Modelling Climate Change Scenarios in a Scarcely Gauged Lowlands Catchment (Quequen, Argentina)

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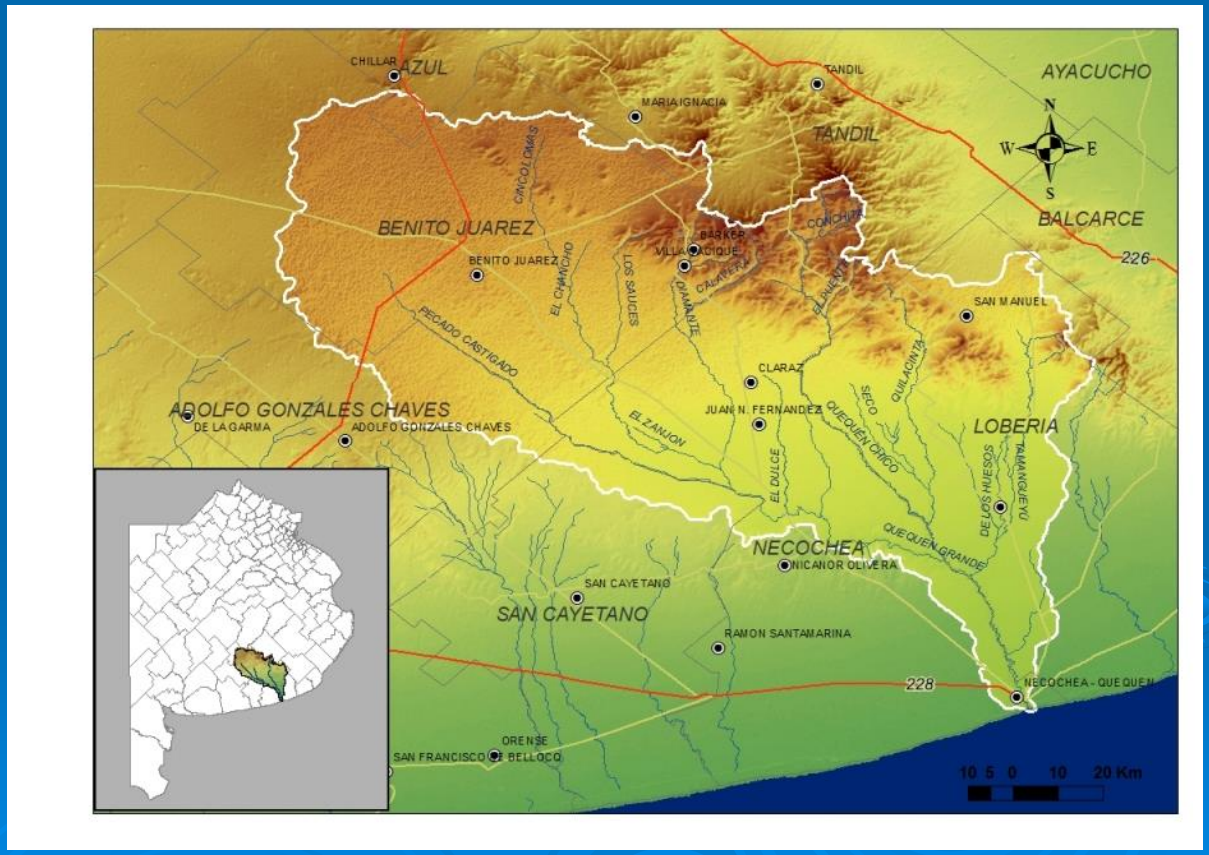
Objective

Model Quequen catchment using SWAT as tool

Specific objectives:

- Adaptation of input parameters to local conditions
- Calibration and validation of model
- Generate climate scenarios for water management

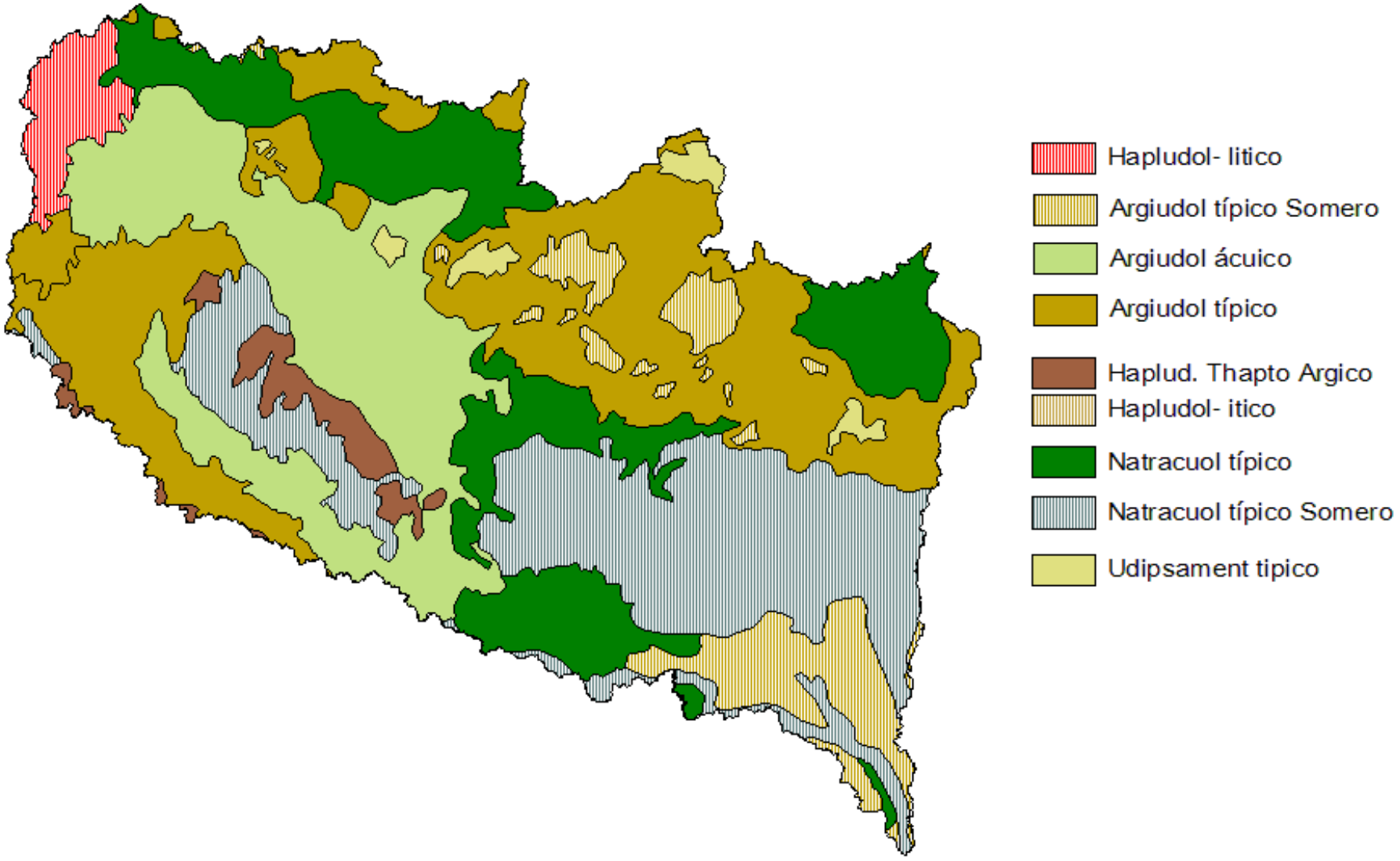
Location


AZUL
TANDIL
AYACUCHO
MARIA IGNACIA
BENITO JUAREZ
BALCARCE
226
SAN MANUEL
CLARAZ
ADOLFO GONZALES CHAVES
DE LA GARMA
JUAN N. FERNANDEZ
LOBERIA
NECOCHEA
NICANOR OLIVERA
SAN CAYETANO
RAMON SANTAMARINA
228
NECOCHEA - QUEQUEN
ORENSE
SAN FRANCISCO DE BELLOCQ
10 5 0 10 20 Km

Methodology

Input

SOIL



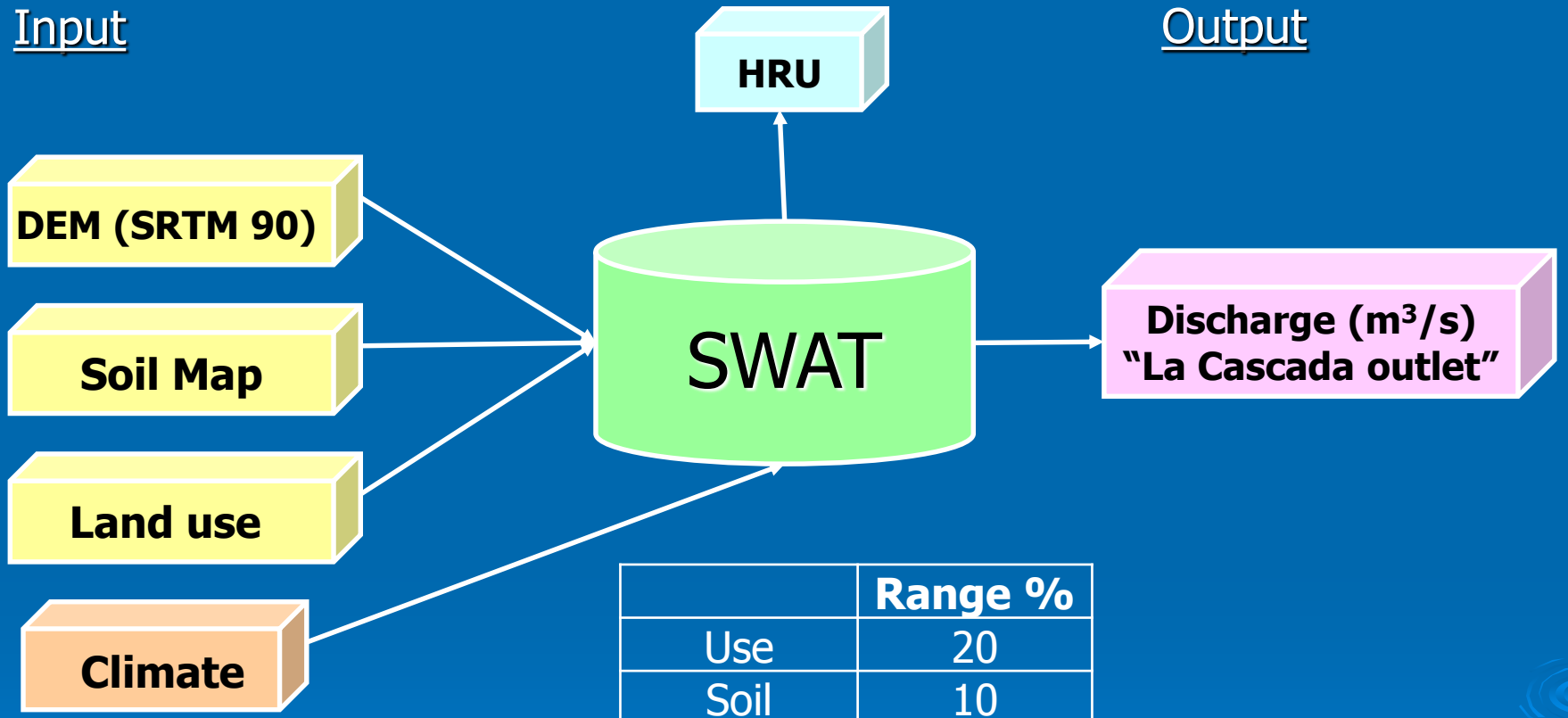
Land Use Class	Area (Ha)	Area (%)
Pastures	681,498	73%
Corn	15,221	2%
Soybean	23,416	3%
Sun Flower	78,445	8%
Wheat & Barley	132,631	14%
Water	4,323	0.5%
Total	935,533	100%

Methodology

SWAT model

Input

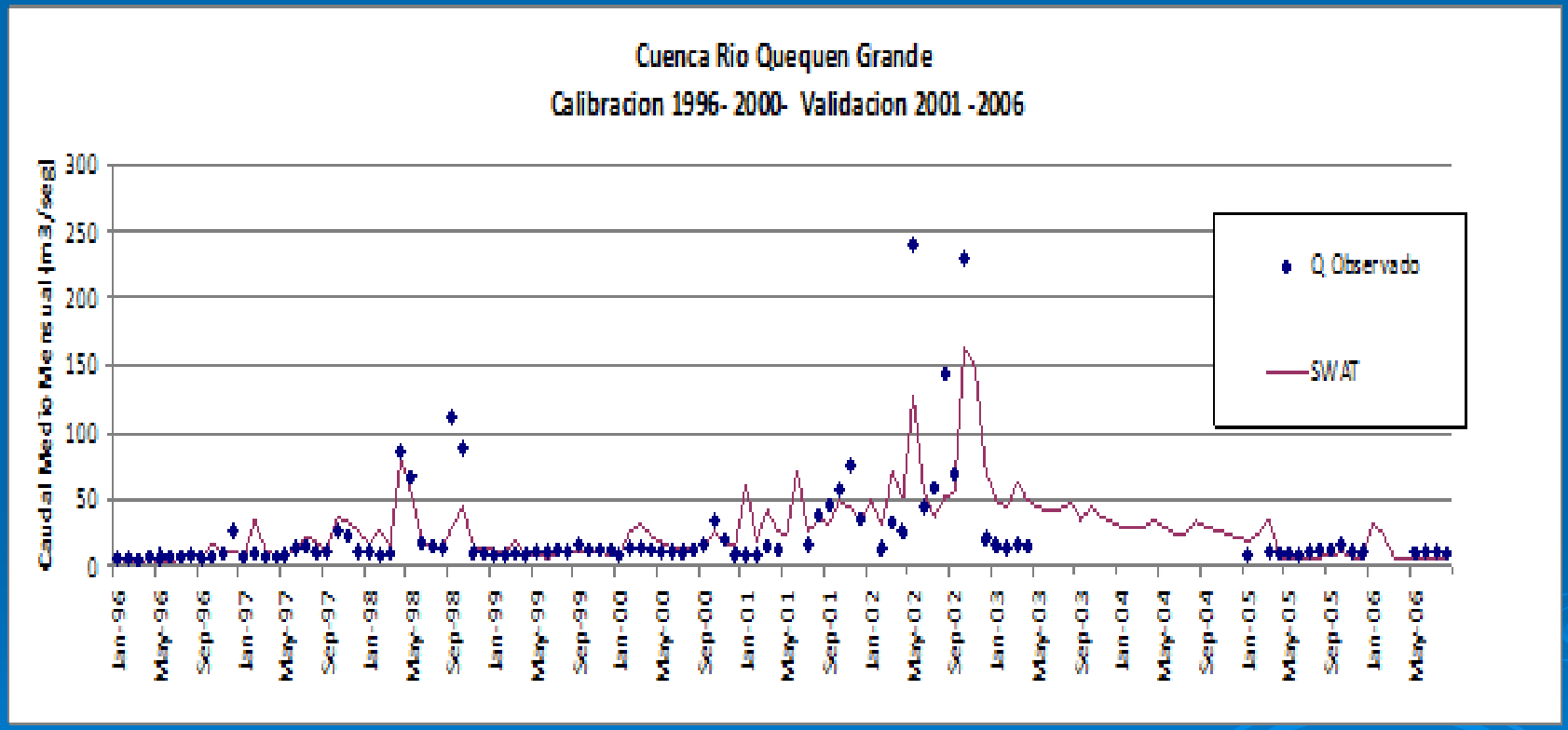
Output



	Range %
Use	20
Soil	10
Slope	20

Soil and Water Assessment Tool
(Arnold et al., 1998)

Calibration and validation graph

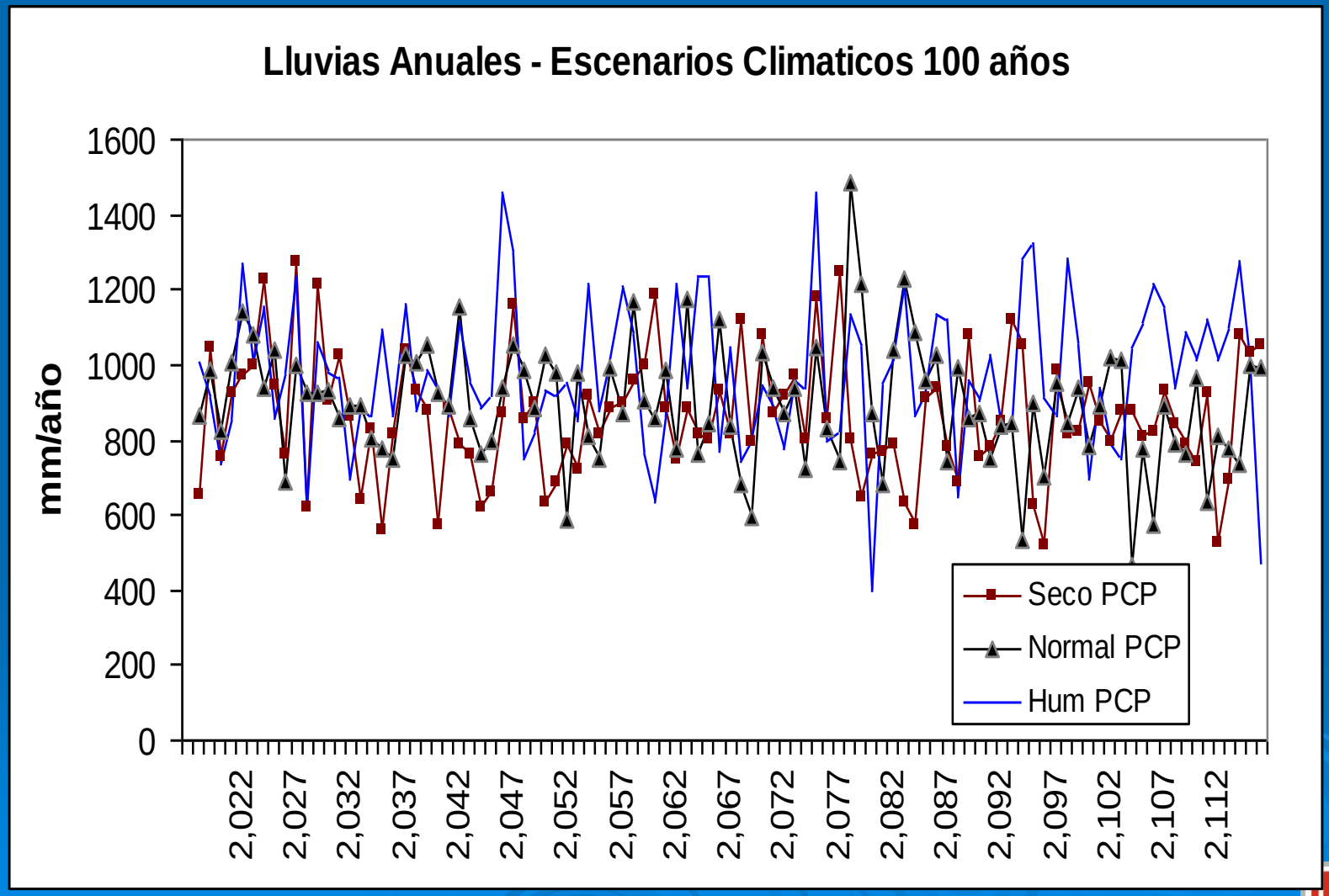


Calibration and validation results for "Cascada" outlet

Parameter	Description	Scale
CN2	SCS runoff curve number	1
AWC_SOL	Available water capacity of the soil layer	2
GWQMN	Threshold depth of water in the shallow aquifer required for return flow to occur	3
ESCO	Soil Evaporation Compensation factor	4
RCHRG_DP	Deep aquifer percolation fraction	5

	Calibration	Validation
	1996-2000	**2001-2006**
Average measured discharge Río Hondo ($m^3.s^{-1}$)	16.54	36.01
Average modelled discharge($m^3.s^{-1}$)	16.70	36.58
Nash y Sutcliffe coefficient (NS)	0.75	0.61
R^2	0.72	0.80
RMSE ($m^3.s^{-1}$)	14.17	33.31

Climate Scenarios

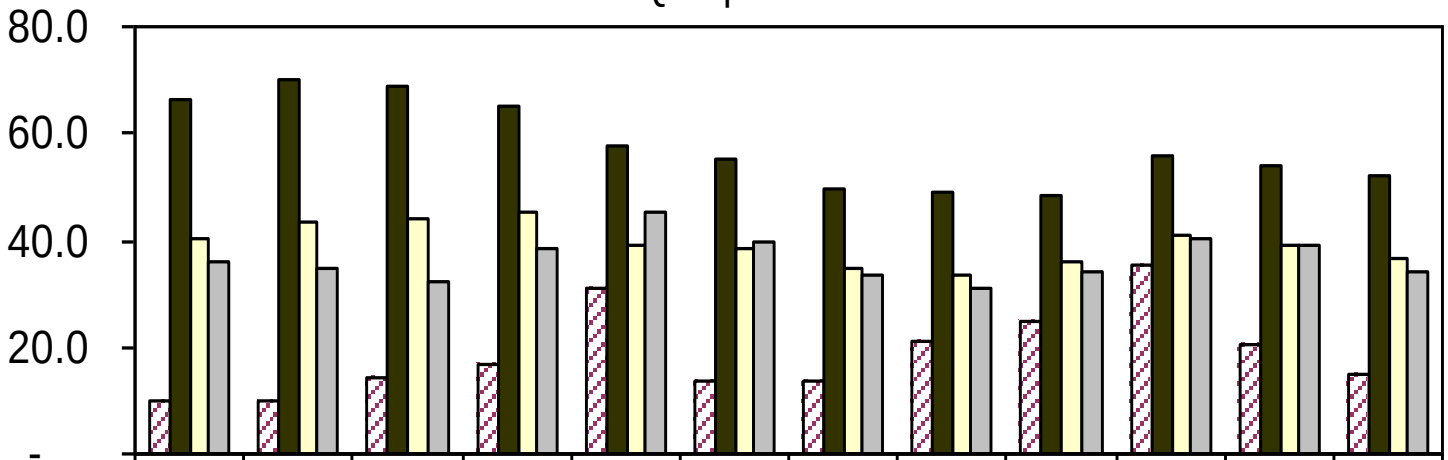


Future climate scenarios

Escenarios Climaticos

Caudales Mensuales Estimados con SWAT 2009

Cuenca Rio Quequen Grande



	Ene	Feb	Mar	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic
Q Observado	10.2	9.8	14.5	16.7	31.2	13.4	13.7	21.0	24.7	35.3	20.2	15.2
Humedo	66.4	70.3	69.0	65.0	57.8	55.5	49.4	49.1	48.4	56.0	54.2	52.0
Normal	40.0	43.1	44.2	45.2	39.4	38.5	34.7	33.6	35.8	41.1	39.3	36.7
Seco	36.2	34.4	32.0	38.1	45.1	39.6	33.5	31.1	34.1	40.1	39.3	34.0

Conclusions and Discussion

- Local inputs for SWAT
- Reasonable adjustment
- Discharge increase for every scenario
- Better adjustment of inputs increase of observation points
- Multidisciplinary water management

Thank you for your attention

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