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Interactive comment on "Surface mass balance and water stable isotopes derived from firn cores on three ice rises, Fimbul Ice Shelf, Antarctica" *by* C. P. Vega et al.

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This paper presents the surface mass balance and water stable isotopes reconstructed using ice cores on three ice rises, Fimbul Ice Shelf, Antarctica. The main tools are high resolution oxygen isotope and identification of volcanic horizons using nssSO4 data. The paper contributes to the reconstruction of the present reconstruction of climate in the coastal area of DML area.

The manuscript subject is very appropriate for "The Cryosphere" and it is well written, but the analysis and presentation of the data and interpretation must be improved.

In the manuscript the Authors point out that at ice rises is present asymmetrical local

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meteorology conditions and surface mass balance respect to surrounding ice shelf, but the Authors do not report any information about the site location of core site respect to the ice rise and climatic condition. The location of core site respect to ice rises morphology is very important parameters for the interpretation of spatial and temporal variability of SMB and isotope.

The dating of core KM and BI is well constrained by isotope and MSA signal (seasonality of MSA for KM must be reported in a figure similar to 3, Na do not provide information and could be removed), whereas the stratigraphy of KC must be improved using seasonal signal of nssSO4, MSA and isotope, the volcanic signal reported is not well constrained respect other nssSO4 antarctic ice core stratigraphy: Double peaks of Pinatubo (melting layer, between? Cerro Hudson eruption?) Agung eruption of 1963 is one of the signals reported in Antarctic ice cores, and it is not observed instead of two others eruptions (Deception and Puyehue), could authors provide a comment?

BI and KM present similar isotope value (with 130 m of elevation difference) and presenting less depleted isotope respect to other ice cores located on ice shelf that authors correctly attributed to reduction of inversion layer, KC core present depleted isotope value and much lower SMB, the position of KC does not appear on the ice rises on the base of the data. The SMB and isotope value appear strictly correlated to morphological position, the discussion of the result must be introduced by the analysis of climate and morphological analysis of core site also of S100 and M2, G3, G4 and G5 site (information of these sites must be reported on Figure 1 and table 1, and if are available the firn temp a -10 m), and the profile of cores (M2, G3, G4 and G5) must be reported in figure 5 and 9.

SMB of KC, S100 and Composite appear similar, whereas the KM and BI are similar, but significant different, clearly the two groups represent different climate condition and history, authors must provide some explanation in the discussion. Clearly ice rises present different SMB and isotope, the KC SMB is “medium/high” for Antarctic standard condition, and with this value normally the seasonal signal is well preserved (see

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WAIS), the absence of annual signal is related at others factor that must be analysed.

KC isotope profiles ∂O18 and deuterium appear on figure 7 very differents, could be due to the melting? KC profile appears smooth in the lower part of profile, could the Authors comments?

At pag 7 line 15 it reports stake measurements: how many per each site? Single stake respect to single core? Explain

Pag 7 line line 18, on the base of figure 6 the melting occurs several time per year, not “some summers”. The importance of melting layer in the stratigraphy must be analysed in more depth with comparison of position respect to nssSO4, isotope and MSA, in particular for KC cores. The site present a “relatively high” SMB (0.24 m we yr) and it is anomalous that the seasonal stratigraphy is not preserved. Could be the combination of windscouring and melting obliterated the seasonal signal?

Pag 9 if the data are not significant at 95% and it is not reported in figure 7, I do not understand their importance.

Pag 10 line 32, the topographical and post-depositional effects are not sufficient presented in section 4.2

The different trend in SMB between ice shelf and ice rises must be also analysed respect the observation of the behaviour of SMB Antarctica proposed by Frezzotti et al., 2013.

In the figure 1 should reported the contour line at 10 m.

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