



SDI Review Form 1.6

Journal Name:	Physical Science International Journal
Manuscript Number:	Ms_PSIJ_27004
Title of the Manuscript:	Timescales of Anthropogenic and Total Carbon Dioxide (CO₂) in the Atmosphere
Type of the Article	Original Research Article

General guideline for Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

To know the complete guideline for Peer Review process, reviewers are requested to visit this link:

(<http://www.sciencedomain.org/page.php?id=sdi-general-editorial-policy#Peer-Review-Guideline>)



SDI Review Form 1.6

PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Compulsory REVISION comments	The article is very interesting and important, and highlights important questions as the atmosphere-ocean-biosphere carbon dioxide exchange and the estimation of carbon dioxide residence time. The model results are different from the most usual scientific papers and models with a good correlation coefficient between observed and estimated variables. The article is well structured and should be considered for publication. Some minor revisions are proposed. Abstract When we read "$r_2 = 0.75$ ($r_2 = 0.81$)" we must read "$r^2 = 0.75$ ($r^2 = 0.81$)". The author certainly wants to mention the coefficient of determination, denoted R^2 or r^2 and pronounced R squared, that is the number that indicates the proportion of the variance in the dependent variable that is predictable from the independent variable. If Is not the case, the author must explain the meaning of the r_2. Line 562- When the author writes "The r_2 correlation is 0.76 for", probably want to write "The r^2 correlation coefficient is 0.76 for". But if r^2 is the	This is a very valid comment. I have used a wrong writing style for r^2 meaning the coefficient of determination for the first order linear regression fitting. I think that I have seen this writing style in some other publications and I did not check that it is wrong. I have corrected the expression to be r^2.



SDI Review Form 1.6

	correlation coefficient than must write as r instead of r^2. The correlation coefficient, r, is the coefficient that illustrates a quantitative measure of dependence, meaning statistical relationships between two or more random variables or observed data values. Seems that be the case. If the author wants to maintain the r^2, then must call to this measure, determination coefficient, instead correlation coefficient. Being the correlation coefficient $r^2=0.76$, the determination coefficient will be $r=0.87$. Line 564- The comment that was made in the line above (line 562) is applied here. When we read “data, the r_2 is 0.81”, we must read “data, the r^2 is 0.81.”. Line 526- When the author mention “The CO₂ concentration increases steadily up to ~ 700 ppm in 2300” probably wants mention the target year of 2030. If not, please explain how this estimated were made and how is possible such emissions scenario. If the author wants mention the year 2030 instead of the 2300 year, must point the scenario mentioned by the IPCC that made such prevision. Line 591- The same comment for line 562 is applied here :” correlation r_2 is 0.71.”. We must read r^2 and determination coefficient or r, as correlation coefficient, but in this case the value is 0.84.	I have corrected the expression to be r^2. This emission scenario is totally created by me and therefore there is no reference to any RCP projections. The emission scenario is simply based on the assumption that the CO₂ emissions stay at the present level of 10 GtC up to 2300 as they have been during the last three years. Therefore this emission scenario could be called “business as usual” scenario. The target year has been really 2300 and not 2030. I have corrected the expression to be r^2.
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SDI Review Form 1.6

Minor REVISION comments	Lines 50 – 60- The author need to explain better the value 0,693 T on the sentence “Sometimes a half lifetime has also been used, which means the time when 50 % of the change has happened and is mathematically in the first order system = $0.693 * T$.” or put there a reference. Line 140- The author used the symbol ~ to mean close to or near 16 years. It is proposed to use a word instead the symbol because that symbol can produce a misinterpret. The same could be applied to the line 304, 318, 319, 320, 338, 393, 526 and 576. Line 148- The values of atmospheric carbon and emissions used on equation 1, need a scientific reference or an explanation how where they estimated. Line 179- The red line of figure 3 is mentioned as the yearly total flux of carbon dioxide measured. Was measured or estimated? How this flux was measured? The legend of trends on the graphic mention CO2 instead CO₂. If not possible to change that is better to use de designation “carbon dioxide”. The same could be applied to figure 6, figure 8 and figure 9. Line 272- The text “$2.2 \pm 0.3 \text{ GtC yr}^{-1}$ from 1995 to 2000 [17].” is highlighted with a tenue grey colour. The	I have revised my expression this way: Sometimes a half lifetime has also been used. The half-time means the time when 50 % of the change has happened. For the first order system a half time = $\ln 2/k = 0.693/k$ and T is $1/k$, where k is the first order rate constant. Therefore in the first order system the half-time = $0.693 * T$. I have replaced all ~ symbols by a proper word. I have corrected this expression in this way: Using the recycling fluxes values for the year 2013 in Table 2 and the measured CO₂ concentration in calculating the atmospheric CO₂ mass, T would be I have modified the text as follows: “The measured atmospheric CO₂ concentrations [10] have been used in calculating the yearly CO₂ flux rates and the CO₂ amount according the empirical eq. (2) are depicted in Fig. 3. The yearly fossil fuel emissions are depicted as a reference only [11].” The figures are copied and pasted from Excel and it is not possible to use subscripts in Excel. Therefore the expression CO₂ has been replaced by carbon dioxide in all figures. The highlighting has been removed.
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SDI Review Form 1.6

	highlight needs to be removed. Line 545- It is proposed to review the English of the sentence “The amount of the observed amount anthropogenic CO₂ in the ocean”, changing one of the words “amount” for example to quantity. Line 567- When we read “The blue graph is the natural CO₂ flux from the ocean into the atmosphere” we must read “The blue trend on the graph is the natural CO₂ flux from the ocean into the atmosphere”. In this context graph refer to the graphical representation of all data. Line 576- When the author mention “According to those researchers,..”, which researchers we are talking about? Those ones of the reference 3? We have here a new paragraph that needs a new reference. Seems that the author text refers to several papers but he/she cites only one. Please introduce one or two references on this sentence. Clarify the plagiarism issue: Where found similarities with the work of Antero Ollila (Anthropogenic Carbon Dioxide (CO₂) Amounts and Fluxes between the Atmosphere, the Ocean, and the Biosphere) (http://sciencedomain.org/abstract/10193). If the author is the same person, no plagiarism is present because this manuscript complement the mentioned above	I have replaced amount by quantity. I have revised the text according to the comment. I have revised this sentence: “In a way this result is a piece of good news for those 34 researchers, which have been surveyed and detailed in the reference [3], who...” I have added a clarification in line 20: “...1DAOBM-2 based on the original 1DAOBM developed by the author [1]...”
<u>Optional/General</u> comments		