**Global Carbon Fluxes Induced by Management Practices on Agricultural Land**

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Management practices on agricultural land significantly affect the carbon dynamics. Previous earth system models usually have a simple or no representation of the management practices. This study uses a land surface model with spatially heterogeneous representations of land management practices to estimate the carbon dynamics induced by land management practices, such as planting crops, fertilization, irrigation, harvesting grains, recovering crop residues, and grazing. The agricultural land productivity is 8,964 Tg C/yr in circa 2010. Among all macro geopolitical regions, South and Southeast Asia has produced the most biomass on cropland, while South America produced the most on grazing land. Harvesting crop grains and recovering crop residues have released 24% and 21% of the total agricultural land productivity, pasture grazing has released 11%. There are 42% of total productivity are left as litter and stover, and 2% are agricultural residue that are burned on the ground. The harvested crop grains, recovered residues, and grazed pasture are released in forms of plant-based human food (9%), animal feed (27%), and non-food products (20%). The animal feed carbon (27% of the total agricultural productivity) has been converted to egg, milk and enteric fermentation (1%), animal respiration (15%), and manure (11%) that is applied or left on the agricultural land. Through quantifying the carbon fluxes induced by different management practices, this study provides a complete estimate on the yearly carbon cycle in the agriculture system at the spatial scale, which may help improve the representations of land management practices in E3SM.