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Supplementary material

Modeling Nitrogen Dynamics in a Waste Stabilization Pond System Using Flexible Modeling Environment with MCMC

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Table S1. List of R-FME functions used [23].

Functions	Description
sensFun	The function is used to determine the local sensitivity of the model outputs to the parameter values, and to estimate the effect of small changes of a single parameter on model output.
Collin	The function estimates the approximate linear dependence of all possible parameter set (''collinearity'') by utilizing local sensitivity results (dimensionless sensitivities).
modFit	The function uses the minimization routines and the pseudorandom search algorithm for nonlinear model-data fitting and determine the best fit parameter set.
modMCMC	The function uses the Delayed Rejection (DR) and Adaptive Metropolis (AM) procedure to conduct Bayesian analysis by using a Markov chain Monte carlo (MCMC) method to obtain data-dependent probability distribution of the parameters with allowable parameter range.
sensRange	The function estimates the uncertainty in model output as a function of parameter probability density function, and performs global sensitivity analysis.
modCRL	The function determines the effect of parameter sensitivity on the mean value of a single model variable output.

Table S2. One-way analysis of variance (ANOVA) for ON-N.

SUMMARY						
Groups	***Count***	***Sum***	***Average***	***Variance***		
ON (influent)	49	533.09	10.87939	8.94		
ON (effluent)	49	287.75	5.872449	0.19		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	614.2012	1	614.2012	134.4178	5.91E-20	3.940163
Within Groups	438.6572	96	4.569346			
Total	1052.858	97				

Note: Similar results for NH_3-N and NO_3-N are not shown.

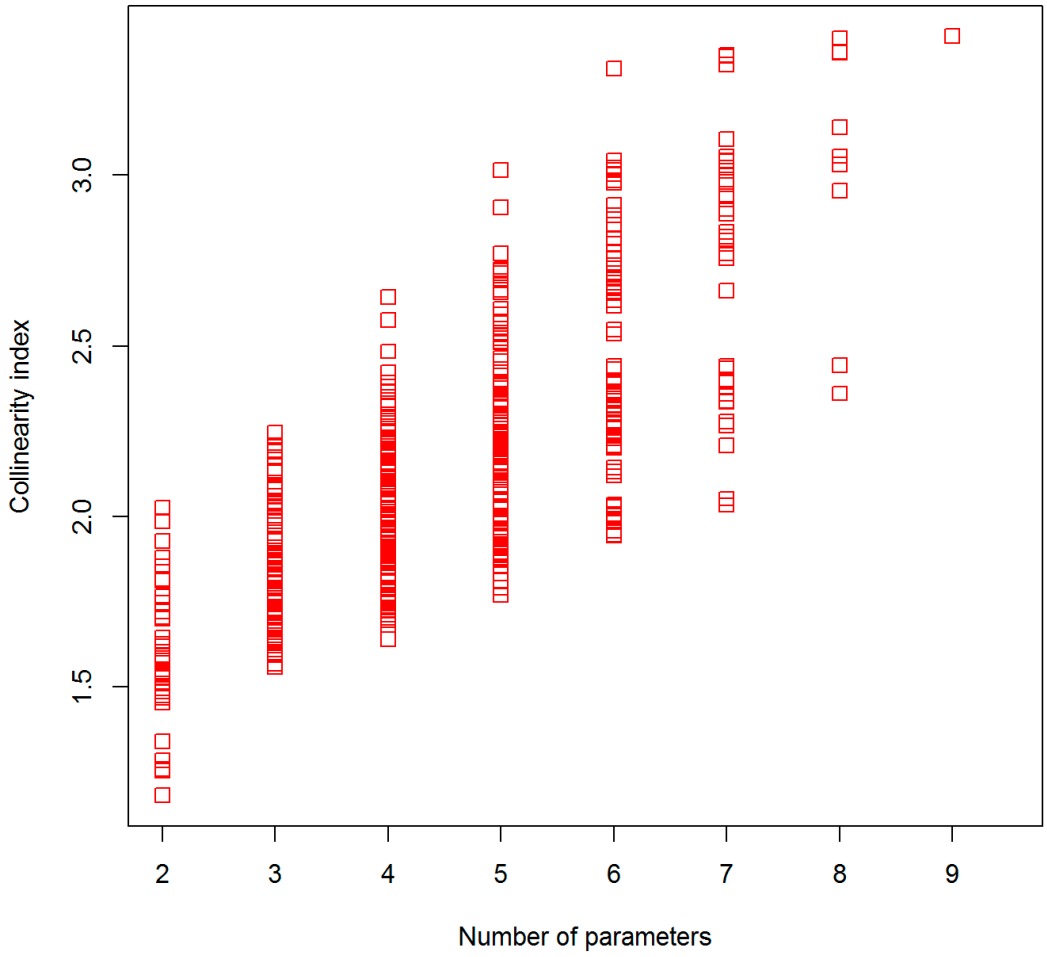

Figure S1. Collinearity index for selected 9 parameters.