<u>River geometry parameters for the San Antonio and Guadalupe basins</u>

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The first part of the project is to evaluate advanced Land Surface Models (LSMs) and archived output of the National and Global Land Data Assimilation System (NLDAS & GLDAS). LSMs offer detailed estimates of distributed hydrological fluxes and storages, which are very important for studies of climate and water resources (*Zaitchik et al.*, 2010). NLDAS & GLDAS integrate satellite and ground-based data within multiple offline LMS to produce fields of land surface states and fluxes (*Zaitchik et al.*, 2010; *Rodell et al.*, 2004).

Among the simulation of advanced LSMs we can find the following:

- Noah (Chen et al., 1996; Ek et al., 2003, and Koren et al., 1999),
- The Common Land Model (CLM, Dai et al., 2003),
- The Variable Infiltration Capacity (VIC) model (Liang et al., 1994),
- Mosaic (Koster and Suarez, 1996).

Considering the area of study -the San Antonio and Guadalupe Basin-, the availability of information and the conclusions of Zaitchik et al., 2010, for this term project the 0.125 Degree Hourly Noah Model Data has been chosen. The Noah LSM is a one dimensional, free standing column model that can be run in uncoupled mode or can be coupled with atmospheric models, and simulates skin temperature, soil temperature and moisture (liquid and frozen) for all soil layers (four in this application), snow depth, snow water equivalent, canopy water content, and surface energy and water fluxes (*Zaitchik et al.*, 2010).

Considering that there is output of the Noah simulations beginning in 1979 to the present, a code in python programming language has been developed to collect all the data from the NASA site. This code allows us to download the data and convert it to raster files, which can be seen later in ArcGIS.

Once we have collected all the information (output from LSMs), we incorporate this information with the river geometry for the different streams in the San Antonio and Guadalupe Basin and run it with the SPRINT model.

The predictions/simulations that are created can be compared with the National Hydrography Dataset PLUS (NHDPlus) or with the information at gauges in the study area from the USGS

STUDY AREA

Guadalupe

San Antonio

San Antonio-Nueces

Legend

- Guada_SanAnt_Basins
- SanAnt_Nueces_Basin
- Guadalupe_HUC
- SanAnton_HUC