Water stable isotope ratios in ice cores are believed to represent paleo-temperature. It was also often pointed out by modeling studies, however, that isotope ratios were altered after snow deposition due to the water vapor transport within the sub-surface snow. In the inland of Antarctica, snow accumulation is extremely low (e.g., 27.3 kg m\(^{-2}\) a\(^{-1}\), at Dome Fuji) and thus snow should stay for several years near the surface. Therefore, significant change isotope ratios are expected. This phenomena has not been so far confirmed by observational approaches.

We dug two snow pits at Dome Fuji (DF) and Meeting Point (MP) (approximately 380 km from DF Station) to reveal the modification of isotopic profile in the inland of Antarctica. The oxygen isotopic profile in the MP pit seems to preserve clear seasonal cycle, whereas large and several-year cycle is found in the DF pit. This DF cycle corresponds to neither seasonal cycle nor any fluctuation of air temperature in Antarctic stations. We confirm that this DF cycle could be formed by vapor condensation at the sub-surface (~20 cm depth) and variability of snow accumulation rates at DF ranging from -20 to 90 kg m\(^{-2}\) a\(^{-1}\) with several-year cycle. We conclude that the inconstant snow accumulation rate under the hyper arid environment strongly should modify the isotopic profile of sub-surface snow in the inland Antarctica.