For simulations of ORCHIDEE-WET performed with a time-variable T_{mean}, increasing Q_{10} (from 3 to 5.5) does not lead necessary to increase in γ_M value at global scale.

Increase in wetland CH_4 emissions in 2100 in comparison with pre-industrial period due to climate alone is expressed by $Clim^{Glob}$ as defined below:

$$Clim^{Glob} = \frac{M_3^{Glob}(2100) - M_1^{Glob}(2100)}{M_3^{Glob}(1860)}$$

Where $M_x^{Glob}(y)$ is the wetland CH_4 emissions at global scale for simulation x and year y. The number x of each simulation refers to Table 1.

$$\text{So,} \quad Clim^{Glob} = \frac{1}{M_3^{Glob}(1860)} \cdot \left(\sum_i M_3^i(2100) - \sum_i M_1^i(2100) \right)$$

Where i can be equal to 'Boreal', 'Temperate' and 'Tropical'.

$$\text{Thus,} \quad Clim^{Glob} = \sum_i \left(\frac{M_3^i(2100) - M_1^i(2100)}{M_3^i(1860)} \cdot \frac{M_3^i(1860)}{M_3^{Glob}(1860)} \right).$$

$$\text{And finally,} \quad Clim^{Glob} = \sum_i \left(Clim^i \cdot \frac{M_3^i(1860)}{M_3^{Glob}(1860)} \right)$$

Where $\frac{M_3^i(1860)}{M_3^{Glob}(1860)}$ is the pre-industrial contribution of latitudinal region i to global emissions.

Modifying Q_{10} leads to changes in pre-industrial contribution of the different latitudinal bands to global wetland CH4 emissions. In the case where T_{mean} is variable, higher Q_{10} leads to changes in boreal band and no changes elsewhere. When variation in wetland extent are not accounting for, this increase is too low to counter-balance the change in contribution.