

## ***Interactive comment on “Quantification of protein biomass of individual foraminifers using nano-spectrophotometry” by A. Movellan et al.***

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The protein quantification method with BCA has been well established by previous studies (Lowry, O.H. et al, J. Biol. Chem., 193, 265-275, 1951 and Smith, P.K. et al, Anal. Biochem., 150, 76-85, 1985). Further, the applications on foraminifera specimens are reported by recent studies (Mojtahid et al., JEMBE, 399, 25-34, 2011 and Schiebel and Movellan, Earth Syst. Sci. Data Discuss., 5, 243-280, 2012). The BCA methodology on foraminifera must be promising. In such circumstance, the study gives many effort to establish the optimum preparation procedure to exposure protoplasm to chemical solution without missing the calcareous shells (i.e. test). If their test can be left even after protein quantification, new road of usage will be opened to biometry, geochemical measurements and others. In my opinion, the point will be nice to

emphasize in abstract and/or title. Further, the study show that there are strong correlation between test weight and BCA protein content. The relationship will be applied to estimate lacked protein contents by fossil materials (Fig. 5). These possibilities can indicate the great potential of the study.

#### Comments and Questions

P6666 L18-21 and Fig. 2: For better application of the suggested methodology, I hope the authors do not hesitate to indicate many merits of the individual-level measurements. For instance, the individual growth history can be related with protein contents of cultured specimens. The color of protoplasm is changed by food and its digestive stage. Did the protein amount change with the protoplasm color? Further, what is happening on protein contents during life history? At least, the protein amount may be compared with numbers of chambers which are filled by protoplasm. Such kind analysis can not be undertaken without individual measurement.

Can the BCA protein values be cross-checked by other protein quantification methods?

P6656 L27 Almost specimens were frozen before measurement. Isn't this step an important? The cellular micro structures would be destroyed by ice crystal growths. This may assist better dissolution of protoplasm.

Some generalized flow chart from initial calibration to field application may be useful supplemental material.

Can this non-destructive exposure methods be applied on the thinner test specimens with small aperture like Fursenkoinoidea, Chilostomella, Globobulimina and others?

P6664 L2 and Fig. 3 Protein amounts may related with protoplasm volume directly. Why the equation is not described as cubic equation. If that is not right, the liner regression also seems appropriate than quadratic equation. Is there some logical reason?

P6663 L25 Check the digits of significant figure.

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P6667 L4 Could you show the examples of "different methods"?

P6667 L15 "Preliminary" might be removed.

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Interactive comment on Biogeosciences Discuss., 9, 6651, 2012.

**BGD**

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