

$$\frac{\tau}{\tau + 7.7} = \sum_{n=1}^N \left[\frac{F_n \cdot W_n}{\sum_{n=1}^N (F_n \cdot W_n)} \cdot \frac{\tau_n}{\tau_n + 7.7} \right]$$

$$F = \frac{\sum_{n=1}^N (F_n \cdot W_n)}{\sum_{n=1}^N W_n}$$

The above equations describe how to regrid in-cloud optical depth and cloud fraction from a “fine” grid to a “coarse” grid.

N = number of “fine” grid boxes (e.g. 0.5 x 0.666) that fit into the “coarse” grid box (e.g. 2 x 2.5, 4 x 5)

τ = resultant in-cloud optical depth in “coarse” grid box

F = resultant cloud fraction in “coarse” grid box”

τ_n = in-cloud optical depth in the “fine” grid box n

F_n = cloud fraction in “fine” grid box n

W_n = fraction of “fine” grid box n that fits into the “coarse” grid box (a.k.a. the mapping weight).