the lack of published length-to-weight conversions for most pteropod species. However, pteropod taxa share certain shape characteristics which allow them to be sorted into different geometrically-shaped groups. Our approach was therefore to sort our taxa according to geometric shape and then apply appropriate conversion equations. This follows the same principle as that applied within the published GLOBEC database to convert abundance to biomass (WHOI Silhouette DIGITIZER, 2003). We extracted some of these same shape-specific conversion equations from the following site: (http://globec.whoi.edu/software/digi_prog/WHOI_Silhouette_DIGITIZER.htm) Specifically, we applied one length-to-wet weight equation to all non-shelled (naked) taxa (Gymnosomata), covering barrel- and oval- shaped families of Spongibranchia spp., Clione spp., Pneumodermopsis and Paedoclione. Within the shelled taxa (Thecosomata), three different shapes were distinguished (cone shaped, round and triangular), for which three different length-to-weight equations were used. For cone shaped and triangular taxa, the conversions were from length to wet weight, for the round taxa, from length to dry weight. A taxon specific length-to-dry weight conversion was applied to all Limacinidae species. Wet weights were converted to dry weights using formulas provided by Davis and Wiebe (1985). Entries indicating juveniles, veligers and larvae (283 in total, representing 2% of entire database) were length-adjusted before converting to biomass to account for their smaller size. Overall, 5 different length-to-weight conversions were applied to the revised dataset, which we believe reduces the uncertainty around the estimate of biomass by a considerable degree. The dataset itself is designed in such a way as to make future improvement possible should any further taxon specific length-to- weight conversions become available.

We agree that some confounding matters (like *Cavolinia tridentata* calcification processes) may remain but these are too complex to be incorporated into the dataset at the present time. However, such issues make only a minor contribution to large scale pteropod biomass estimates and are better dealt with in more focussed studies elsewhere. These issues are mentioned alongside other sources of variance in the

Discussion section of the manuscript.

Although dataset was not accessible on PANGEA at the time of review, it has now become open access.

All the specific comments and technical corrections are acknowledged and have been changed.

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