

## Description of Additional Supplementary Files

File name: Supplementary Data 1

Description: Method details of the leaf methionine analysis from frozen leaf extracts separated using hydrophilic liquid interaction chromatography.

File name: Supplementary Data 2

Description: 76 protein sequences from 22 species used to construct the phylogenetic tree shown in Figure 7 with protein ID, Genus and species, and plant category

File name: Supplementary Data 3

Description: Data set for all data-based figures including Figure 1a, Figure 1b, Figure 2, Figure 3, Figure 7a, Figure 7b, and supplementary Figures S1, S2, S3, S4, S5, S6, S7, S8, S9, S11, S12, S13, S14, S15, and S16.

File name: Supplementary video 1

Description: Animation illustrating biosphere-atmosphere interactions of CO<sub>2</sub> and methanol linked with photosynthesis and plant growth mediated by the photosynthetic C<sub>1</sub> pathway. From CO<sub>2</sub> in the global atmosphere to ecosystem, plant, stomata, cellular, subcellular, and extracellular processes and back again to the global atmosphere.