

On the availability of old meteoric ice in the vicinity of Dome B, East Antarctica

Aleksandra Skakun (1,2), Vladimir Lipenkov (1), Frederic Parrenin (3), Catherine Ritz (3), Sergey Popov (4,5)

(1) Climate and environmental research laboratory, Arctic and Antarctic Research Institute, St. Petersburg, Russia
(a_skakun@mail.ru), (2) Central astronomical observatory of Pulkovo, St. Petersburg, Russia, (3) Institut des Géosciences de l'Environnement - UMR 5001, Université Grenoble Alpes, Saint-Martin d'Hères Cedex, France, (4) Polar Marine Geological Research Expedition (PMGRE), St. Petersburg, Lomonosov, Russia, (5) Saint-Petersburg State University, St. Petersburg, Russia

One of the priority tasks for the international Antarctic community is drilling and studying old Antarctic ice - ice which is more than 1 million years old - in order to investigate the reasons for the Mid-Pleistocene climatic Transition (MPT). A number of publications have predicted that this ice may be found in the vicinity of Antarctic domes C, F, and A. Recent studies have shown that stratigraphically disturbed meteoric ice observed near the base of the Vostok ice core dates back to 1.2 Ma BP, and possibly beyond. The existence of ice older than 1 million years in the vicinity of Vostok implies that in the area of Dome B, where the ice flow line which passes through the Vostok borehole originates, even older ice, with undisturbed stratigraphy, may exist. As part of the Vostok Oldest Ice Challenge (VOICE) initiative (Lipenkov & Raynaud, 2015), we carried out a preliminary investigation of the Dome B area with regard to its potential as one of the oldest-ice areas in Antarctica. At this initial stage of research, our study was based on the existing models and data sets (Pollard & DeConto, 2009; Van Liefferinge et al., 2018; Quiquet et al., 2018) as well as GPR and RES data. We first reconstructed the old ice trajectory between Dome B and Vostok and located the formation site of the oldest meteoric ice found in the Vostok core. Our study showed that Dome B has been relatively stable over the last 1 million years (its displacement did not exceed 50 km), and that the probability that the basal ice reached the pressure melting point over the last 1.5 Ma is low (<50%). Consequently the Dome B area can be suggested for a detailed reconnaissance programme aimed at identification of specific candidate sites for new deep drilling for the oldest ice.