

Comments on “A model framework on atmosphere-snow water vapor exchange and the associated isotope effects at Dome Argus, Antarctica: part I the diurnal changes” by Ma et al.

The authors developed a box model to quantify the atmosphere-snow water vapor exchange and the isotopic effect at sites with very low snow accumulation rates where the atmosphere-snow exchange is an important post-depositional process that can significantly influence the isotopic compositions in surface snow. The model is better than the simple Rayleigh distillation models in previous studies because it parameterizes atmosphere-snow water vapor exchange by using the bulk aerodynamic method. After reading the revised paper carefully, I suggest to publish it after a minor revision. I gave several minor comments below.

Line 85, “box model.” changes to ‘box model’.

Line 99-100, the authors indicate that at Dome A the time interval between two precipitation events can reach ~80 days. Please give a reference here.

Line 235-237, the authors indicate that the isotopic composition of vapor in the free atmosphere layer (δ^f_0) is greater than the isotopic composition of vapor in the boundary layer (δ^v_0). This is due to the contribution from the free atmosphere can increase the ratio of H₂¹⁸O molecules in the boundary layer (Casado et al., 2018). Why the contribution from the free atmosphere can increase the ratio of H₂¹⁸O molecules in the boundary layer? The authors should explain it in more details.

Line 237, ‘Casado et al. 2018’ should be ‘Casado et al., 2018’.

Line 410-411, the authors indicate that as $\delta^{18}O_{s0}$ decreases, the magnitude of $\delta^{18}O_s$ diurnal changes decreases. But in Fig. 8e, we can see that as $\delta^{18}O_{s0}$ decreases, the magnitude of $\delta^{18}O_s$ diurnal changes increases (not decrease). Is that right?

Line 426, ‘Fig. 2, 4c, and 5c’ should be ‘Figs. 2, 4c, and 5c’.

Line 449, 'data from Dome A simulations' changes to 'data at Dome A'.

Line 526, 'by those in summer' changes to 'by those in winter'; 'snow isotopes.'" changes to 'snow isotopes.'.