

**Fig. S1** CNMM-DNDC model-included processes determining ammonium (NH4+), ammonia (NH3) concentrations in the liquid phase of a soil, and ammonium bicarbonate decomposition (ABC), and thus volatilization of this nitrogenous gas in the uplands. This figure was drawn by decoding the original and revised Catchment Nutrient Management Model - DeNitrification DeComposition (i.e., CNMM-DNDC) model. NH4+(clay) denotes the NH4+ adsorbed by clay minerals. NH4+(l) and NH3(l) are referred to as the dissolved NH4+ and NH3, respectively, in the liquid phase of a soil. Bold word(s) aside arrow(s) indicate(s) the nitrogen transfer/transformation process(es). Italic word(s) aside arrow(s) is/are the regulating factor(s) for the corresponding process(es). The influencing factors with their parameters/parameterizations/definitions fully inherited from the original DNDC95 (http://www.dndc.sr.unh.edu/) with minor changes by Cui et al. (2014) are shown in black color; and those newly added/calibrated in the study of Dubache et al. (2019) and Li et al., (2019), are displayed in red color.

**Reference**

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