

## ***Interactive comment on “Very old firn air linked to strong density layering at Styx Glacier, coastal Victoria Land, East Antarctica” by Youngjoon Jang et al.***

**Mauro Rubino (Referee)**

m.rubino@keele.ac.uk

Received and published: 9 May 2019

### General comments

The manuscript by Jang et al. describes a study performed on the firn, the upper part made of partially compacted snow/ice, of Styx Glacier (near the coast of East Antarctica). The authors report older than usual firn air for a coastal site in Antarctica, where snow accumulation rate and temperature are relatively high. They suggest that firn layering, possibly produced by blizzards, creates a thick lock-in zone, which, in turn, causes the age of firn air to grow quickly before close-off.

C1

The paper is decently well written and clear enough (though I suggest some changes to improve clarity in the attached document). The methodology is adequate and the results are discussed in a balanced way. However, the conclusions are somewhat overstated because the authors generalise their findings without showing that the correlation between lock-in zone thickness and firn air age holds for all sites in Antarctica. The results seem to be relevant to the journal's readers and, more in general, to the scientific community working on ice core science. However, the major novelty is the finding of the relatively old firn air for a coastal site. There is no major advancement in understanding the mechanisms of firn formation and air bubble sealing.

I believe the article can be published in a technical, specialist journal (after some revisions as suggested in the attached document), but I leave it to the Editor to decide whether the manuscript is suitable for The Cryosphere.

### Specific comments and technical corrections

See notes in the attached document.

Please also note the supplement to this comment:

<https://www.the-cryosphere-discuss.net/tc-2019-17/tc-2019-17-RC1-supplement.pdf>

---

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2019-17>, 2019.

C2