Figure S1. Global mean pH estimated by sample mean in simulated sampling experiments, compared with population value estimated from CAF model.
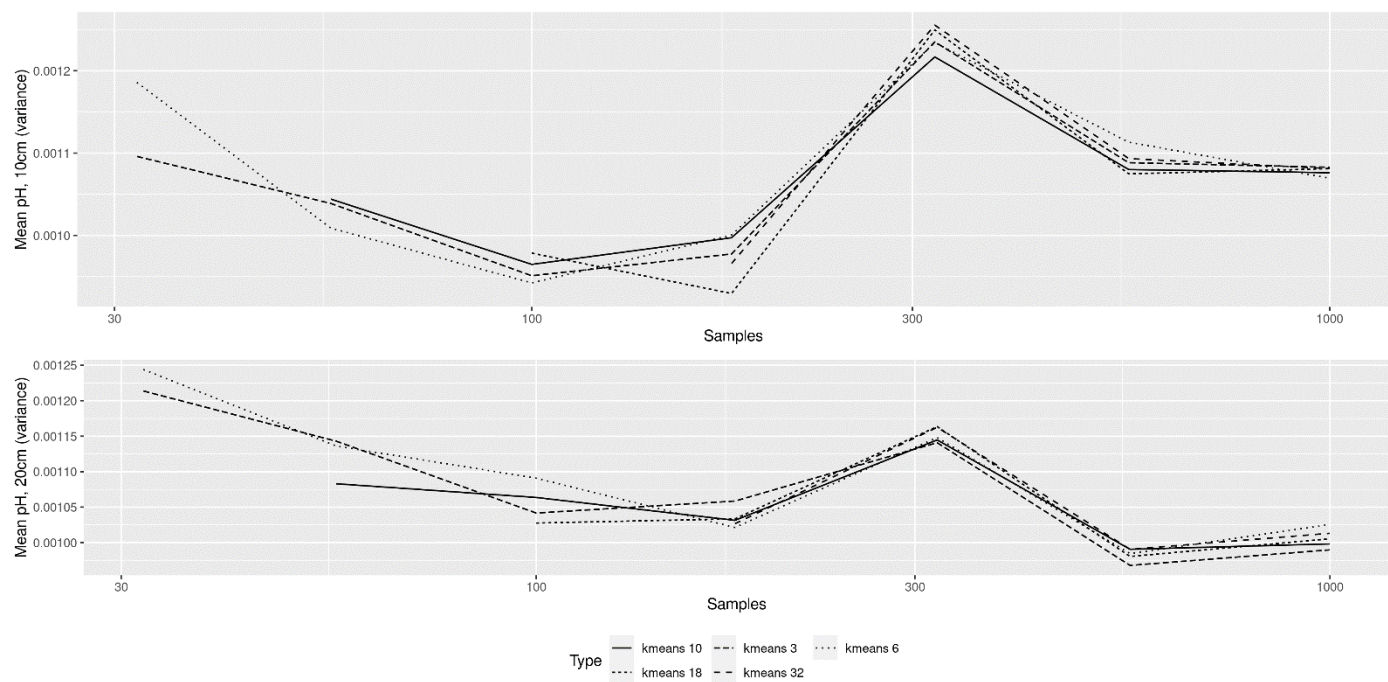

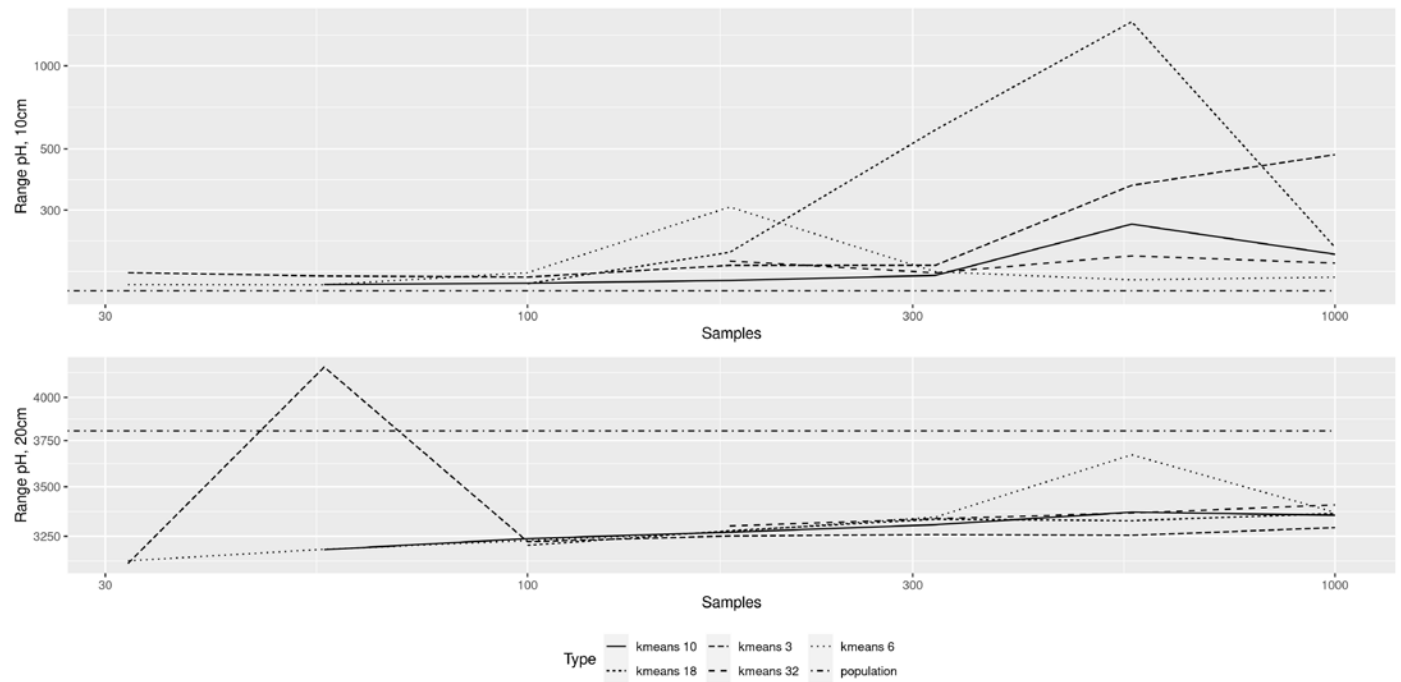**Figure S2.** Sample variance of global mean in simulated sampling experiments.

Figure S3. Semivariogram range estimated by sample mean in simulated sampling experiments, compared with population value estimated from CAF model.
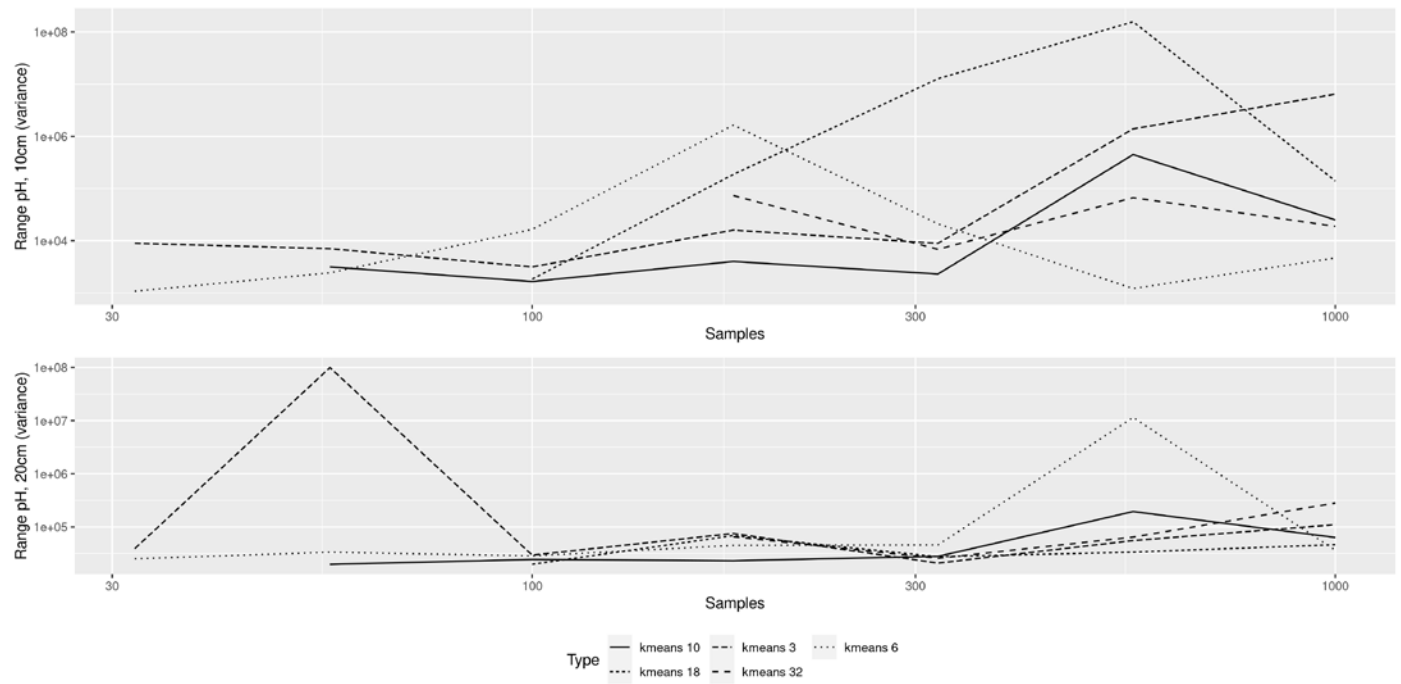

Figure S4. Sample variance of semivariogram range in simulated sampling experiments.