

Water Resources in Region II of Chile

Overview of Study

This study aims to characterize potential water resources in the arid territories of Ollague, Calama, and San Pedro de Atacama, located in Region II of northern Chile.

Initial steps for the project involve data collection for a rural area that does not currently have a centralized database fully compatible with ArcGIS functions. The ultimate goal of this project is to obtain and organize data in a simple, understandable manner for Region II of Chile. After completion of the project data will hopefully be published on CUAHSI HIS database so that anyone can obtain and use the data to investigate the region's water resources. Results will also be posted on ArcGIS online.

Disclaimer: I realize that publication of data will involve active discussion with data providers to convince them (or to allow me) to publish their data on a public domain...I will try my hardest to fulfill this idea.

After collection of data I will perform terrain analysis of hydrologic surface features and attempt to delineate the watersheds in Region II. An investigation of groundwater sources throughout the region will be performed as well. I will also study surface-groundwater interactions by linking relationships between the surface water and groundwater data collected (identification of recharge zones).

Thus far, a map of the region along with surface water features has been obtained (as shown below). Groundwater information has been requested. However, the search for a DEM has been difficult. A **DEM** of the region is **required** for spatial analysis and watershed delineation of the study area to allow for an investigation of the regions hydrology.

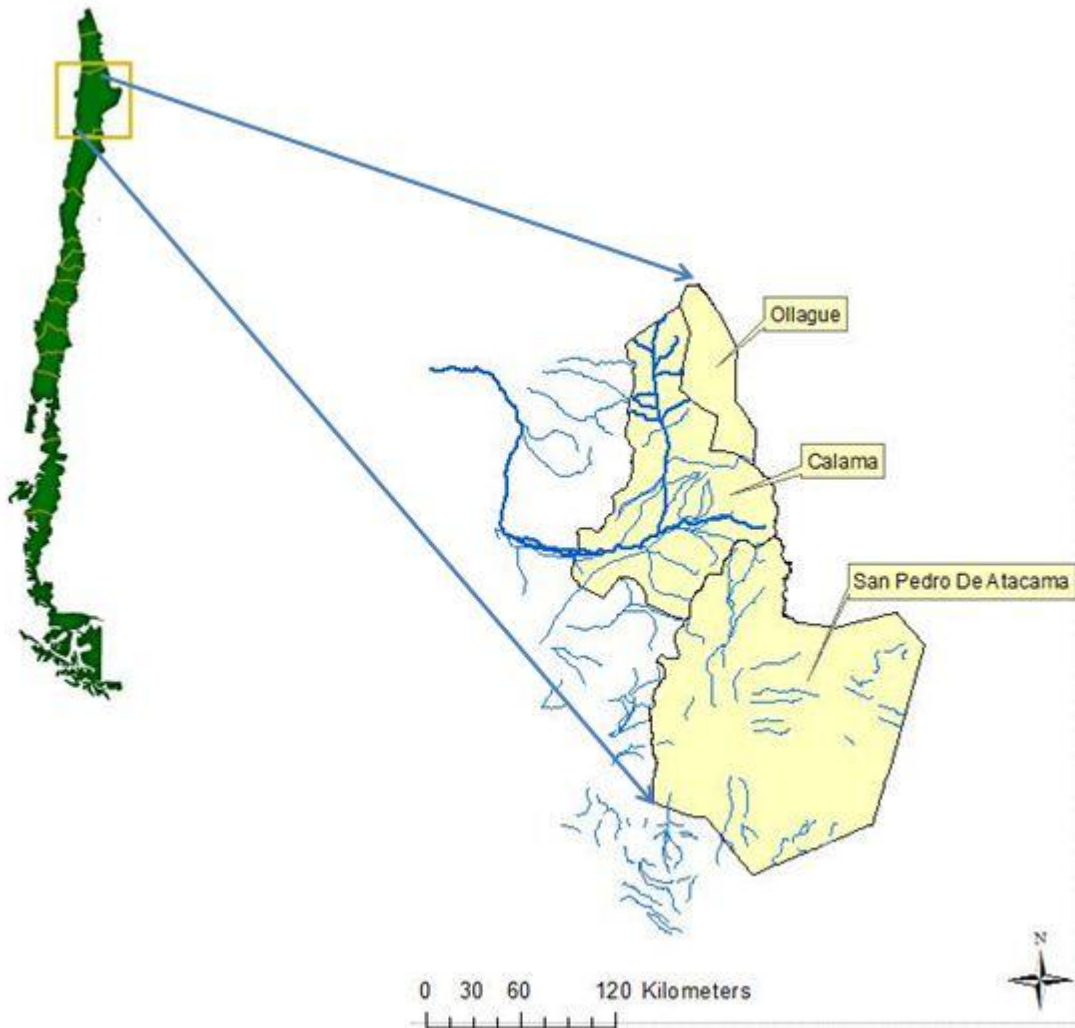
As time Allows (Other Project Ideas that I may develop)

Climatic information will be displayed across the study area: including precipitation, potential evapotranspiration, and the calculated aridity index (precipitation/ET). Time-lapse information of climatic values and mean annual flow of streams will be used to determine how the periodicity of flow in the non-perennial streams correlate with climatic inputs and outputs.

Dams and aqueducts throughout the region will be displayed on the map so as to investigate the usefulness of such systems (discharge values). Hopefully, the results from this study aid in planning for future construction of dams and/or canals throughout this water-limited region while taking into account preserved indigenous areas.

Geothermal energy is an alternative energy resource throughout the region as a result of many active volcanoes. The Chilean Government and foreign private companies (primarily from Italy) have mined for geothermal energy throughout the area. However, many indigenous communities complain that the mining affects their water resources. I would like to determine if water quantity and quality is affected by these mining operations.

Region of Investigation



Collected Data

- Geology
- Coarse-scaled water surface features as shown in map
- Climatic Data
- Protected Indigenous Areas
- Mining Operations throughout the region

Available Data that has been Requested (primarily from “Dirección General de Aguas”)

- Watersheds and Subwatersheds
- Detailed Shapefile of Surface Water Features (streams/lakes)
- MAF of Streams

- Water Quality Data
- Climatic Information: Precipitation, Evapotranspiration
- Groundwater related information (aquifers, wells)
- Aqueducts and Dams throughout the region

Current Data Issues

Currently I only have contours of elevation, but this seems worthless unless I am able to convert this into a DEM grid. DEM data is hard to come by for the region. I feel as though the military might be my only hope...I have data from "Aster" with 30m DEM's of the area, but they do not seem completely reliable datasets.