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Interactive comment on "The haplo-diplontic life cycle expands niche space of coccolithophores" *by* Joost de Vries et al.

Anonymous Referee #1

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This is a beautifully crafted review drawing attention to the overlooked global importance of coccolithophore species for which heterococcolithophore (diploid)-holococcolithophore (haploid) pairing has been identified. As stated, roughly these paired species account for 18% of total coccolithophore abundance, but because the diploid phase tends to be more heavily calcified than the lighter, or non-calcified, haploid phase, they are likely to occupy different ecological niches, as exemplified by different biogeography (Fig.3; eg. holococcolithophores rare in Southern Ocean >50oS), different depth profiles (Fig.4; holococcolithophores in upper 50 m, heterococcolithophores evenly distributed with depth), different seasonality (Fig.7; but apparently different niches off Bermuda and in Mediterranean; this needs to be better explained). The coloured SEM plate in Fig.2 is spectacular and I applaud how the red (diploid) and

blue (haploid) colour coding is consistently adopted throughout all graphs.

What knowledge is missing, albeit repeatedly admitted, is how this haplo-diplontic life cycle works to expand the niche for the globally most abundant (59.2%) coccolithophore Emiliania huxleyi, because its non-calcified haploid stage cannot currently be identified by regular LM and which calls for new molecular techniques [1].

A number of these knowledge gaps where future work should focus, best should be summarised in the abstract. This also includes [2] more SEM observations in the Pacific; [3] role of carbonate chemistry within the haploid-diploid niche space; and [4] resolution of the fact that grouped hetero-holococcolithophore abundances may not always be the best representation for individual species.

In detail: How was the estimate made that the haplo-diplontic life cycle expands the coccolithophore niche space by 17%??

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