

Manuscript: “**Local Allometric Equations for Estimating Above-Ground Biomass (AGB) of Mangroves (*Rhizophora* spp. and *Avicennia germinans*) from the Komo, Mondah and Rio Mouni Estuaries in Gabon**”

Submitted: 09 April 2021

Accepted: 15 September 2021

Published: 30 September 2021

Corresponding Author: Marjolaine Okanga-Guay

Doi:10.19044/esj.2021.v17n34p172

Peer review:

Reviewer 1: Joël Loumeto, Congo

Reviewer 2: Hassan Lemacha, Laboratory of Applied Geology, Geomatics and Environment, Department of Geology, Faculty of Sciences Ben M'sik, Hassan II-Casablanca University, Casablanca, Morocco

ESJ Manuscript Evaluation Form 2021

This form is designed to summarize the manuscript peer review that you have completed and to ensure that you have considered all appropriate criteria in your review. Your review should provide a clear statement, to the authors and editors, of the modifications necessary before the paper can be published or the specific reasons for rejection.

Please respond within the appointed time so that we can give the authors timely responses and feedback.

NOTE: ESJ promotes peer review procedure based on scientific validity and technical quality of the paper (not perceived the impact). You are also not required to do proofreading of the paper. It could be recommended as part of the revision.
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| | |
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| Date Manuscript Received: 21.4.2021 | Date Review Report Submitted: 22.5.2021 |
| Manuscript Title: Preliminary local allometric equations for estimating above-ground biomass (AGB) of mangroves from Komo, Mondah and Rio Mouni estuaries in Gabon | |
| ESJ Manuscript Number: 14170 Article Text 41366 20210408 | |
| You agree your name is revealed to the author of the paper: Yes/No NO | |
| You approve, your name as a reviewer of this paper, is available in the “review history” of the paper: Yes/No YES | |
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Evaluation Criteria:

Please give each evaluation item a numeric rating on a 5-point scale, along with a thorough explanation for each point rating.

| <i>Questions</i> | <i>Rating Result</i> [Poor] 1-5 [Excellent] |
|--|---|
| 1. The title is clear and it is adequate to the content of the article. | 3 |
| The title is not so clear, because field data collection was made on one site only: Mondah estuary. In the other side, they are allometric equations for estimating above-ground biomass (AGB) of two mangrove species (Rhizophora and Avicennia) from Mondah estuary, not mangrove ecosystem having many species. | |
| 2. The abstract clearly presents objects, methods and results. | 3 |
| The abstract needs to be improved: <ul style="list-style-type: none"> • Introduction should not focus on biomass but rather above-ground biomass, because biomass includes above-ground and below-ground biomass; | |

- Authors must choose between " Allometric model "and" Allometric equation ";
- How many trees for each of the two species and the range of tree diameter and height values?
- What are the physical parameters of the tree used to build the models?
- Authors must define the three models presented (AGBbark, AGBwood and AGBmix), and indicate the best model?
- Authors must refrain from giving affirmative statements like `` These local equations, developed with the densities of wood and bark, improve the precision of the estimate of the biomass " because the manuscript only addressed the 'establishing models and not evaluating them in comparison with those pre-established by other authors;

3. There are few grammatical errors and spelling mistakes in this article.

3

Concerning grammatical errors and spelling mistakes, suggestions are inserted in the manuscript jointed to this evaluation form to improve it.

Introduction section.

The introduction section should be reviewed as follows:

- Authors must present a context related to mangroves: type of ecosystem, main species, their importance while freeing their place in the fixation of atmospheric CO₂;
- Authors could indicate the place of allometric models in the estimation of biomass and therefore forest carbon, the types of allometric models existing (multispecies and monospecific), the physical parameters of the tree used in their establishment and indicate their location of the models;
- Authors must present the problematic and the objects of the study. It is important to show the weaknesses of the allometric models used to estimate the above-ground or below-ground biomass of mangrove tree species in Africa. *Sampling (number of individuals felled), interval of trees diameter and the generated biases could be evoked.*

Following Articles could be useful :

Komiyama et al. (2005)_doi:10.1017/S0266467405002476 ;

Kirui et al. (2006)_Allometric Equations for EstimatingAbove Ground Biomass of Rhizophora mucronataLamk. ;

Banerjee et al.(2013) <http://dx.doi.org/10.1016/j.biombioe.2013.05.010>;

Hutchison et al.(2013)_doi: 10.1111/conl.12060 ;

Ajonina et al.(2014b)_DOI: 10.1007/978-3-319-06388-1_15 ;

Ajonina et al. (2014a)_Ajonina, G. J. G. Kairo, G. Grimsditch, T. Sembres, G. Chuyong, D. E. Mibog, A. Nyambane and C. FitzGerald 2014. Carbon pools andmultiple benefits of mangroves in Central Africa:Assessment for REDD+. 72pp ;

Sitoe et al. (2014)_doi:10.3390/f5081967 ;

Trettin et al. (2015)_DOI: 10.1007/s11273-015-9465-8 ;

Jadot (2016)_La Mangrove, un écosystème au service de l'homme. ES Caribbean LLC. 14pp.DOI: 10.13140/RG.2.2.35082.88002 ;
Scales and Friess (2019)_https://doi.org/10.1007/s11273-019-09680-5.

4. The study methods are explained clearly.

3

Study area: It is only one study site, Mondah estuary.

Field data collection methods:

More information must be given. Then, in the aim to improve the field data collection section, answers to following questions could help.

- Data collection period?
- Why was the field data collected at the Mondah site only ? while three study sites are mentioned : Komo, Mondah and Rio Mouni estuaries
- How many trees were sampled for each species?
- What are the diameter classes that have been retained?
- At what level of the roots and trunk did the authors harvest the wood aliquots and how many aliquots per compartment and per species?
- How did store the aliquots in the field and transfer to the laboratory?
- How many 10mx10m plots for the study ?

Density

References (sources) for the equations used for “ The volume and density of each sample should be given :

$$V = h * L * l \text{ (Equation 1)}$$

where V = volume, h = thickness, L = length and l = width.

$$(P) = V / M \text{ (Equation 2)}$$

where M is the dry mass of each sample.

Density formula presented here seems to be wrong ; the correct formula would be :
 $\rho = m / v$;

Aboveground biomass and validation model

- The use of the Allometric model of Adjonina (2008) for the estimation of the aboveground biomass reveals that trees were not felled. Then, the biomass obtained is a *predicted biomass*, not an *observed biomass*
- Some information on the selected validation parameters are needed (RMSE and BIAS).
- What was the shape of the models retained for this study after estimating the aboveground biomass of each tree : linear, power,...?

5. The results are clear and do not contain errors.

4

The results are clear, but their presentation could be improved.

Results

- It seems possible to have the first subtitle on « Tree biomass and density ».
- Regarding the second subtitle « Allometric model for estimating aboveground biomass », it is necessary to go back to the type and the form of the model ($y = aX^b$) in the part-modeling of the « Material and method » section .
- The titles of figures must appear at the bottom and not at the top, and those of tables at the top.
- Table 2 could be improved by simply outlining the model formulas ; the coefficients are already known.

Discussion

The figure could be removed in the discussion section. It seems to be a result.

The results could be discussed by comparing the masses obtained in this study with that of the other studies, showing the best model of the three types chosen (bark, wood or mix) and which biases are generated by the use of existing models.

| | |
|---|----------|
| 6. The conclusions or summary are accurate and supported by the content. | 3 |
|---|----------|

Taking into account suggestions made, the conclusions and summary should be rewrite.

| | |
|---|----------|
| 7. The references are comprehensive and appropriate. | 3 |
|---|----------|

- Authors should follow author instructions to better present bibliographic references. For exemple:

Alves L.F., Vieira S.A., Scaranello M.A., Camargo P.B., Santos F.A.M., Joly C.A. and Martinelli L.A., 2010. Forest structure and live aboveground biomass variation along an elevational gradient of tropical Atlantic moistforest (Brazil). *Forest Ecology and Management*, 260, 679–691.

- More references can be completed: see “Introduction” section.

Comments and Suggestions to the Author(s):

- The theme is topical and concerns a special ecosystem. However, the title should be reviewed because only one study site was sampled.
- The selection in the use of the expression Allometric model and Allometric equation must be made.
- Two specific objectives could be retained for the present study: (i) Establishment of allometric models and (ii) Evaluate the prediction of established models and existing ones.
- The introduction should be rewritten.

- The Material and Methods part is also to be improved according to the questions asked above and based on the existing work to justify some choices.
- The results, discussion and conclusion could be better presented.

Some comments and suggestions are made on manuscript jointed to this evaluation.

ESJ Manuscript Evaluation Form 2021

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You approve, your name as a reviewer of this paper, is available in the "review history" of the paper:

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- Yes
- No

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- Yes
- No

The TITLE is clear and it is adequate to the content of the article.

*

(Please insert your comments)

Yes

The ABSTRACT clearly presents objects, methods, and results.

*

(Please insert your comments)

Revoir les mots clés

Nous avons marqué les corrections sur le document.

Mots-clés: Biomasse des Mangrove, Gabon, Afrique Centrale, Avicennia et Rhizophora, Densité.

Équation allométrique: ce mot clé ne figure pas dans le résumé.

There are a few grammatical errors and spelling mistakes in this article.

(Please insert your comments)

No

The study METHODS are explained clearly.

*

(Please insert your comments)

les méthodes sont claires

le travail est bon

The body of the paper is clear and does not contain errors.

*

(Please insert your comments)

Ajoutez la source et l'année pour : Map 1: Location of mangroves in Gabon's Estuary Province (Source, Année)

The CONCLUSION or summary is accurate and supported by the content.

*

(Please insert your comments)

La conclusion est bien rédigée.

The list of REFERENCES is comprehensive and appropriate.

*

Each in-text citation has to be included in the list of references and vice versa.

(Please insert your comments)

Ajoutez des références récentes pour améliorer la qualité du travail (2019, 2020, 2021)

Please rate the TITLE of this paper.

[Poor] **1-5** [Excellent]

*

- 1
- 2
- 3
- 4
- 5

Please rate the ABSTRACT of this paper.

[Poor] **1-5** [Excellent]

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- 1
- 2
- 3
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- 5

Please rate the LANGUAGE of this paper.

[Poor] **1-5** [Excellent]

*

- 1
- 2
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- 4
- 5

Please rate the METHODS of this paper.

[Poor] **1-5** [Excellent]

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- 1
- 2
- 3
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- 5

Please rate the BODY of this paper.

[Poor] **1-5** [Excellent]

*

- 1
- 2

- 3
- 4
- 5

Please rate the CONCLUSION of this paper.

[Poor] 1-5 [Excellent]

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- 1
- 2
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Please rate the REFERENCES of this paper.

[Poor] 1-5 [Excellent]

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- 1
- 2
- 3
- 4
- 5

Overall Recommendation!!!

*

- Accepted, no revision needed
- Accepted, minor revision needed
- Return for major revision and resubmission
- Reject

Comments and Suggestions to the Author(s):

- 1- Quelques mots-clés ne figurent pas sur le résumé ;
- 2- Nous avons ajouté d'autres mots clés ;
- 3- Revoir le résumé en anglais après la correction de la version française ;
- 4- ajouter la source et l'année pour la carte de la localisation ;
- 5- Ajoutez des références récentes pour améliorer la qualité du travail (2018, 2019, 2020, 2021) ;

Bonne chance