

Interactive comment on “Simultaneous shifts in stoichiometric and fatty acid composition of *Emiliana huxleyi* in response to environmental changes” by Rong Bi et al.

Anonymous Referee #1

Received and published: 7 June 2017

General comments: This study is an important step in understanding the interactive effects of environmental factors on coccolithophores. The paper has been well written. My general comments are as follows:

Line 30: “PIC” for the first appearance, should be marked it’s the abbreviation of “particulate inorganic carbon”. Also for “POC”. Line 31-32: “10:1, 24:1 and 63:1” are the ratios of N:P, the unite “mol mol⁻¹”, not necessarily shown. Line 87-92: “*E.huxleyi* is expanding its range poleward”, why then gave an example of the subtropical area. Line 149-151: “The target values were chosen to reflect a present and future regime of each factor”, however, the pCO₂ concentrations 560 and 2400 μatm they used, can hardly

C1

be considered reasonable. An explanation why a gap in the CO₂ concentrations was so big. Line 172: Can they write in detail about how “the specific growth rate of 20% of μ_{max} was applied”. I’m curious and puzzled about the reason and methods of how the 20% of μ_{max} (μ) was realized. Usually, specific growth rate is not expressed by %. Line 175-176: They said that the incubation water was exchanged with fresh seawater, since the culture medium was partially renewed according to the renewal rate D, the N:P ratios might deviate the target supply ratios in the remained medium due to differential consumption of N and P, can they give some information to show that the N:P supply ratios are stable after several rounds of renewal. Line 178: It seems that the cell concentration was extremely high, the cell concentration range should be provided. Line 180: What do the authors mean by “the net growth rate (r)”, what’s the difference between r and μ? Confusing wordings or mis-understood definitions? Line 203: Here “was” should be “were”. Line 241: Is this theory applicable in all species and in any conditions. Line 1103: Why there is no panel for the pCO₂ effect in Fig. 2. Line 1112: As I read from the “experimental setup” part, this study investigates the combined effects of temperature, pCO₂ and N:P supply ratios on *E.huxleyi*. Why in Fig 3. the combined effects of N:P supply ratio and pCO₂ are not considered, i.e. pCO₂ is not considered in panel (a), (b), (c), and N:P supply ratio is not considered in panel (d), (e) and (f). The same question for Fig. 4, 5 and 6.

Major revision is needed

Interactive comment on Biogeosciences Discuss., https://doi.org/10.5194/bg-2017-162, 2017.

C2

General comments:

This study is an important step in understanding the interactive effects of environmental factors on coccolithophores. The paper has been well written. My general comments are as follows:

Line 30: "PIC" for the first appearance, should be marked it's the abbreviation of "particulate inorganic carbon". Also for "POC".

Line 31-32: "10:1, 24:1 and 63:1" are the ratios of N:P, the unite "mol mol⁻¹", not necessarily shown.

Line 87-92: "*E. huxleyi* is expanding its range poleward", why then gave an example of the subtropical area.

Line 149-151: "The target values were chosen to reflect a present and future regime of each factor", however, the pCO₂ concentrations 560 and 2400 μatm they used, can hardly be considered reasonable. An explanation why a gap in the CO₂ concentrations was so big.

Line 172: Can they write in detail about how "the specific growth rate of 20% of μ_{max} was applied". I'm curious and puzzled about the reason and methods of how the 20% of μ_{max} (μ) was realized. Usually, specific growth rate is not expressed by %.

Line 175-176: They said that the incubation water was exchanged with fresh seawater, since the culture medium was partially renewed according to the renewal rate D, the N:P ratios might deviate the target supply ratios in the remained medium due to differential consumption of N and P, can they give some information to show that the N:P supply ratios are stable after several rounds of renewal.

Line 178: It seems that the cell concentration was extremely high, the cell concentration range should be provided.

Line 180: What do the authors mean by "the net growth rate (r)", what's the difference between r and μ? Confusing wordings or mis-understood definitions?

Line 203: Here "was" should be "were".

Line 241: Is this theory applicable in all species and in any conditions.

Line 1103: Why there is no panel for the pCO₂ effect in Fig. 2.

Fig. 1.

C3