

## Supplementary Figure Captions

**Fig. S1.** Summary statistics for overall soil variables. Diagonals give kernel density plots of variables in blue. Hedge's  $d$  are represent mean values of those variables by each unique soil. Off-diagonals give bivariate scatterplots of two variables, and lowess regression lines. Soil organic carbon unit is  $\text{g kg}^{-1}$ , clay given in  
5 percentage by mass, Soil total nitrogen unit is  $\text{g kg}^{-1}$ , Soil C:N= soil organic carbon/soil total nitrogen.

**Fig. S2.** Summary statistics for paddy soil variables. Diagonals give kernel density plots of variables in blue. Hedge's  $d$  are represent mean values of those variables by each unique soil. Off-diagonals give bivariate scatterplots of two variables, and lowess regression lines. Soil organic carbon unit is  $\text{g kg}^{-1}$ , clay given in  
10 percentage by mass, Soil total nitrogen unit is  $\text{g kg}^{-1}$ , Soil C:N= soil organic carbon/soil total nitrogen.

**Fig. S3.** Summary statistics for upland soil variables. Diagonals give kernel density plots of variables in blue. Hedge's  $d$  are represent mean values of those variables by each unique soil. Off-diagonals give bivariate scatterplots of two variables, and lowess regression lines. Soil organic carbon unit is  $\text{g kg}^{-1}$ , clay given in  
15 percentage by mass, Soil total nitrogen unit is  $\text{g kg}^{-1}$ , Soil C:N= soil organic carbon/soil total nitrogen.

**Fig. S4.** Summary statistics for overall biochar variables. Diagonals give kernel density plots of variables in blue. Hedge's  $d$  are represent mean values of those variables by each unique soil. Off-diagonals give bivariate scatterplots of two variables, and lowess regression lines. HTT = pyrolysis temperature, Biochar C = carbon by  
mass ( $\text{g kg}^{-1}$ ), Biochar N = total nitrogen by mass ( $\text{g kg}^{-1}$ ), Biochar C:N = Biochar C/Biochar N.

**Fig. S5.** Summary statistics for paddysoil biochar variables. Diagonals give kernel density plots of variables in blue. Hedge's  $d$  are represent mean values of those variables by each unique soil. Off-diagonals give bivariate  
20 scatterplots of two variables, and lowess regression lines. HTT = pyrolysis temperature, Biochar C = carbon by mass ( $\text{g kg}^{-1}$ ), Biochar N = total nitrogen by mass ( $\text{g kg}^{-1}$ ), Biochar C:N = Biochar C/Biochar N.

**Fig. S6.** Summary statistics for upland biochar variables. Diagonals give kernel density plots of variables in blue. Hedge's  $d$  are represent mean values of those variables by each unique soil. Off-diagonals give bivariate scatterplots of two variables, and lowess regression lines. HTT = pyrolysis temperature, Biochar C = carbon by mass ( $\text{g kg}^{-1}$ ), Biochar N = total nitrogen by mass ( $\text{g kg}^{-1}$ ), Biochar C:N = Biochar C/Biochar N.

5 **Fig. S7.** Summary statistics for overall management variables. Diagonals give kernel density plots of variables in blue. Hedge's  $d$  are represent mean values of those variables by each unique soil. Off-diagonals give bivariate scatterplots of two variables, and lowess regression lines. Bio.app = biochar application rate (% soil dry mass), Days = experimental duration (day), N app = nitrogen fertilizer application rate ( $\text{kg N ha}^{-1}$  soil),  $\text{P}_2\text{O}_5$  app = nitrogen fertilizer application rate ( $\text{kg P}_2\text{O}_5 \text{ ha}^{-1}$  soil),  $\text{K}_2\text{O}$  app = nitrogen fertilizer application rate ( $\text{kg K}_2\text{O ha}^{-1}$  soil).

10 **Fig. S8** Summary statistics for paddy soil management variables. Diagonals give kernel density plots of variables in blue. Hedge's  $d$  are represent mean values of those variables by each unique soil. Off-diagonals give bivariate scatterplots of two variables, and lowess regression lines. Bio.app = biochar application rate (% soil dry mass), Days = experimental duration (day), N app = nitrogen fertilizer application rate ( $\text{kg N ha}^{-1}$  soil),  $\text{P}_2\text{O}_5$  app = nitrogen fertilizer application rate ( $\text{kg P}_2\text{O}_5 \text{ ha}^{-1}$  soil),  $\text{K}_2\text{O}$  app = nitrogen fertilizer application rate ( $\text{kg K}_2\text{O ha}^{-1}$  soil).

15 **Fig. S9.** Summary statistics for upland management variables. Diagonals give kernel density plots of variables in blue. Hedge's  $d$  are represent mean values of those variables by each unique soil. Off-diagonals give bivariate scatterplots of two variables, and lowess regression lines. Bio.app = biochar application rate (% soil dry mass), Days = experimental duration (day), N app = nitrogen fertilizer application rate ( $\text{kg N ha}^{-1}$  soil),  $\text{P}_2\text{O}_5$  app = nitrogen fertilizer application rate ( $\text{kg P}_2\text{O}_5 \text{ ha}^{-1}$  soil),  $\text{K}_2\text{O}$  app = nitrogen fertilizer application rate ( $\text{kg K}_2\text{O ha}^{-1}$  soil).

**Fig. S10.** The relationship between the biochar properties variables and the Hedge's  $d$  for total soil (a-e), paddy soil (f-j) and upland (k-o). Shaded bands indicate 95 % confidence intervals for the mean effect of each treatment. Negative  $d$  values indicate increased atmospheric CH<sub>4</sub> sink or decreased CH<sub>4</sub> emission by soils with biochar addition. The dotted vertical line indicates Hedge's  $d$  of 0 or no change in methane flux upon biochar addition.

**Fig. S11.** The relationship between the management factors variables and the Hedge's  $d$  for total soil (a-e), paddy soil (f-j) and upland (k-o). Shaded bands indicate 95 % CI for the mean effect of each treatment. Negative  $d$  values indicate increased atmospheric CH<sub>4</sub> sink or decreased CH<sub>4</sub> emission by soils with biochar addition. The dotted vertical line indicates Hedge's  $d$  of 0 or no change in methane flux upon biochar addition.























