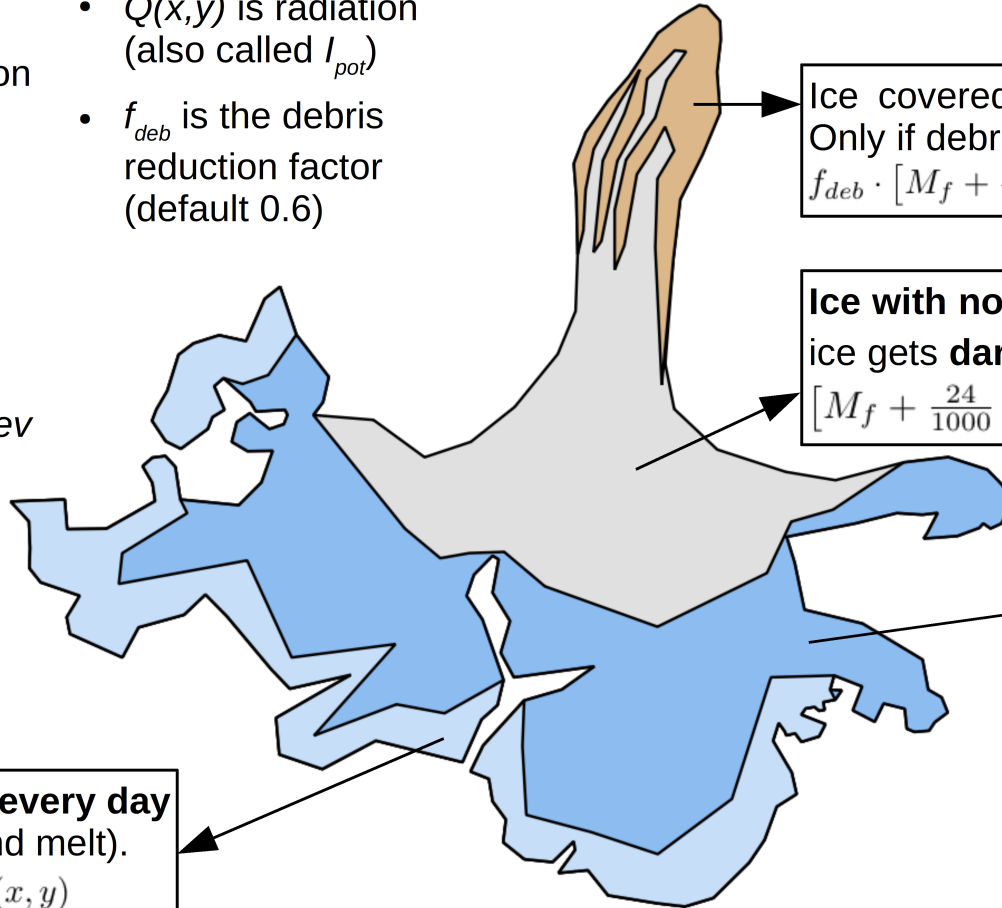


# Formulas used to calculate glacier melt in DMBSim

## NOTES

- $M_f$  is the melt factor
- $r_i$ ,  $r_f$  and  $r_s$  are the radiation factors.  $r_f = (r_s + r_i) / 2$
- $T(x,y)$  is the daily mean temperature, **only when**  $> 0\text{ }^{\circ}\text{C}$  (else no melt)
- $a_i(x,y) = 1$  (= no effect) if you don't set parameter *albedo\_ice\_decrease\_elev* in *set\_params*
- $Q(x,y)$  is radiation (also called  $I_{pot}$ )
- $f_{deb}$  is the debris reduction factor (default 0.6)



Ice covered with **thick debris (less melt)**. Only if debris **shapefile** is used.

$$f_{deb} \cdot \left[ M_f + \frac{24}{1000} \cdot r_i \cdot Q(x,y) \right] \cdot T(x,y)$$

**Ice with no debris.** You can use  $a_i(x,y)$  if the ice gets **darker** on the tongue (**more melt**).

$$\left[ M_f + \frac{24}{1000} \cdot r_i \cdot a_i(x,y) \cdot Q(x,y) \right] \cdot T(x,y)$$

**Firn surface.** Only if firn **shapefile** is used and only when it is not covered by seasonal snow.

$$\left[ M_f + \frac{24}{1000} \cdot r_f \cdot Q(x,y) \right] \cdot T(x,y)$$

**Snow surface** (changes **every day** depending on snowfall and melt).

$$\left[ M_f + \frac{24}{1000} \cdot r_s \cdot Q(x,y) \right] \cdot T(x,y)$$