

Supplementary Material

Building trust in SWAT model scenarios through a multi-institutional approach in Uruguay

This document contains the supplementary data for the paper. In particular, much of the detail about the model for the Santa Lucia catchment and the data behind the model are contained in this document. These tables and figures provide more detail about the model implementation and results.

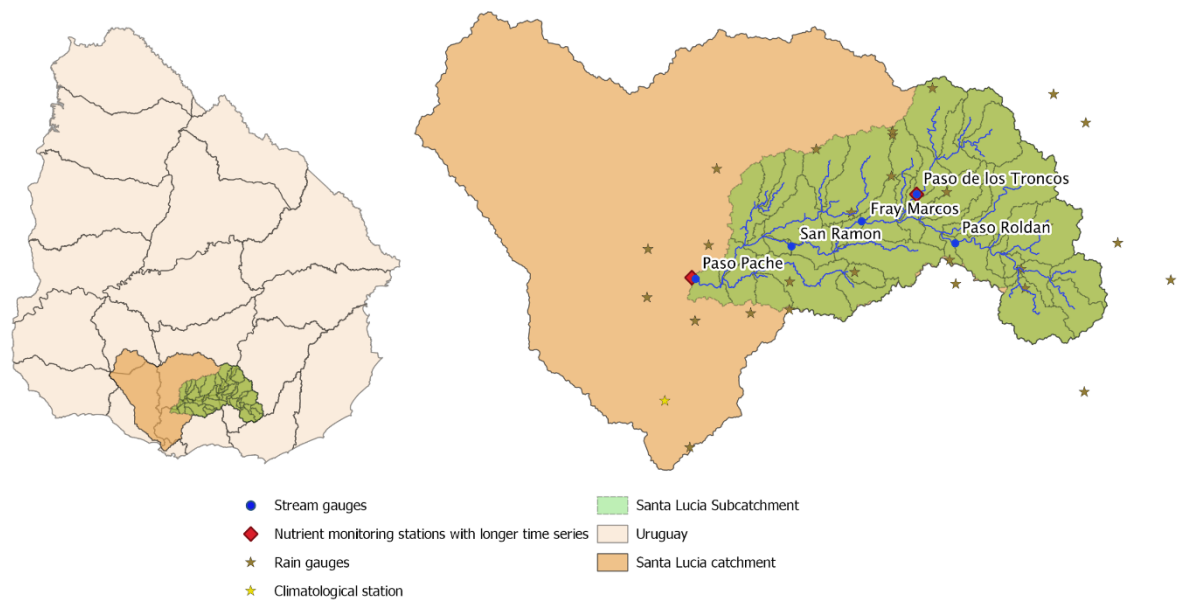


Figure S1: Santa Lucia sub catchment location and variables used

Table S1: Summary of the datasets used for model development and Uruguayan government sources of the data.

Data sets	Application	Data description	Sources
Digital Elevation Model (DEM)	Subbasin delineation	Raster format with a spatial resolution of 30 x 30 meters and an interpolation accuracy of 2.5 meters between points	MGAP (http://www.mgap.gub.uy/unidad-organizativa/direccion-general-de-recursos-naturales/tramites-y-servicios/biblioteca-digital/modelo-digital-del-terreno)
Land use data sets	HRU definition	Adaptation of the map from Land Cover Classification (LCCS) methodology of the Global Land Cover Network (GLCN) of the United Nations Organization for Agriculture and Food (FAO). Integration of dairy information from MGAP-DICOSE which ensure the supply of information and its quality for the sustainability of the National Livestock Information System. In total 14 landuse types.	MVOTMA-DINAMA
Crop management and rotation data sets	Agricultural management schedules	Definition of 3 main crop rotations based on land use plans that the farmers registered in MGAP	MGAP
Soil data sets	HRU definition	1:40,000 soil map established by MGAP (37 soil types). Proprietes were defined based on trial pits.	MGAP
Contamination point sources	Point sources	Discharges from industrial and domestic activities	MVOTMA-DINAMA
Climate data sets	Meteorological forcing	INIA Las Brujas station: Daily maximum and minimum temperature, daily mean relative humidity, daily global solar radiation Inumet precipitation stations: 28 stations with daily precipitation. From the rain gauges that have at least three quarters of the complete record, the average daily rainfall (PMD) for each sub-basin of the Santa Lucia river was calculated according to subdivision level 3 and level 5 of MVOTMA-DINAMA.	INIA (http://www.inia.uy/gras/Clima/Banco-datos-agroclimatico) INUMET
Observed Flow data sets	Model calibration	Daily flow monitoring	MVOTMA-DINAGUA
Observed Water quality variable data sets	Model calibration	Bimonthly water quality monitoring since 2004. Temperature, conductivity, pH, colifecal, BOD5, Nitrates, Nitrites, Ammonium, Total nitrogen, Total phosphorus, turbidity	MVOTMA-DINAMA

Table S2: Main rotations implemented in the model

Rotation Name	Duration	Crops
Agricultural rotation (AGRC)	3 years	<ul style="list-style-type: none"> ● Two summer seasons of soybeans ● One season of corn ● Three cover crops of oats
Agricultural rotation with pasture (AGRP)	5 years	<ul style="list-style-type: none"> ● Same rotation as the Agricultural rotation plus three years of pasture with grazing activities
Dairy rotation (LECH)	4 years	<ul style="list-style-type: none"> ● One season of winter cereal ● One season of forage sorghum ● Three years of pasture with grazing activities

Table S3: Calibration overview results

Name	Variable	R2	NSE*	P Bias*
Fray Marcos	Flow	0.76	0.74	7.9
Paso Pache	Flow	0.71	0.68	1.7
Paso de los Troncos	Nitrate	0.89	0.85	-34.9
Paso Pache	Nitrate	0.78	0.6	-84.2
Paso de los Troncos	Phosphorous	0.46	0.15	80.8
Paso Pache	Phosphorous	1	0.81	-24.3

**NSE is "Nash Sutcliffe Efficiency" which captures the ratio of the variance in the observed data versus the variance of the simulated data. A value of 1 indicates a perfect fit of simulated to observed data. P Bias is "percentage bias" =mean(bias)/mean(observed)*100*



Figure S2: Calibration plot and uncertainties for flow, nitrate and total phosphorus at Fray Marcos and Paso Pache in the Santa Lucia catchment (simulated = red, observed = blue). (continued next page)

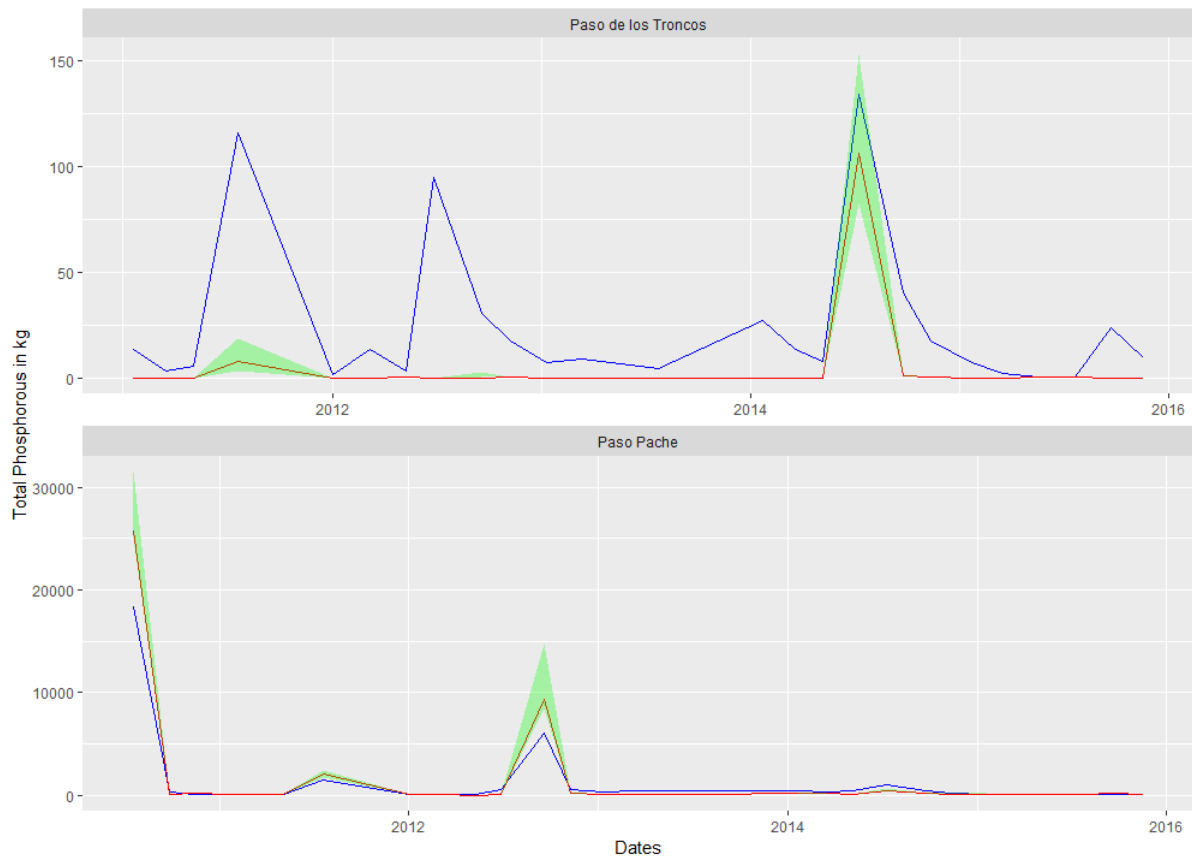


Figure S2: Calibration plot and uncertainties for flow, nitrate and total phosphorus at Fray Marcos and Paso Pache in the Santa Lucia catchment (simulated = red, observed = blue). (*continued*)