TEMPORAL VARIATIONS IN THE HYDROLOGICAL CONDITONS OF ERGENE BASIN

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INTRODUCTION

Ergene Basin is an important water resource of Turkey because of large-scale agricultural activities in the basin. The groundwater resource of the basin has been diminishing due to many years for irrigation and industrial activities.

The aim of this study is to investigate water balance parameters (precipitation, evapotranspiration, etc.) between 1980-2010 in selected sub-basins using spatial data analysis tools. The climate change is also expected to have an impact on the water budget of the basin. By using water budget method, evapotranspiration of the basin has been calculated.

MATERIALS AND METHODS

Water Budget Method

Water budget method is a hydrological method for calculating the amount of water flowing into and out of a system.

$$ET = P - Q - \Delta S$$

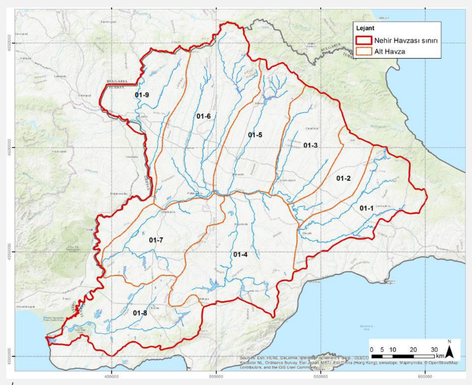
Where,
ET = evapotranspiration
P = precipitation
Q = stream runoff
ΔS = change in the storage

Softwares

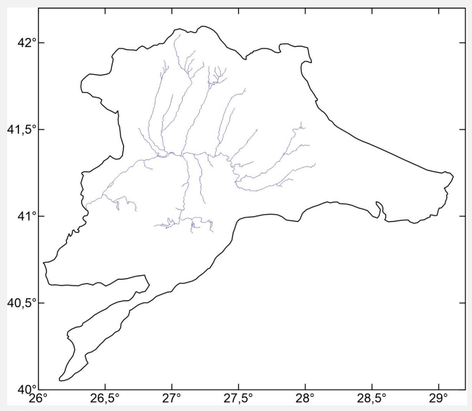
Surfer

Google Earth Pro

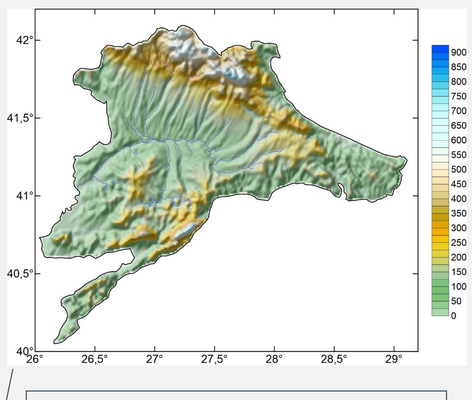
Map Visualization



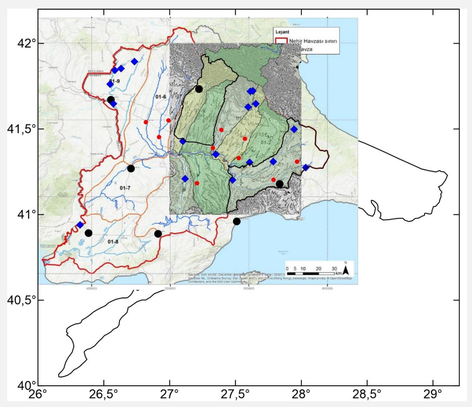
Reference map for streams and area seperation.



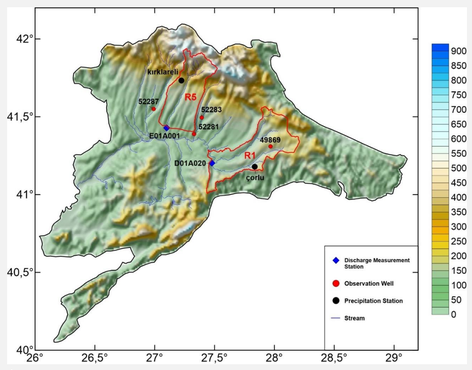
Stream lines are drawn with the help of the refence map.



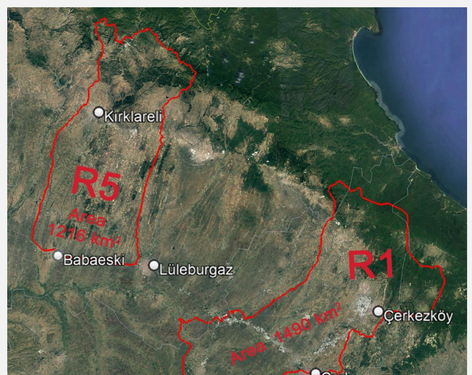
Altitude map and stream map are combined for better visualization.



Each station was placed on the map. Then regions with consistent variables were chosen.



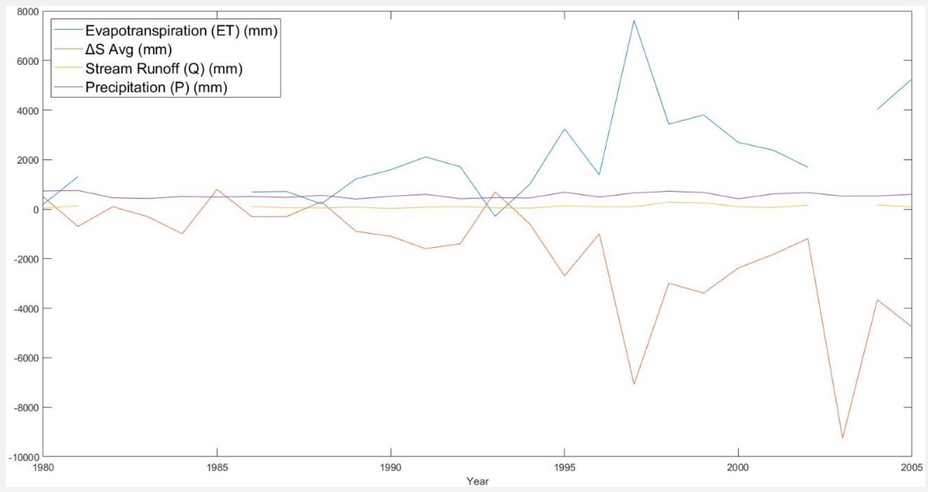
Border of the region 1 and 5 were determined. Each region's related stations were placed. Index map was completed.



Borders were used to calculate area of each region on Google Earth Pro.

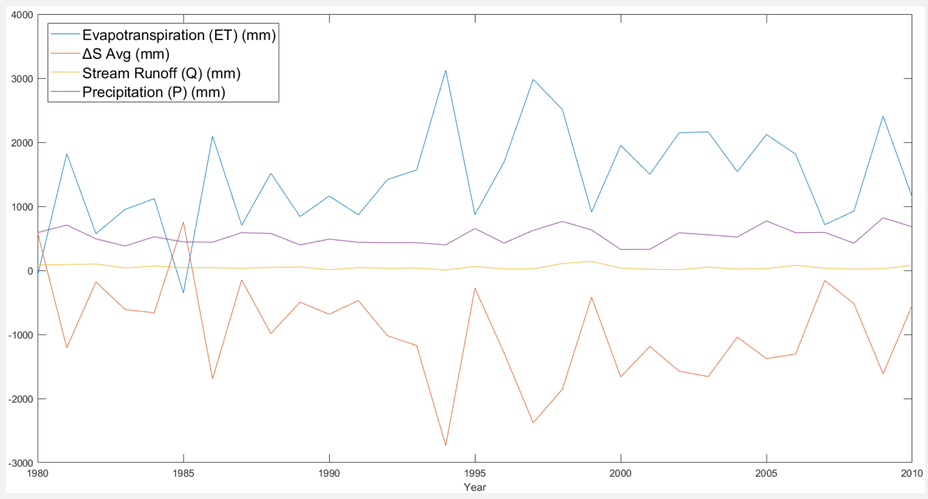
RESULTS

Region 1



	Pearson Correlation Coefficient (r)	
ET - P	0,318	Low Correlation
ET - Q	0,418	Low Correlation
ET - ΔS	-0,999	High Anti-correlated
P - Q	0,457	Low Correlation
P - ΔS	-0,276	Low Anti-correlated
Q - ΔS	-0,428	Low Anti-correlated

Region 5



	Pearson Correlation Coefficient (r)	
ET - P	-0,068	Low Anti-correlated
ET - Q	-0,406	Low Anti-correlated
ET - ΔS	-0,994	High Anti-correlated
P - Q	0,289	Low Correlated
P - ΔS	0,169	Low Correlated
Q - ΔS	0,399	Low Correlated

CONCLUSION

As shown in the tables, region 1-5 have 2 common and 4 different correlations. Each region have their own characteristics. Missing runoff values are present in region 1. That can lead to inaccurate results for region 1.

To show diffences and similiarities between regions, conditions of each region listed below;

Region 1

- Increasing Industrial activities might cause drastic change because industries use large amount of ground water.
- Increasing agricultural activities tend to increase the ground water usage for irrigation.
- There are missing data for 5 different year and data range is between 1980 to 2005. So unstable data may effect the results .

Region 5

- Increasing agricultural activities tend to increase the ground water usage for irrigation.
- Data range is between 1980 to 2010 and the data are complete. So data of region 5 is stable compared to data of region 1 .