

Hydrological modeling of Mendoza River Watershed Using Soil and Water Assessment Tool



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EMOCLIP Summer School Program. Geneva 2nd-6th July 2012

OBJECTIVES

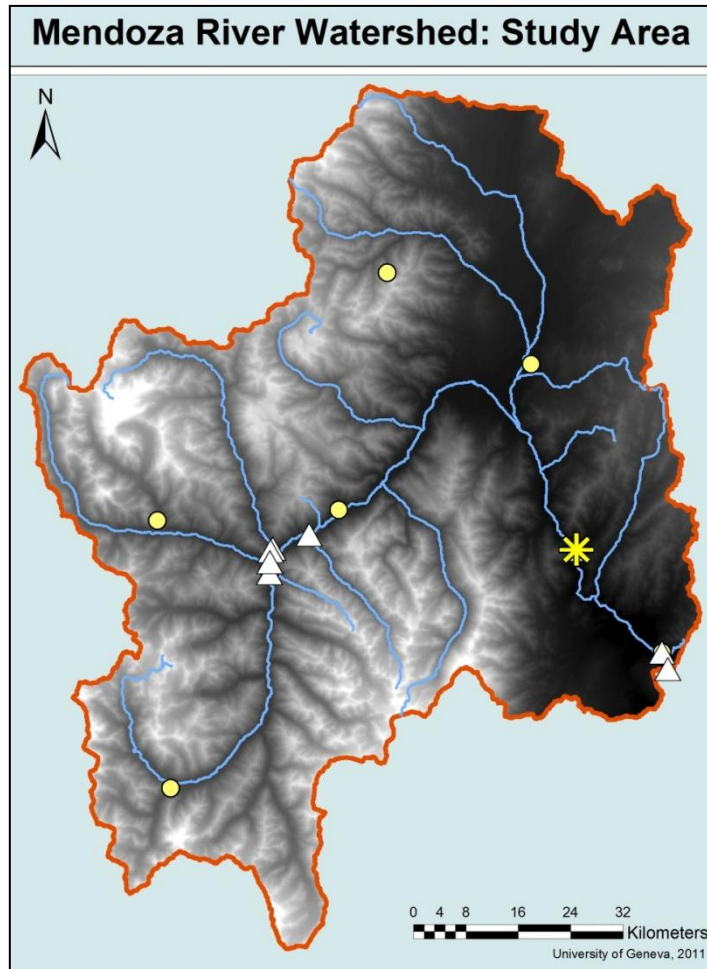
To understand the concepts and data structure of SWAT

To be able to use ArcSWAT interface in ArcGIS 10

To simulate the flow discharge at the outlet of a river basin

To analyze the results of a model

STUDY AREA



Part of M.Sc Thesis project of

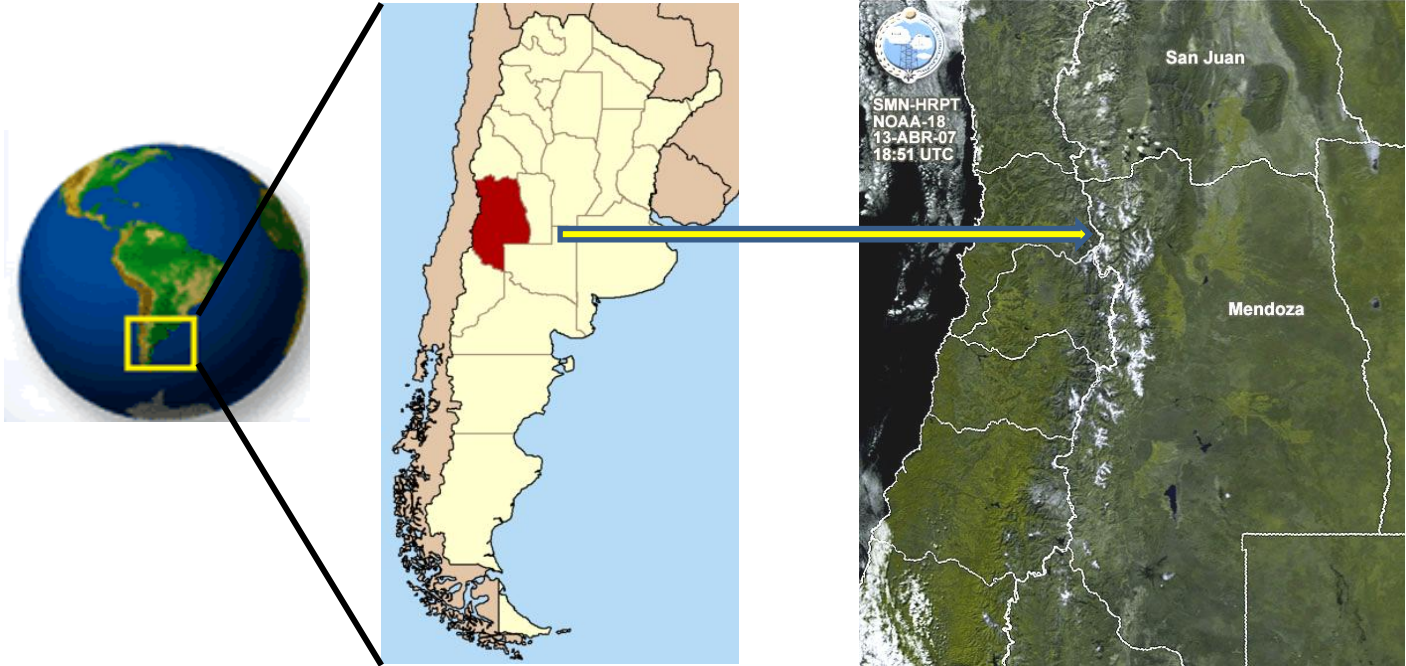
- [1] Rocio Escobar
- [2] Julia Schwank
- [3] Gissela Girón

Under supervision of
Prof. Dr. Anthony Lehmann
EnviroSPACE Lab Unige

Title:
"SWAT modeling as a tool for the
interdisciplinary study of climate change
impacts in the Mendoza River watershed,
Argentina"

Objectives:
Impact assessment of climate change on
Social political aspect
Environmental aspect
Eco hydrological aspect.

STUDY AREA



STUDY AREA HIGHLIGHTS



- [1] Watershed Area: 7000 Km²
- [2] Average Precipitation:
- [3] Maximum Discharge: 150 m³/sec
- [4] Minimum Discharge: 30 m³/sec
- [5] High flow period: Summer Time
- [6] Low flow period: Winter time
- [7] Population : 1738,929
- [8] Agriculture: 1178.62 hm³
- [9] Hydropower:
- [10] Drinking: 196.47 hm³

DATA
REQUIREMENT

GIS data

DEM (topography)

River Geometry

Land use

Soil type

**Measured discharge time series from
1996-2010 at daily time step.**

Weather Data

Precipitation

Temperature (min max)

Wind Speed

Relative Humidity

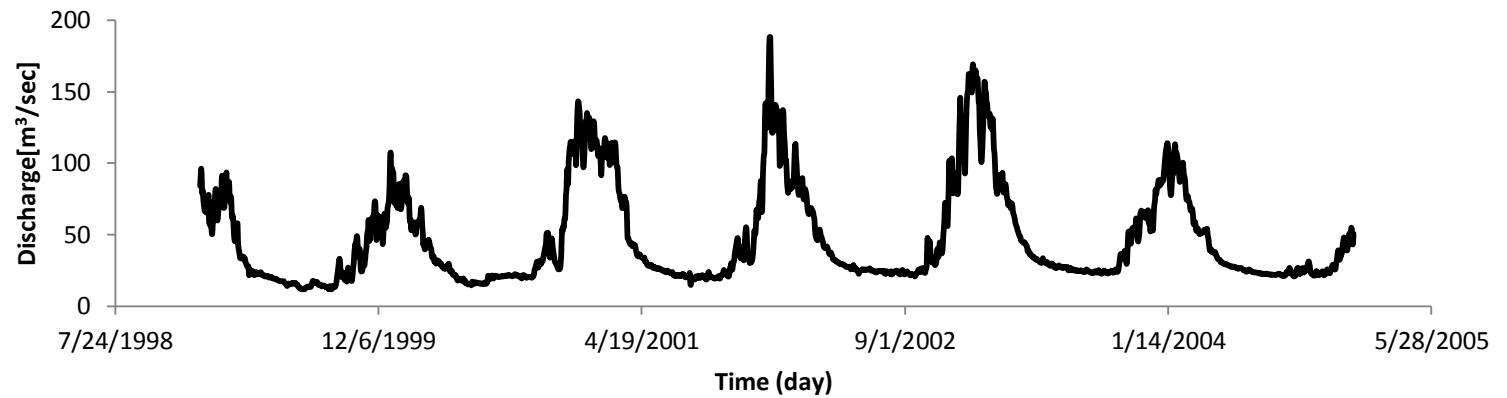
Solar Radiation

DATA SOURCES

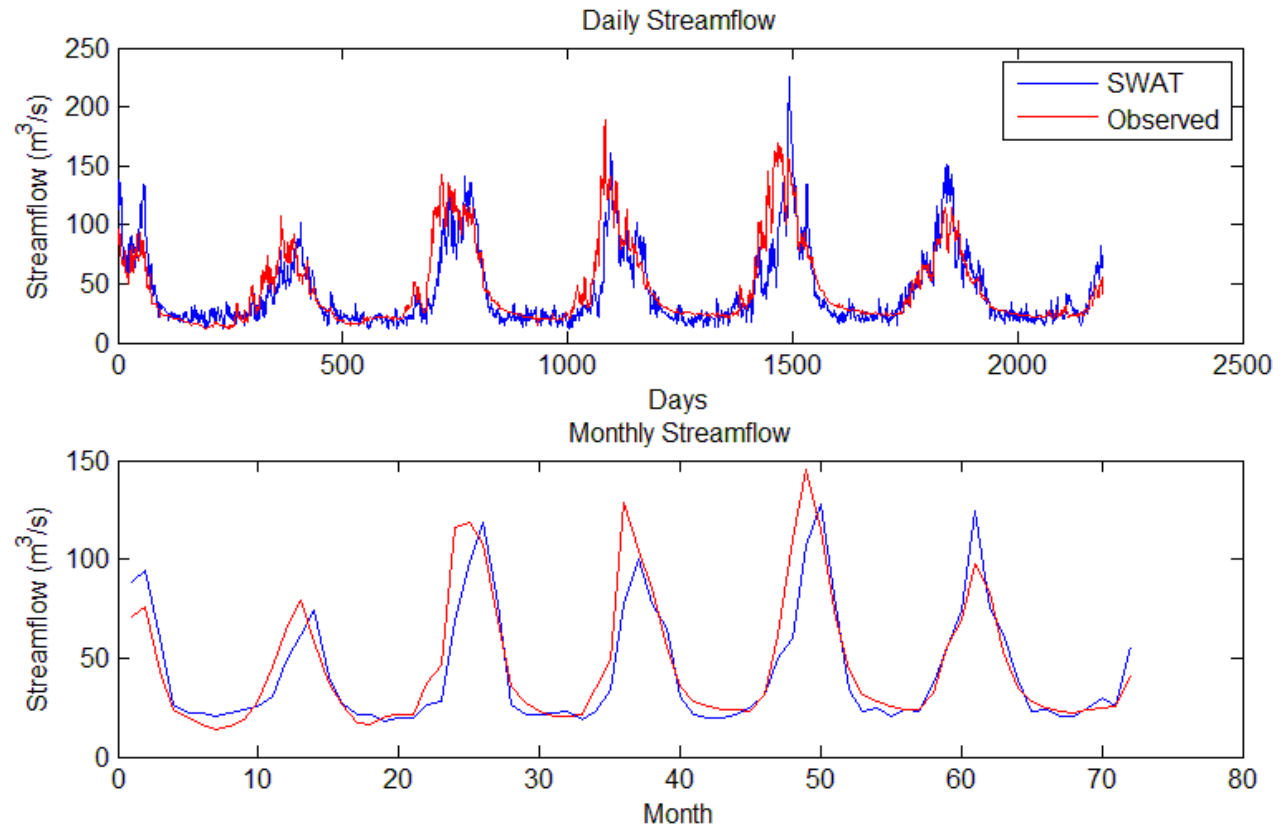
Data	Source
DEM	SRTM –NASA http://srtm.csi.cgiar.org/
River Geometry	HydroSHEDS http://hydrosheds.cr.usgs.gov/
LAND Use	Globe Cover http://landcover.usgs.gov/
Soil	FAO http://www.fao.org/nr/land/soils/en/
Meteorological Data	Water Resources Agency, Arg (SRH)

OBSERVED
DISCHARGE

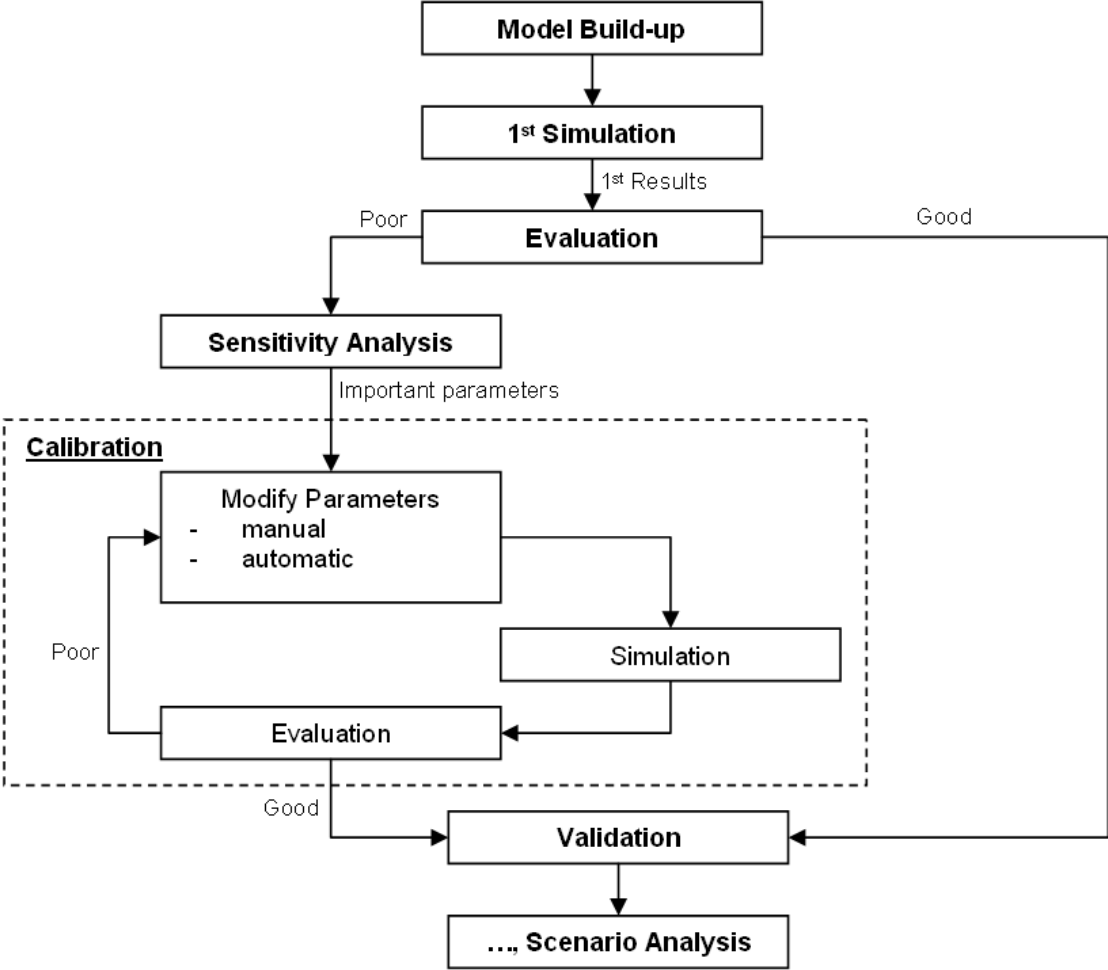
Daily Discharge Hydrograph of Mendoza River watershed.



CALIBRATED DISCHARGE



MODELING
CONCEPT



Sessions Planning

Sessions	Details
Session 1	Introduction-Hydrological modeling-SWAT model
Session 2	Build up a SWAT model (with hands on exercise)
Session 3	Continue with model build up and primary results
Session 4	Result analysis and spatial map preparation
Session 5	Various calibration techniques
Session 6	Extracting geographic data and formatting
Session 7	Extracting climatic data and formatting
Session 8	Recap and idea exchange

NEXT STEPS



Application of genetic algorithm for SWAT calibration
High performance computing application in
Hydrological modeling & Ecological modeling