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Results of the 2017 field campaigns to refine Oldest Ice candidate locations in the Little Dome C region. Modelling aspects.

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Retrieving an ice record of 1.5 million years is an international challenge emphasized for instance in the framework of IPICS.Glaciological (and logistical) criteria to obtain such a record have been proposed and the Little Dome C region, 40 km far from the Concordia station (East Antarctic Plateau) seems a good candidate. Successive surveys aiming at refining the choice of best locations have thus been performed, first with airborne radar in january 2016 (ICECAP) followed by a ground based survey for a more detailled spatial resolution in january 2017 and november/december 2017. This last campaign had, as an additional task, to choose by mid-december 2017 a location a good as possible for the pilot hole of SUBGLACIOR (a rapid access drill planned to be deployed in 2018-2019). To do so data acquisition, processing and modelling were performed in the field in an interactive way. This presentation focuses on the modelling aspects and we will indicate how, in a very limited time and computer power, we took advantage of data from various surveys, with different instruments and different level of data processing. We propose a simple method to use outputs of the existing model on ICECAP data (Parrenin et al. TC, 2017) to add local criteria based on the relative depth of the deepest dated layer. We also show how we defined a thickness treshold for this region in order to avoid basal melting on the bases of lake observations, internal layers spacing and thermal model outputs (Passalacqua et al. TC, 2017).

More extensive internal layers tracking and temperature measurements and their associated modelings should of course be performed afterward but this "modelling in the field" experience was very fruitful. Beside reaching the objective of selecting a site for SUBGLACIOR with reasonable confidence, the close interaction between data acquisition and modeling allowed to refine the survey over the most appropriate locations. The semi-qualitative inspection of the internal layers shape also indicated some limitations linked with the 1D aspect of the model used to the perform the internal layer inversion.

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