# Supporting Information

Article title: Comparison of CO2 and O2 fluxes demonstrate retention of respired CO2 in tree stems from a range of tree species

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The following Supporting Information is available for this article:

Figure S1 Eight hours measurement of CO2 and O2 in a stem chamber

Figure S2 ARQ measured in nutrients and litter removal manipulations

Figure S3 In-stem ARQ, and CO2, and O2 concentrations in various stem depths and positions above the ground.

Figure S4 An example of stem core incubation system

Methods S1 Description of sap flux density measurement

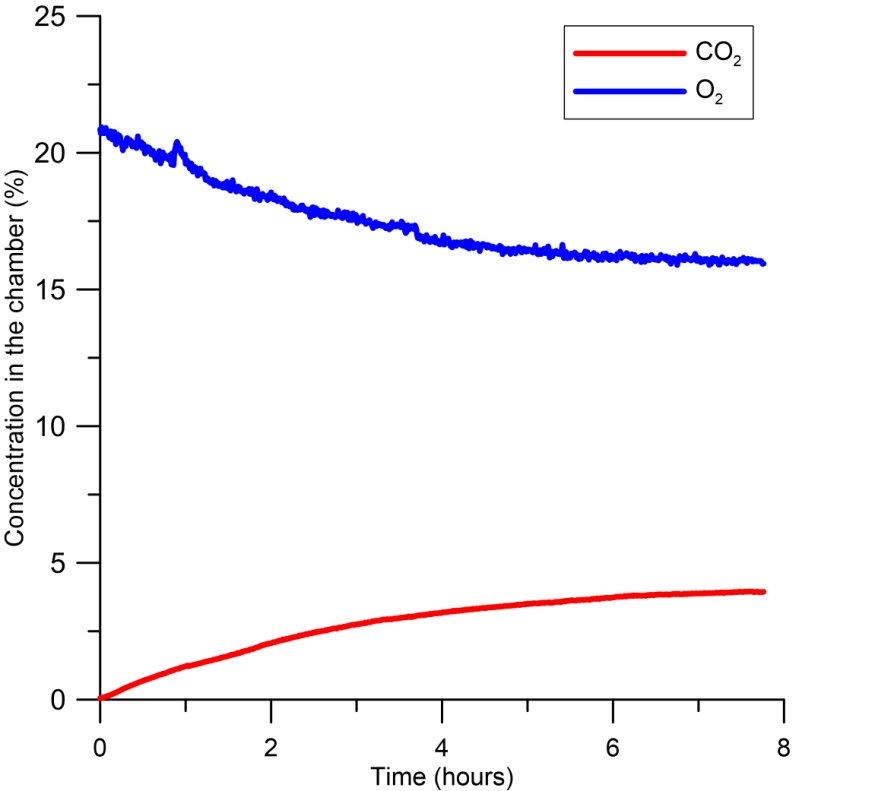


Figure S1 The concentrations of CO2 and O2 in a stem chamber attached to *Malus domes­tica* tree, measured continuously by gas sensors. The data is after ([Hilman and Angert, 2016](#_ENREF_1)). After the linear change in the gases concentrations in the first hour, diffusive exchange of the chamber air with outside air balanced the gas change, and after 7 hours the concentrations were constant.

Figure S2 The "steady state" ARQ (ratio of CO2 efflux/O2 influx for tree stems) for *Tetragastris* *panamensis* trees (n =4, mean ±SE) measured in plots where nitrogen (N), phosphorus (P), and potassium (K) are added in a factorial design with four replicate plots for each treatment ([Kaspari et al., 2008](#_ENREF_2); [Wright et al., 2011](#_ENREF_4)). In addition to the fertilization project, there is also a litter manipulation project (L-) where litter is gathered once a month from the plots ([Sayer and Tanner, 2010](#_ENREF_3)). No treatment effect was found in one-way ANOVA for the factorial experiment (F = 1.2584, P = 0.3117).

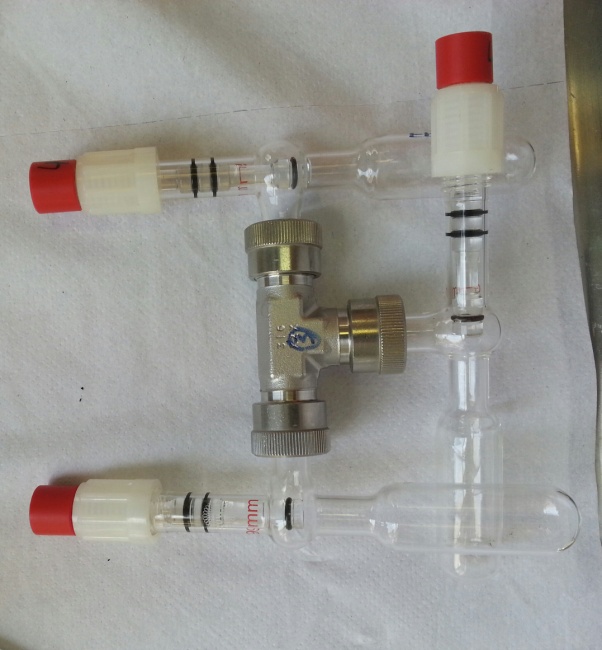
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Figure S3 An example of incubation system used for stem core ARQ measurement. Stem core wrapped with moist gauze cloth was inserted into the flaks “neck” indicated by an arrow.

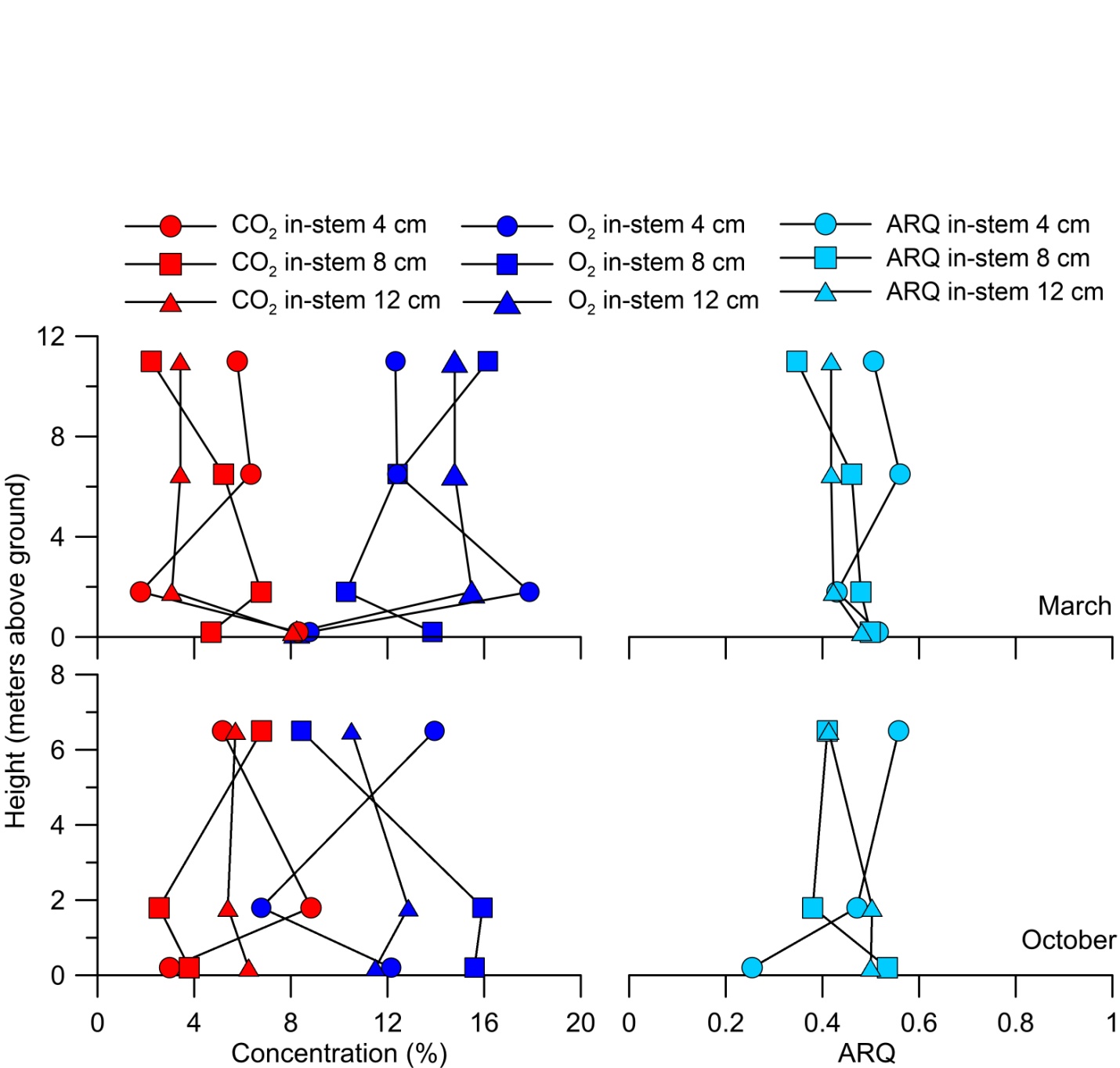
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Figure S4 The concentrations of CO2 and O2, and the ARQ (ratio of CO2 efflux/O2 influx) measured in different depths and in different heights on *a S. micranthum* tree in Brazil. The measurements were conducted during 30 March and 18 October 2012.

**Methods S1**: **Description of sap flux density measurement**

The sensors consisted of two temperature probes (3.5 cm long and 0.13 cm in diameter), which were inserted into the trunk at breast height and each sensor was spaced 0.5 cm from a heater. At half-hourly intervals, the heater fired a heat pulse that was sensed by the upper and lower temperature probes. Each temperature probe measured changes in temperature at two radial measurement points (7.5 mm and 22.5 mm from the needle tip) after the heat pulse (60 s). The sap velocity was calculated as the ratio of the temperature rise of the upper to lower sensors. The sap velocity profile was integrated as a weighted average of the cross-sectional area of sapwood associated with its respective sap velocity measured along the radial profile. Total sapwood area was estimated for each sampled tree from an empirical relationship between sapwood area - determined with destructive sampling – and the trunk diameter at the breast height.

# References

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