For illustrating the process of land-use change we consider a simplified case with static climate (= static steady-state SOC stocks). Whereas we assume SOC under natural vegetation to be in its steady state for simplicity, the cropland SOC stock still developed torwards its steady state without reaching it so far (a). For the time step from t-1 to t (here called t*) a land conversion occurs and half of the natural vegetation is cleared to be used as cropland (b). Splitting newly converted cropland and older cropland to account for SOC developments (c) leads to the same weighted mean SOC stock within the given cell as averaging SOC stocks of new and old cropland before accounting for SOC dynamics (d):

$$C_t^{new} = C_{t-1}^{new} + (C_{eq}^{new} - C_{t-1}^{new}) \cdot k^{new}, \quad C_t^{old} = C_{t-1}^{old} + (C_{eq}^{old} - C_{t-1}^{old}) \cdot k^{old}$$

$$\text{for } C_{eq}^{new} = C_{eq}^{old}, \quad k^{new} = k^{old}: \quad C_t^{wmean} = C_{t-1}^{wmean} + (C_{eq} - C_{t-1}^{wmean}) \cdot k$$