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Corrigendum to "An assessment of basal melt parameterisations for Antarctic ice shelves" published in The Cryosphere, 16, 4931–4975, 2022

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The originally published version of this article included an imprecise definition of the temperature and salinity in Eq. (6) and Eq. (7). At the bottom of page 4936 and top of page 4937, we like to correct this as follows.

Locally, the basal melt rate m (in metres of ice per second) is determined by the heat flux across the turbulent boundary layer created by current shear against the ice base and was formulated as follows in Jenkins et al. (2018) based on a linearisation of the three equations (Jenkins et al., 2010):

$$m = \frac{\rho_{\mathrm{oc}}}{\rho_{\mathrm{i}}} \frac{C_{\mathrm{d}}^{1/2} \Gamma_{\mathrm{TS}}}{[L_{\mathrm{i}} - c_{\mathrm{i}}(T_{\mathrm{i}} - T_{\mathrm{f,\,bc}})]/c_{\mathrm{oc}}} U (T_{\mathrm{bc}} - T_{\mathrm{f,\,bc}}), \quad (6)$$

where Γ_{TS} is a transfer coefficient combining information about heat and salt transfer; T_{i} and T_{bc} are, respectively, the temperature of the ice and the ocean temperature in the boundary current at the ice–ocean interface; and $T_{\mathrm{f,\,bc}}$ is the local freezing temperature computed using the ice-shelf draft depth z_{draft} and S_{bc}, the salinity in the boundary current, in Eq. (3).

The temperature and salinity of the boundary current can be described using the far-field ocean temperature and salinity extrapolated to z_{draft}, called T_{loc} and S_{loc} in the following, by the relationship $(T_{\mathrm{bc}} - T_{\mathrm{f,bc}}) = \epsilon \times (T_{\mathrm{loc}} - T_{\mathrm{f,loc}})$, as suggested by Jenkins et al. (2018). ϵ, situated between 0 and 1, can be related to the relative efficiency of mixing across the thermocline that separates the boundary current from the warmer water below and across the ice–ocean boundary layer.

Given that ice temperature has a relatively small effect on melt rates (Dinniman et al., 2016; Arzeno et al., 2014), we can rewrite Eq. (6) as follows:

$$m = \frac{c_{\mathrm{oc}}}{L_{\mathrm{i}}} \frac{\rho_{\mathrm{oc}}}{\rho_{\mathrm{i}}} \gamma_{\mathrm{TS}} \cdot \epsilon (T_{\mathrm{loc}} - T_{\mathrm{f,\,loc}}). \quad (7)$$

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