

Clim. Past Discuss., referee comment RC3
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Comment on cp-2021-134

Anonymous Referee #3

Referee comment on "Summer sea-ice variability on the Antarctic margin during the last glacial period reconstructed from snow petrel (*Pagodroma nivea*) stomach-oil deposits" by Erin L. McClymont et al., Clim. Past Discuss., <https://doi.org/10.5194/cp-2021-134-RC3>, 2021

This is an interesting, original and well written study.

My main concern is the distribution of krill in coastal waters during the breeding season of snow petrels. The table 3 and the discussion section (lines 515-530) state that snow petrels feed less on krill near the continental shelf. However authors only consider the main krill species, *Euphausia superba* : "Post-larval krill are mostly oceanic (Atkinson et al., 2008)" and "adult krill move to deeper waters for egg development (Nicol, 2006) (lines 520 -525). Another krill species, *Euphausia crystallorophias*, known as ice krill, are closely associated to sea ice, feeding on diatoms under the ice and living in coastal waters, where it replaces the more oceanic *E. superba*. High densities of *E. crystallorophias* can be found in coastal polynya during the Antarctic summer (La, et al. 2015) and can be preyed by snow petrels (Ridoux & Offredo 1989). This should be considered to avoid shortcuts in the discussion (lines 525 "the observed shift in fatty acid and element profiles in Unit II suggests that fish became more important to snow petrel diet, suggesting that polynyas had opened up over the continental shelf between 26.8-25.7 ka. We hypothesise that these shifts in foraging habitat reflect changes in sea ice conditions, by either influencing prey distributions or access to surface waters for feeding". The discussion should thus include the distribution and ecology of *E. crystallorophias* for a more nuanced picture of the link between dietary changes (fish vs krill) and foraging habitat (pelagic vs neritic).

References :

La, et al. 2015. High density of ice krill (*Euphausia crystallorophias*) in the Amundsen sea coastal polynya, Antarctica" Deep sea research Part I: Oceanographic Research Papers, 95,75-84

Ridoux, V., & Offredo, C. (1989). The diets of five summer breeding seabirds in Adélie

Land, Antarctica. *Polar Biology* 9(3), 137-145.