2014 International SWAT Conference & Workshops

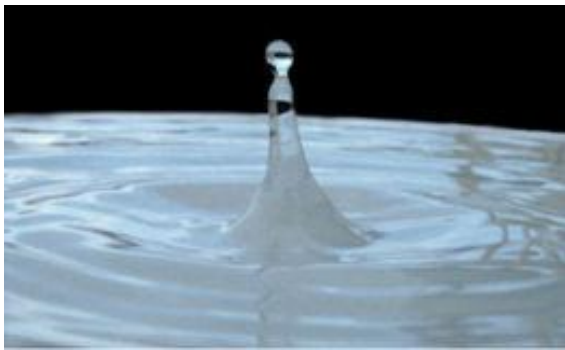
Analysis of the São Lourenço Watershed in Matão-SP using SWAT

Matheus Felipe Oliveira

Edson Baldan Junior

Alex Luiz Sagula

Teresa Cristina Pissarra



Introduction

The morphometric characterization of watershed allows a more practical way to understand the dynamics, thus facilitating the hydrological and environmental analysis, with the aid of Geographic Information Systems.

Introduction

The availability of Geographic Information Systems (GIS) software (e.g., ESRI ArcGIS®) and corresponding GIS data provides a relatively new tool for evaluating surface-water flows.

The connectivity of surface water and groundwater suggests that the watershed is a logical spatial unit for such analyses [1].

- Use of GIS technology for understanding watershed systems has provided environmental managers with additional methods for targeting limited resources and identifying potential problem areas [2].

Objective

to analyze the soil, slope and morphometric characteristics of the watershed and subbasins to define better management practices

MATERIAL AND METHODS

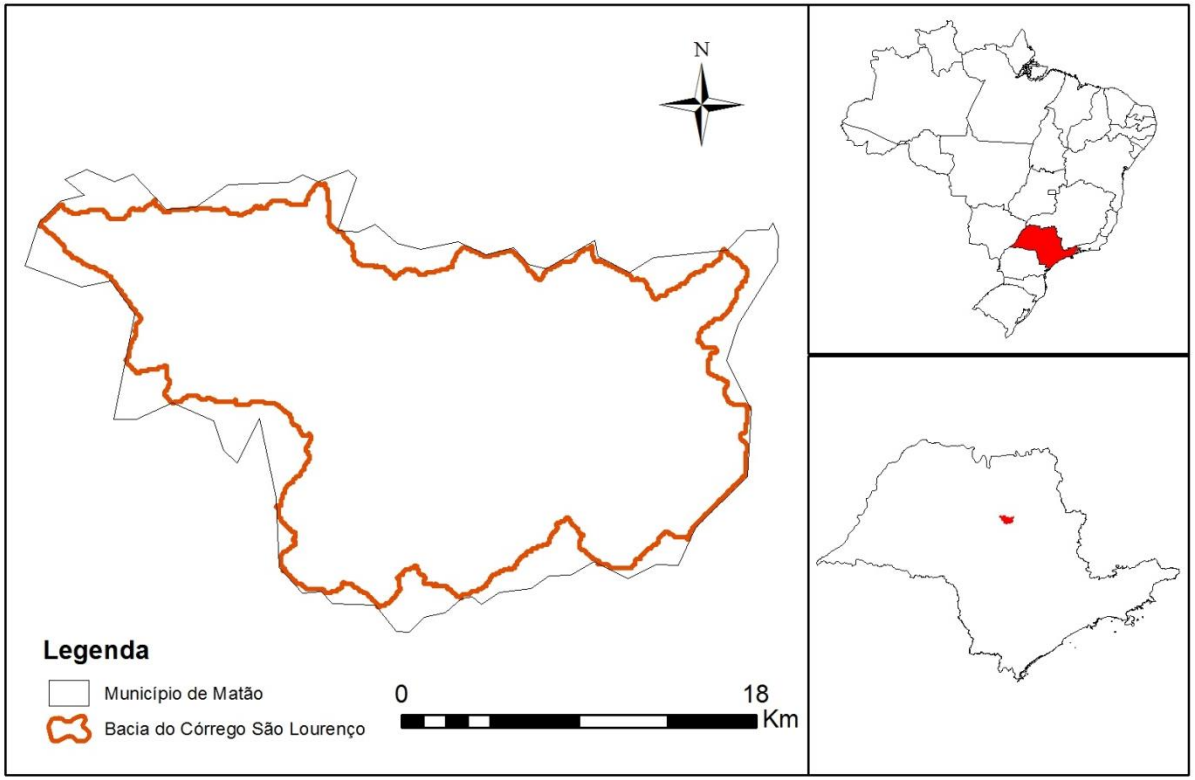
The study area includes the watershed of the São Lourenço River, Matão County, SP

UTM

7607946.5m N e

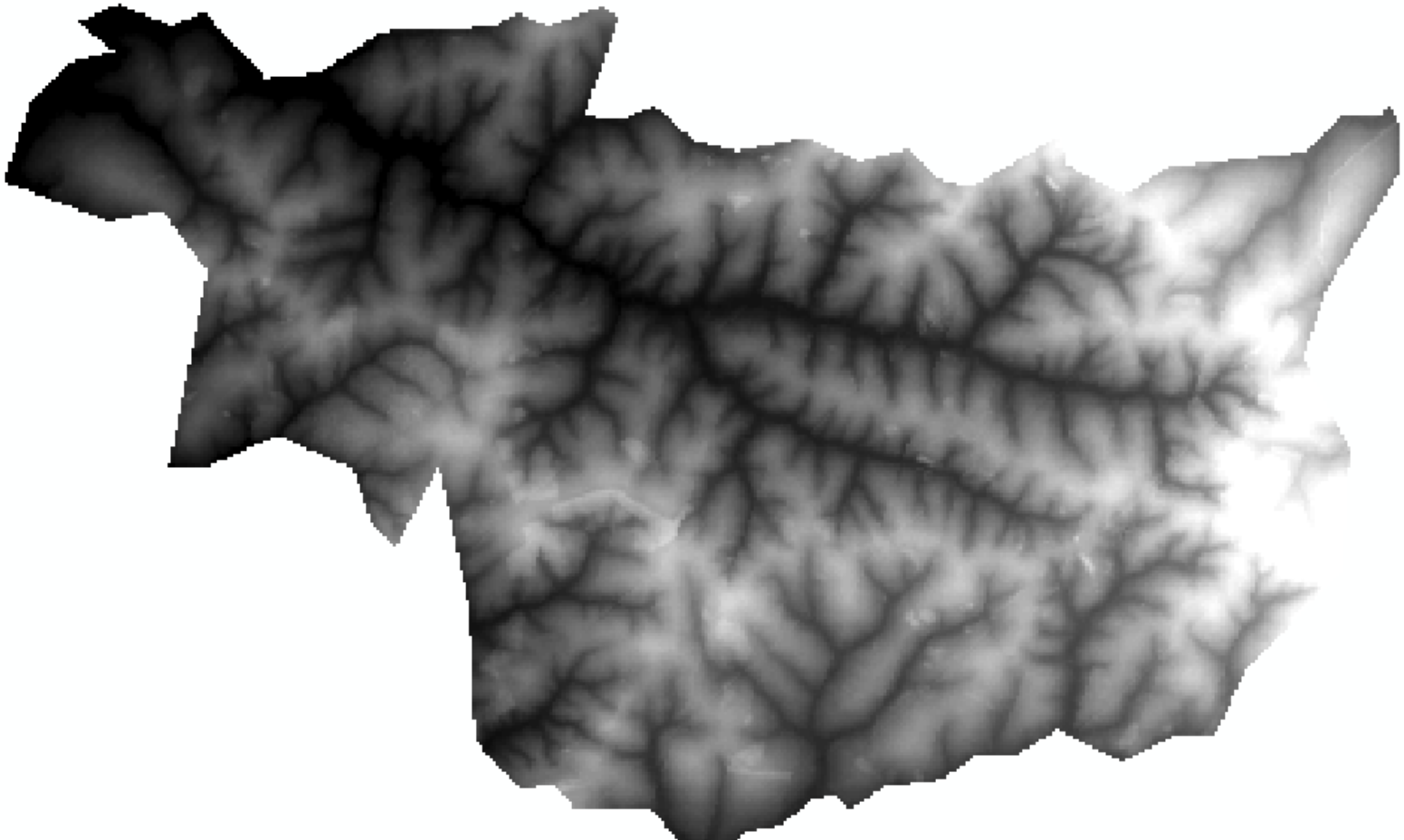
766402,6m E

Area: 43126,42 ha



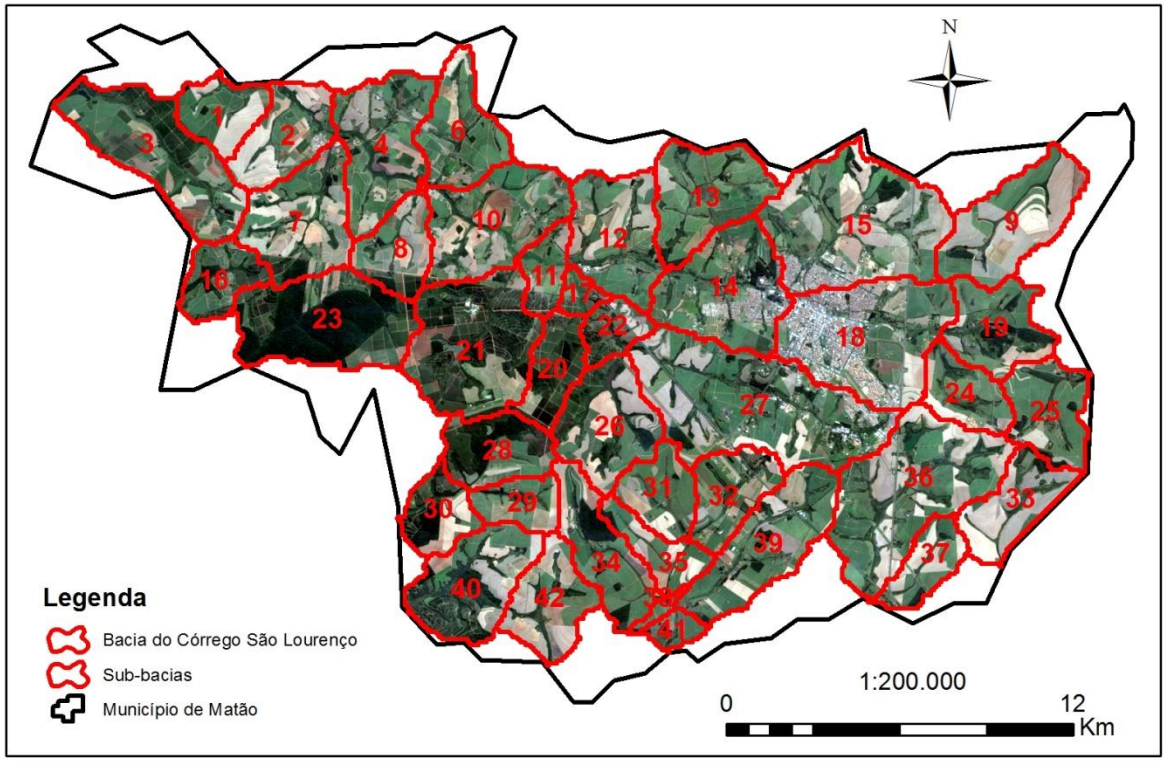
Material

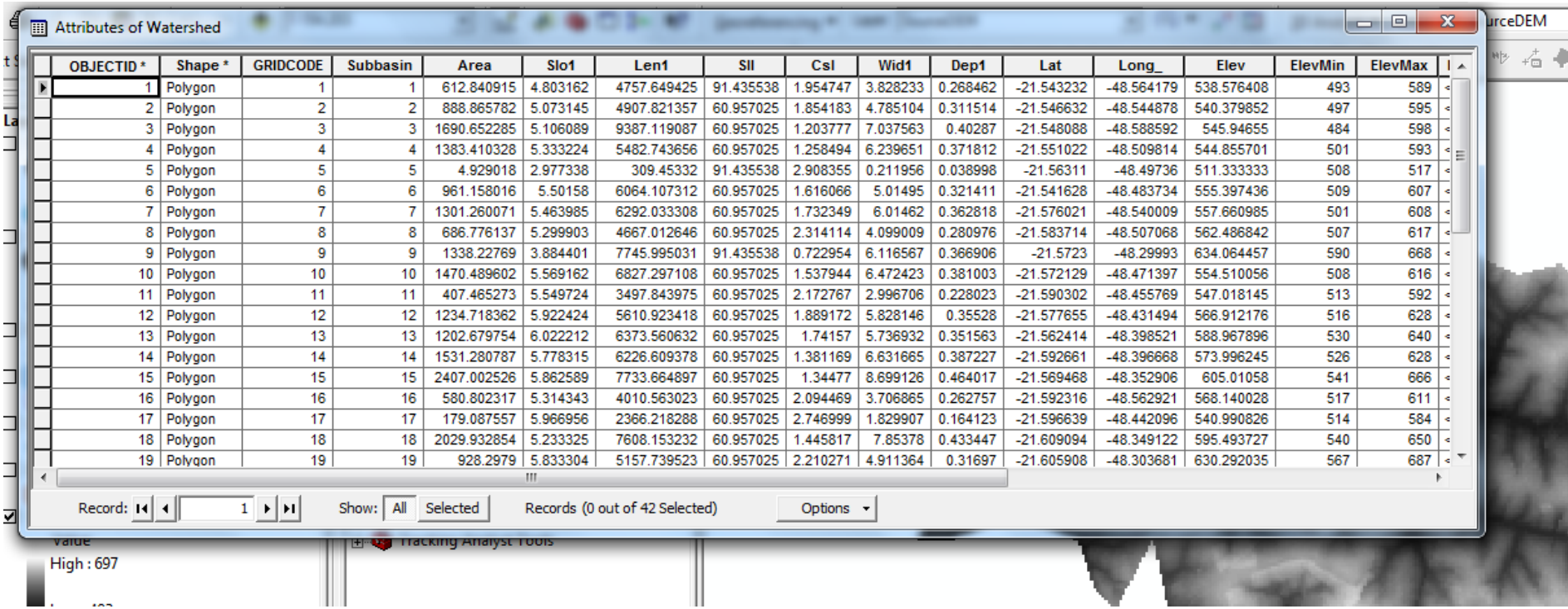
Digital Elevation Model (DEM)



- The original DEM SRTM was interpolated to 20 meters of spatial resolution using a *spline* filter and the projection coordinate system was converted to Córrego Alegre (the same projection used in the shape of drainage network edited manually).

- Image of SF-22 - XD map provided by EMBRAPA (MIRANDA, 2005).





Attributes of Watershed

OBJECTID *	Shape *	GRIDCODE	Subbasin	Area	Slo1	Len1	Sll	Csl	Wid1	Dep1	Lat	Long_	Elev	ElevMin	ElevMax
1	Polygon	1	1	612.840915	4.803162	4757.649425	91.435538	1.954747	3.828233	0.268462	-21.543232	-48.564179	538.576408	493	589
2	Polygon	2	2	888.865782	5.073145	4907.821357	60.957025	1.854183	4.785104	0.311514	-21.546632	-48.544878	540.379852	497	595
3	Polygon	3	3	1690.652285	5.106089	9387.119087	60.957025	1.203777	7.037563	0.40287	-21.548088	-48.588592	545.94655	484	598
4	Polygon	4	4	1383.410328	5.333224	5482.743656	60.957025	1.258494	6.239651	0.371812	-21.551022	-48.509814	544.855701	501	593
5	Polygon	5	5	4.929018	2.977338	309.45332	91.435538	2.908355	0.211956	0.038998	-21.56311	-48.49736	511.333333	508	517
6	Polygon	6	6	961.158016	5.50158	6064.107312	60.957025	1.616066	5.01495	0.321411	-21.541628	-48.483734	555.397436	509	607
7	Polygon	7	7	1301.260071	5.463985	6292.033308	60.957025	1.732349	6.01462	0.362818	-21.576021	-48.540009	557.660985	501	608
8	Polygon	8	8	686.776137	5.299903	4667.012646	60.957025	2.314114	4.099009	0.280976	-21.583714	-48.507068	562.486842	507	617
9	Polygon	9	9	1338.22769	3.884401	7745.995031	91.435538	0.722954	6.116567	0.366906	-21.5723	-48.29993	634.064457	590	668
10	Polygon	10	10	1470.489602	5.569162	6827.297108	60.957025	1.537944	6.472423	0.381003	-21.572129	-48.471397	554.510056	508	616
11	Polygon	11	11	407.465273	5.549724	3497.843975	60.957025	2.172767	2.996706	0.228023	-21.590302	-48.455769	547.018145	513	592
12	Polygon	12	12	1234.718362	5.922424	5610.923418	60.957025	1.889172	5.828146	0.35528	-21.577655	-48.431494	566.912176	516	628
13	Polygon	13	13	1202.679754	6.022212	6373.560632	60.957025	1.74157	5.736932	0.351563	-21.562414	-48.398521	588.967896	530	640
14	Polygon	14	14	1531.280787	5.778315	6226.609378	60.957025	1.381169	6.631665	0.387227	-21.592661	-48.396668	573.996245	526	628
15	Polygon	15	15	2407.002526	5.862589	7733.664897	60.957025	1.34477	8.699126	0.464017	-21.569468	-48.352906	605.01058	541	666
16	Polygon	16	16	580.802317	5.314343	4010.563023	60.957025	2.094469	3.706865	0.262757	-21.592316	-48.562921	568.140028	517	611
17	Polygon	17	17	179.087557	5.966956	2366.218288	60.957025	2.746999	1.829907	0.164123	-21.596639	-48.442096	540.990826	514	584
18	Polygon	18	18	2029.932854	5.233325	7608.153232	60.957025	1.445817	7.85378	0.433447	-21.609094	-48.349122	595.493727	540	650
19	Polygon	19	19	928.2979	5.833304	5157.739523	60.957025	2.210271	4.911364	0.31697	-21.605908	-48.303681	630.292035	567	687

Record: 1 Show: All Selected Records (0 out of 42 Selected) Options

High : 697

- Discharge Calculation

Resultados

Precipitação anual média (mm):	1336,2
Região hidrológica:	M
Região hidrológica (parâmetro C):	Z
Latitude:	21° 36' 41''
Longitude:	48° 25' 36''
Norte (m):	7607946,500
Este (m):	766402,600

Recalcular

Resultado 1: Vazão média de longo termo

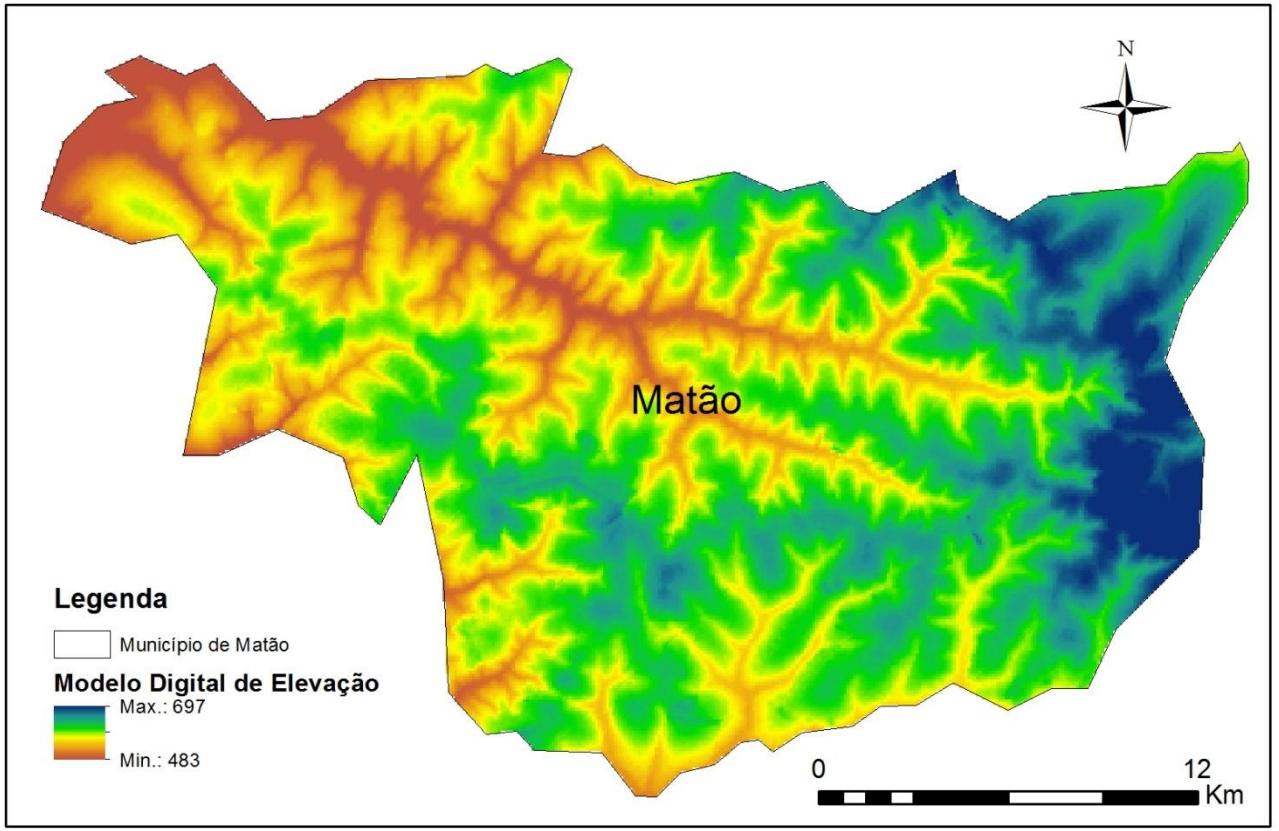
Vazão média plurianual (m^3/s):	0,059

Resultado 2: Curva de Permanência

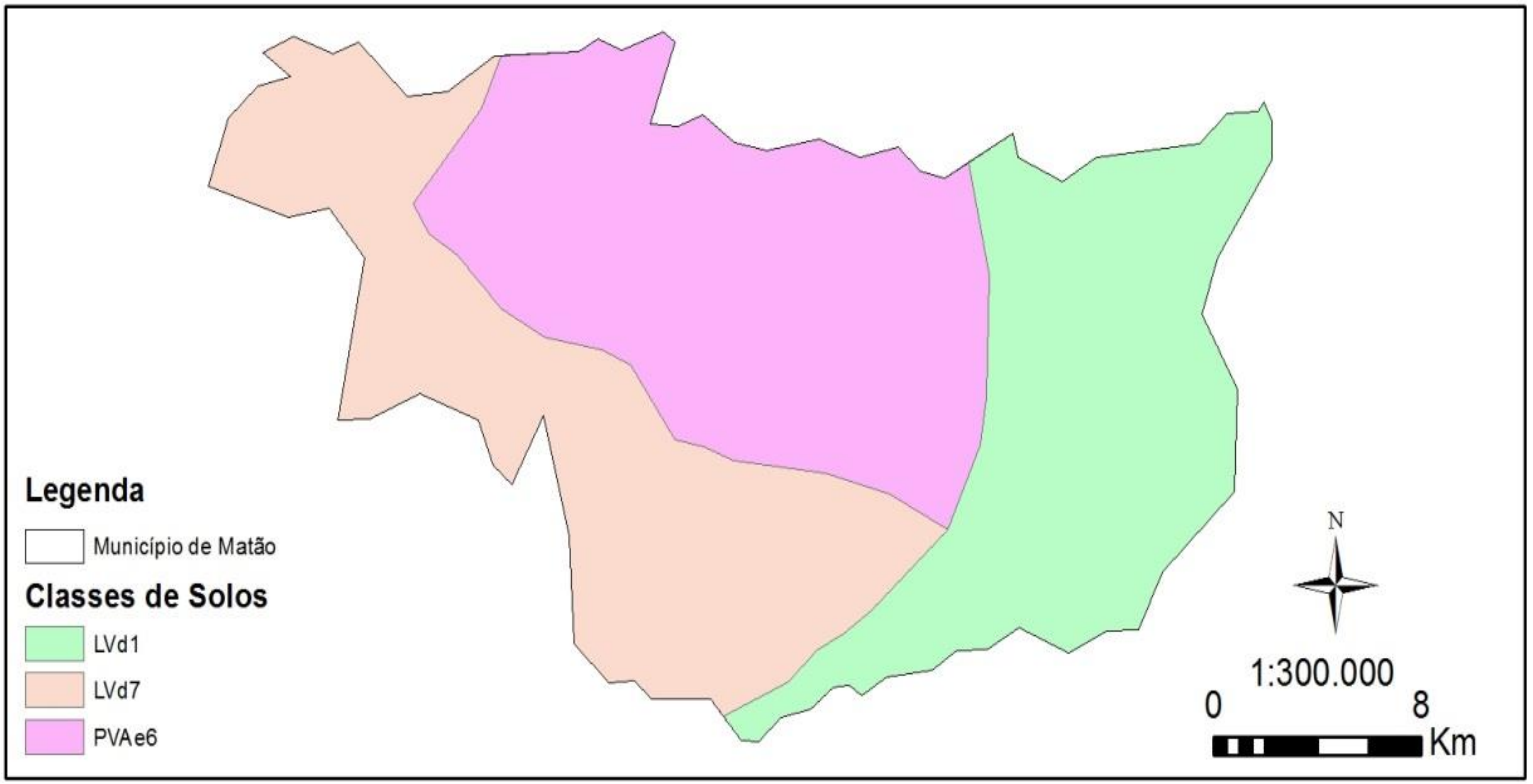
Vazão para "P (%)" de permanência (m^3/s):

P (%)	5	10	15	20	25	30	40	50	60	70	75	80	85	90	95	100
Q (m^3/s)	0,117	0,099	0,087	0,077	0,070	0,065	0,057	0,052	0,047	0,042	0,040	0,038	0,036	0,034	0,031	0,025

- Slope


N
Matão
Legenda
Município de Matão
Modelo Digital de Elevação
Max.: 697
Min.: 483
0
12
Km

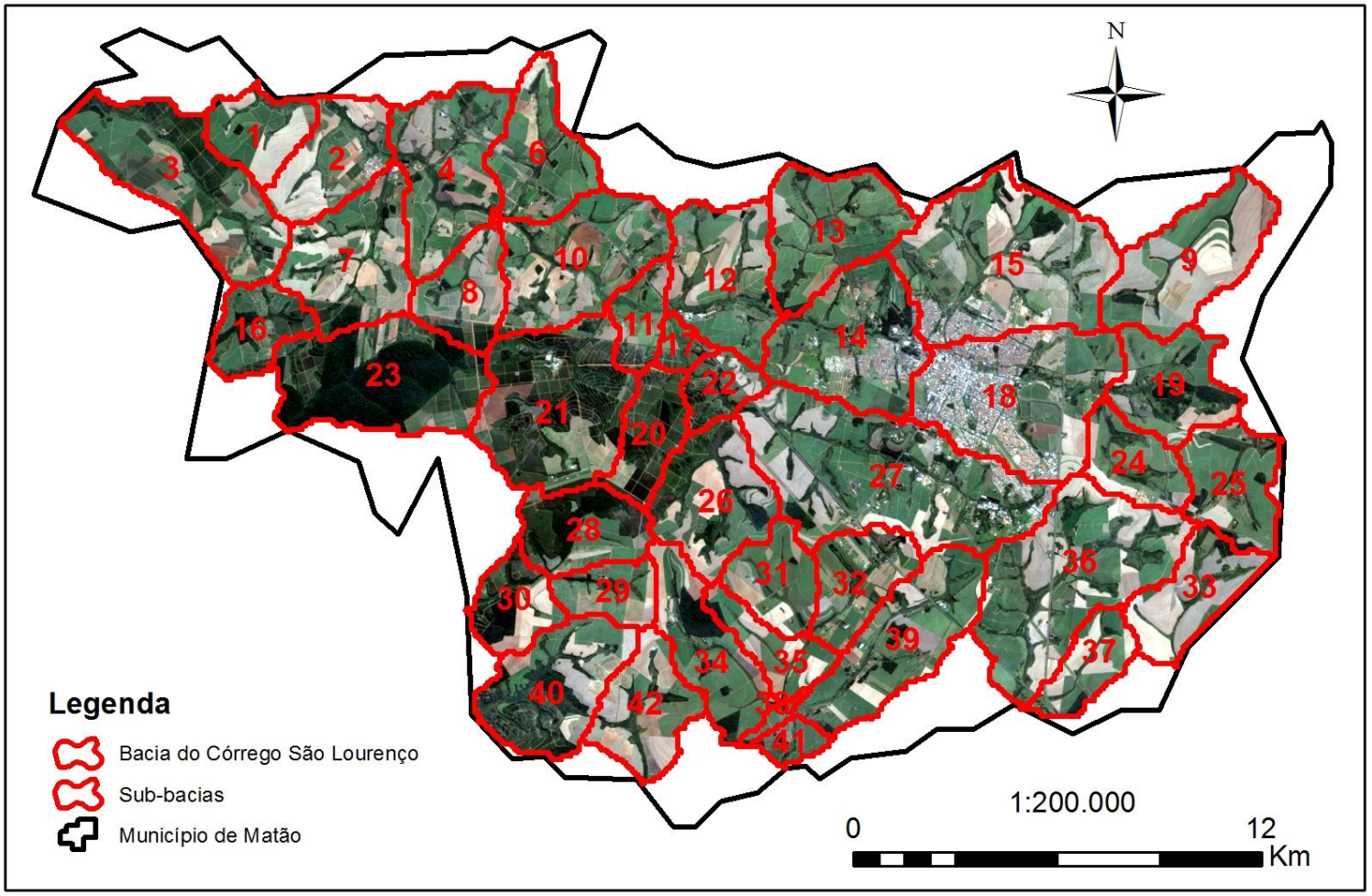
Soil


Legenda
Município de Matão
Classes de Solos
LVd1
LVd7
PVAe6
N
1:300.000
0
8
Km

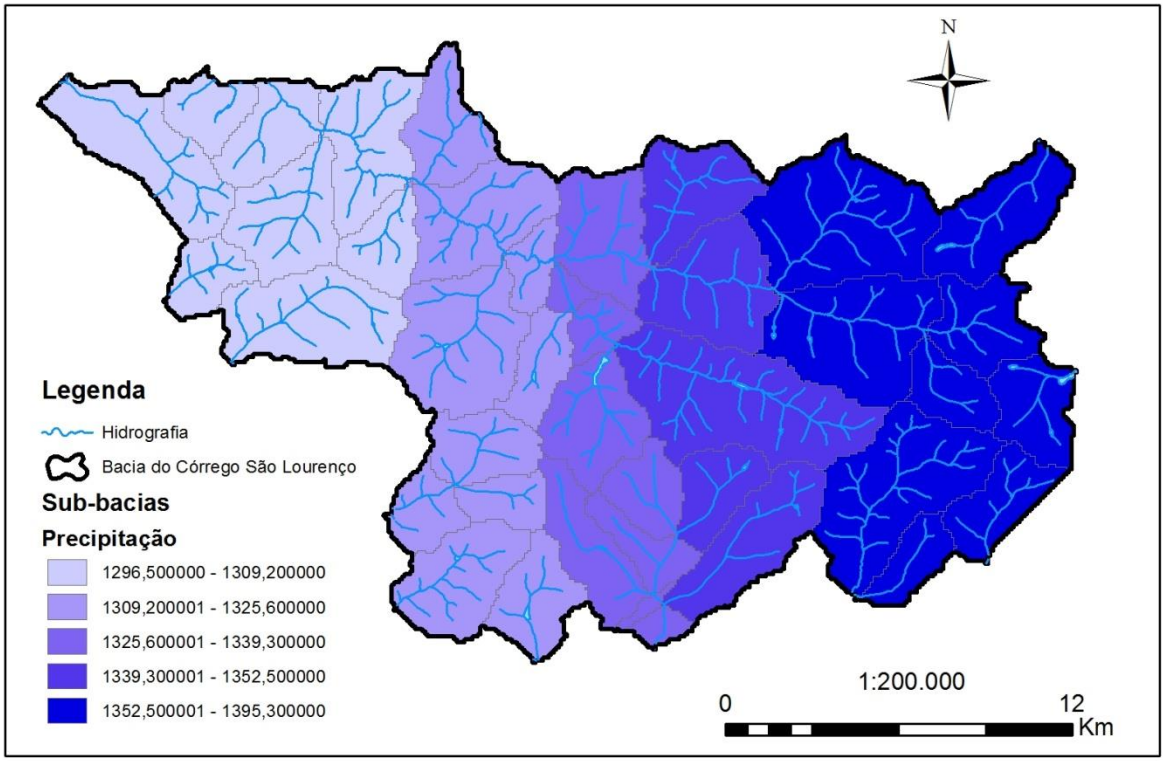
- The watershed modeling tool selected for identifying the stream network was the Soil and Water Assessment (SWAT) model [4].

- SWAT (more specifically ArcSWAT, which is the ArcGIS® interface version of SWAT) identifies streams using a DEM and the ArcMap Spatial Analyst® extension. For this application, a 50 ha threshold value was used without modification of outlets or stream burning (Di Luzio, 2002).

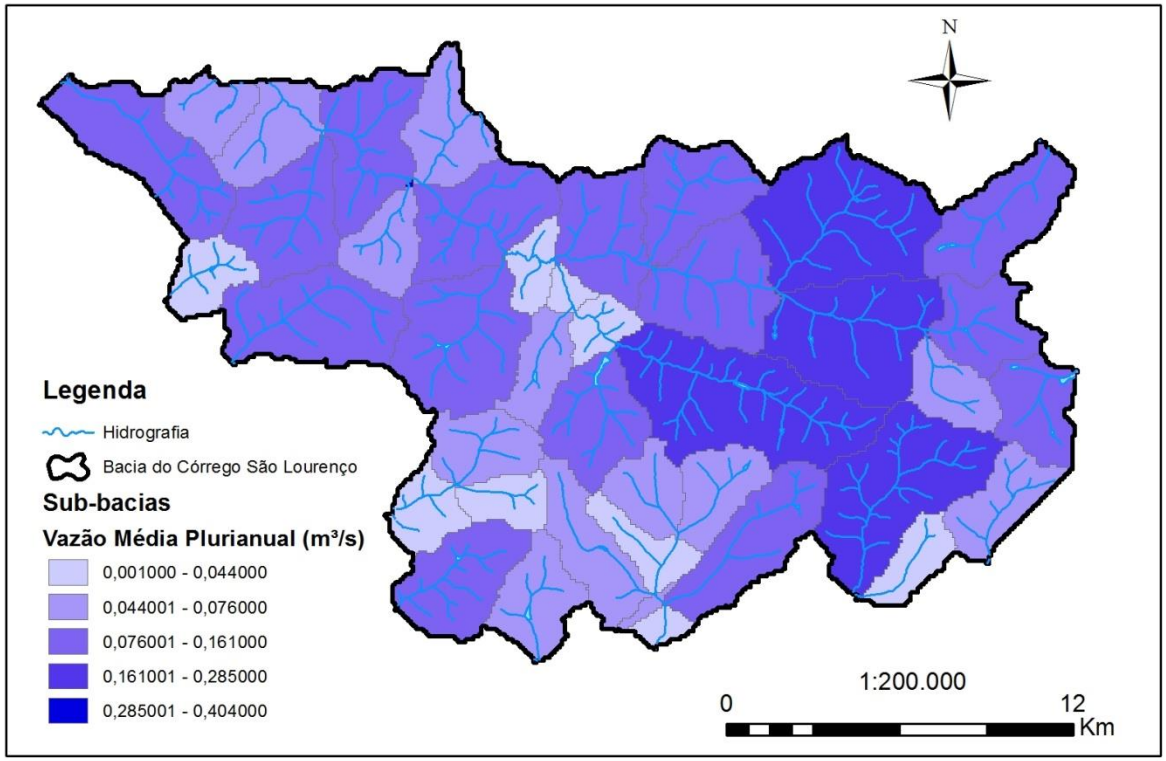
RESULTS AND DISCUSSION



RESULTS AND DISCUSSION



RESULTS AND DISCUSSION



RESULTS AND DISCUSSION

- The model results has showed a satisfactory agreement between precipitation and flow water

- The SWAT model has helped the analyses of the watershed for better understanding the environmental processes

References

- IBGE. Instituto Brasileiro de Geografia e Estatística. **Malha Geométrica dos Municípios de São Paulo** em 2010. Disponível em: <http://dados.gov.br/dataset/malha-geometrica-dos-municipios-brasileiros/resource/93e3e2f0-e9fd-4cc1-af06-0046af19736f> Acesso: 21 abr. 2014.
- MIRANDA, E. E. de; (Coord.). **Brasil em Relevo**. Campinas: Embrapa Monitoramento por Satélite, 2005. Disponível em: <http://www.relevobr.cnpm.embrapa.br>. Acesso em: 21 abr. 2014;
- NEITSCH, S.L.; ARNOLD, J.G.; KINIRY, J.R. & WILLIAMS, J.R. **Soil and water assessment tool: Theoretical documentation - version 2005**. Grassland, Soil and Water Research Laboratory - Agricultural Research Service; Blackland Research Center - Texas Agricultural Experiment Station, 2005. 494p.

Thank you!