

***Interactive comment on “The Arctic picoeukaryote
Micromonas pusilla benefits synergistically from
warming and ocean acidification” by
Clara J. M. Hoppe et al.***

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This is a worthwhile study of an important issue. It is topical and well conducted. I am late with this review, so will offer some quick input on units and figures.

Abstract: Fine

Introduction: Line 51, I think: "In this region, temperatures are rising more than twice as fast as the rest of the globe (Miller et al., 2010)."

Table 2: There are discrepancies, real or apparent, in the table. Line 1: growth rate d⁻¹, 0.75, implies more than one division per day (0.693 d⁻¹). POC production is 178

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Discussion paper





fmol cell⁻¹ d⁻¹, but POC quota is 239 fmol cell⁻¹

How can growth rate exceed 1 generation per day, when cells are producing less than a cell quota of carbon per day.

At 6C, growth rate constant of 1.06 d⁻¹ implies a generation time of 16 h. But POC production is only 261 fmol cell⁻¹ d⁻¹, while cell quota is 245 fmol cell⁻¹. So cells need a full day to produce a cell worth of carbon, but they are apparently dividing in 16 h.

The discrepancies are larger than the quoted error bars on the determinations, so something is going on here with discrepancies among the determinations.

Table 3: ETR_{max} does not have to be dimensionless. $I \times \sigma_{PSII} \times \phi_{PSII} / (F_v / F_m)$ or some similar equation can give e- PSII⁻¹ s⁻¹ in absolute units. Likewise for alpha.

Figure 1: This figure might be more informative if plotted as cell specific exponential growth rate (panel A, as presented) and C specific exponential growth rate (an arithmetic transform of panel B). This comes back to my concerns about Table 2.

Figure 2: Panel D: why switch to a mass:mass expressssion, when other panels use molar comparisons. Mole:Mole is more informative, to my mind. Panel A vs. Panel B 200 fmol C cell⁻¹ 25 fmol Chl cell⁻¹.

But: Each Chl a contains 55 C (not sure if Chl indicates Chl a, or Chl a + c). Either way: 25 fmol Chl cell⁻¹ \times 55 C/chl = 1375 fmol C in the chl per cell.

So, there is something wrong here with the unit conversions or calibrations. You have more C in the chl per cell, than in the total C per cell. Impossible. Unit conversion error or calibration error somewhere.

None of this affects the response patterns, but people will use these results for multiple purposes, so reconciling unit issues is worthwhile.

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