Supplement on Methods

Method to compute remaining amplitude

1) We define 'half-amplitude' as: abs($\delta^{18}O$-mean($\delta^{18}O$)). Thus, we first compute the mean $\delta^{18}O$ in the core, and then for each depth compute the absolute difference to the mean. Following a suggestion by Reviewer 3, we will replace 'half-amplitude' by the more common term 'semi-amplitude' in the manuscript.

2) We then look for maximas in this series of half-amplitudes. In the first version of the manuscript, we used 20-cm windows at this step. However, this is not well adapted for NEEM. In the revised version we will present results obtained with a 30-cm window for the first 10 meters of the core. Indeed, in this shallow part of the firn the density is about 400 kg m^3. Using accumulation rates of 0.23 m i.e. at GRIP, and 0.22 m i.e. at NEEM, the expected length for the cycles is 52 and 55 cm respectively. Since we are looking at half-cycles, a window of 30 cm should allow to get all the maximas present in the record. Deeper in the firn we will use **a window of only 20 cm** coherent with higher snow density downward.

3) Then over this series of maxima, we keep the maximum value for **each meter of the core** (see Figure below). We use this larger window for the fitting, because we prefer to evaluate attenuation based on the larger (well-defined) maxima. We use the value obtained in the first meter as our '**initial half-amplitude'**. All other maximas are expressed relative to this first meter "maxima of maximas", even if the maximas downward happened to be larger.

4) Lastly, we apply an exponential fit to these values: