

Supplemental material S2

Correspondence between measured and modeled dimethylallyl diphosphate (DMADP) apparent pools and isoprene emission rates following light-dark transients

Figure S2.1. Correlations between predicted and measured apparent pools of DMADP ($S_{\text{DMADP,app}}$) (a) and isoprene emission rate (b) during light-dark transients in aspen (*Populus tremula*) leaves of different age (6-20 days old) together with 1:1 lines. The apparent pool of DMADP at time t was obtained by integrating the isoprene emission rate after leaf darkening (time t_0) to time t . When multiple processes consume DMADP, this pool is significantly less than the true DMADP pool. Especially in young leaves, chlorophyll and carotenoid synthesis strongly competes for chloroplastic DMADP at the level of geranyl diphosphate synthesis. Provided the competing processes have different Michaelis-Menten constants, data of isoprene emission vs. $S_{\text{DMADP,app}}$ size can be employed to estimate the rate of the competing processes and true Michaelis-Menten constants for isoprene synthase and the competing reactions. An iterative least squares fitting approach was used to fit simultaneously isoprene emission rate and DMADP pool size relationships by Eq. 4 and 5 and estimate the Michaelis-Menten constants (K_m) for isoprene synthase and pigment synthesis as well as the capacities for isoprene synthase and pigment synthesis reactions and derive the true initial DMADP pool sizes. For better visual assessment, only the data corresponding to sample transients in Fig. 4a are demonstrated.

