**Supplementary File S2**

**Part 1. Calibrating ETR II estimated from chlorophyll fluorescence**

Although ETR II has been shown to correlate well with linear electron flow calculated from measured O2 evolution rate in some cases, it is not an accurate estimation, see (Kalaji et al., 2017) for more detail. This deviation in ETR II led to the difference between measured *A* and estimated *A*j. In some cases, this difference was as large as 30% of transient *A* (Figure S1). This should not be true, as the coordination theory of leaf photosynthesis states that plant actively regulated to achieve the balance between *A*c and *A*j in response to environmental conditions (Chen, Reynolds, Harley, & Tenhunen, 1993), such as *T*30 applied in this study. Therefore, we introduced a parameter to ensure that *A*j matches *A*c at the end of induction (for *T*30 only) and then applied it to all transient *A*j, including *T*dyn and *T*40.

However, the coordination theory has been validated for growth conditions only (Maire et al., 2012) and may not apply for non-steady-state and potential stressful conditions, like *T*dyn and *T*40 (Walker et al., 2014). A recent report using dynamic *A*-*C*i method also suggests that transient *A*j would be higher than transient *A*c for almost entire period of induction at quasi growth condition (Taylor & Long, 2017). Therefore, differences between transient *A*c and *A*j under *T*dyn and *T*40 are reasonable.

**Part 2. Modelling the midway decrease in assimilation rate during induction**

In some induction curves obtained under *T*dyn and *T*40, *A* decreased within several minutes since the onset of the lightfleck. We first assumed no decrease in *V*c occurred during induction and then calculated *A*c as described in the article:

(S1)

(S2)

The results were compared against measured *A*, as shown in Figure S2. It is clear that *A*c were much larger than measured *A* during the late phase of induction. Such deviations went against the widely reported limitation by Rubisco-capacity on photosynthesis at high temperatures in literatures (Hikosaka, Ishikawa, Borjigidai, Muller, & Onoda, 2006; Sage & Kubien, 2007; Yamori, Hikosaka, & Way, 2014), confirmed by our analysis of the photosynthetic CO2 response curves (Fig. 4 in the text).

Thus, midway deactivation of Rubisco was deemed likely. We divided induction curves into two parts, an increasing part and a decreasing part. Each part was fitted after the method proposed by (Woodrow & Mott, 1989) to obtain . For the increasing parts, and were estimated from data recorded prior to the increase in irradiance and at the end of the part. For the decreasing parts, were set to equivalent to of the increasing part and were estimated from data at the end of induction.

**Figures**

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**Figure S1.** Exemplar time courses of measured *A* and estimated *A*j without calibration in a tree seedling of *S. leprosula*. Measured *A* were simultaneously recorded during chlorophyll fluorescence measurements. Estimated *A*j was the potential *A* supported by transient ETR II. Periodic oscillations of *A* were inevitable, due to the periodic dark pulses necessary for determining fluorescence yield.

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**Figure S2.** Exemplar time courses of measured *A* and estimated *A*c with and without assuming decrease in *V*c during photosynthetic induction under simulated dynamic temperature (*T*dyn, upper) and constant 40 °C condition (*T*40, lower), respectively. Measured *A* were simultaneously recorded during chlorophyll fluorescence measurements. Estimated *A*c was the potential *A* supported by transient *V*c, respectively. Periodic oscillations of *A* were inevitable, due to the periodic dark pulses necessary for determining fluorescence yield.

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