EVALUATE THE PERFORMANCE OF THE HYDROLOGICAL MODEL OF LARGE BASIN IN SIMULATE RUNOFF IN THE WATERSHED TAPAJOS'S RIVER FROM OF ETA ATMOSFERIC MODEL

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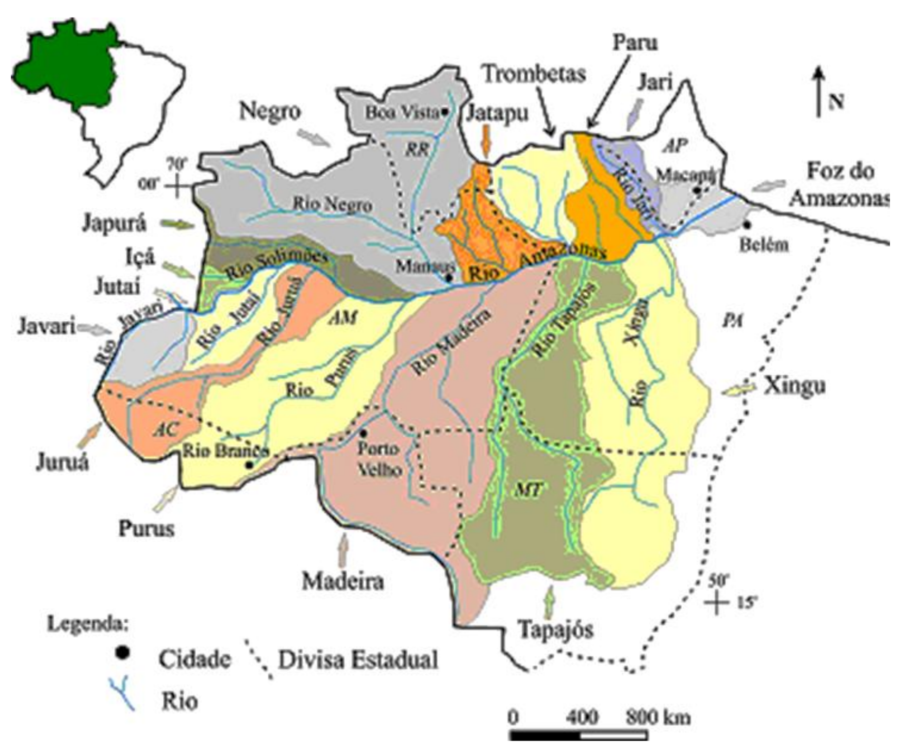
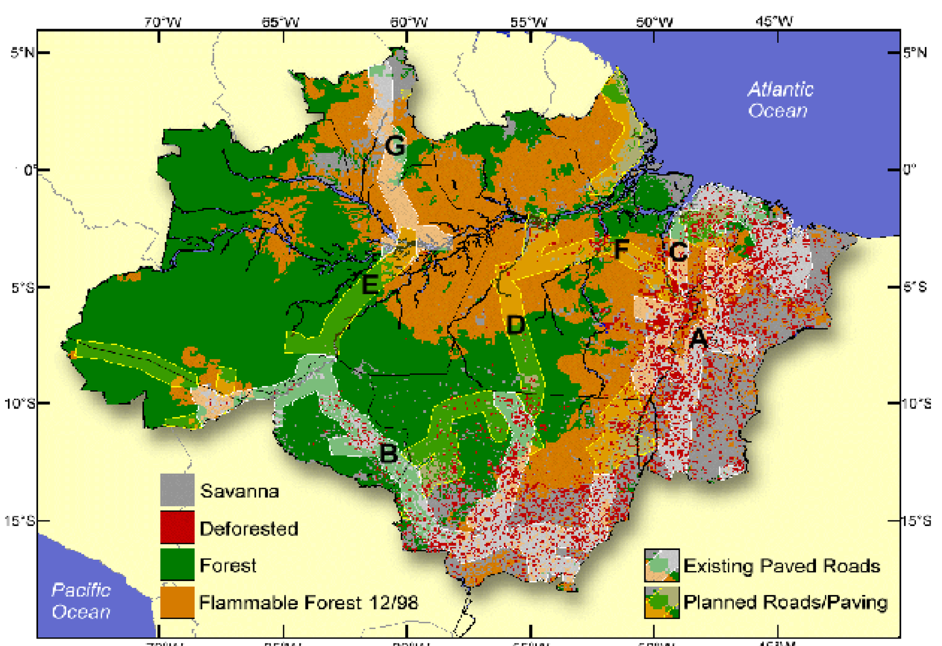
INTRODUCTION

Reserve of greatest biodiversity in the world, the Amazon is also the largest Brazilian biome in extent and occupies almost half the national territory with approximately 6.5 million square kilometers. It is home to the largest river system on the planet.

Extreme events in this region may occur more frequently if considered future climate scenarios with increased emissions of greenhouse gases that will result in serious problems. The Amazon is vulnerable to climate change, both socioeconomically and in terms of its biodiversity (Ambrizzi et al., 2007).





Currently the region with the highest rate of deforestation in the Amazon is called "arc of deforestation". It is a band extending from Maranhão to Rondônia and represents a area of transition between two major Brazilian biomes, the Amazon and the Cerrado.

In this region the main activity that has resulted in deforestation has been the construction and road paving (Nepstad et al., 2001; Soares-Filho et al., 2004; Fearnside, 2005; Cohen et al., 2007).

The understanding of the ways of how the changes in land use and climate changes affects the hydrology in the watershed is necessary. The correct evaluation of the processes involving the atmosphere-surface interaction is important in formulating water resources management that targets the region's sustainable development (Silva, 2005; Troch et al., 2003).

The aim of this study is to analyze the impacts of changes in land use, resulting from highway construction, and the impacts of climate changes in surface and sub-surface hydrological processes in a watershed of a large scale in the Amazon rainforest. For the analysis will be necessary to apply a kind of distributed hydrological model for large basins.

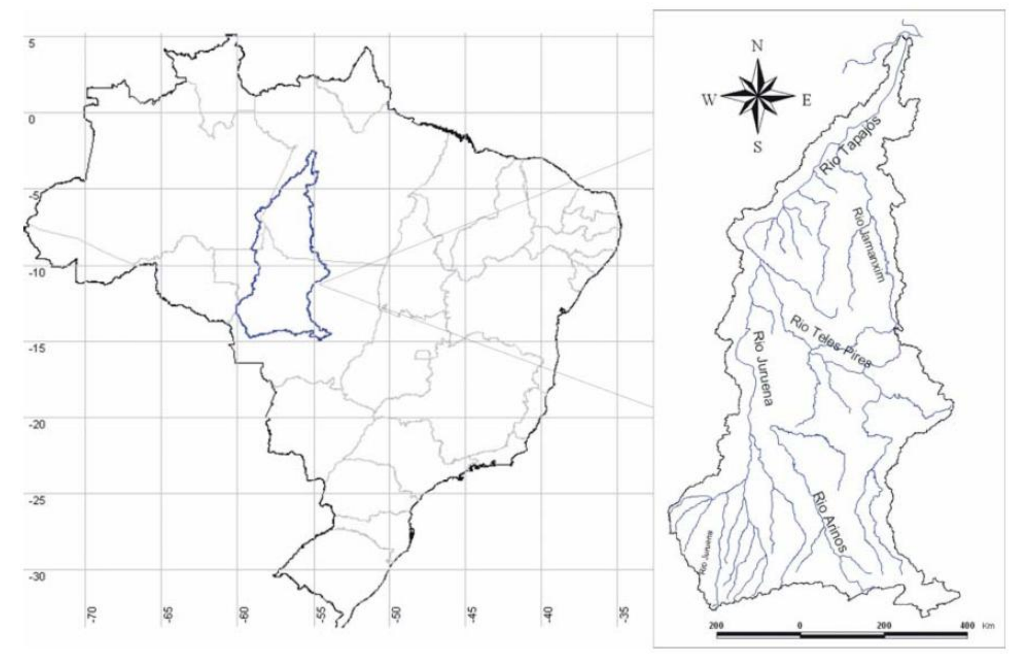
DATA AND METHODOLOGY

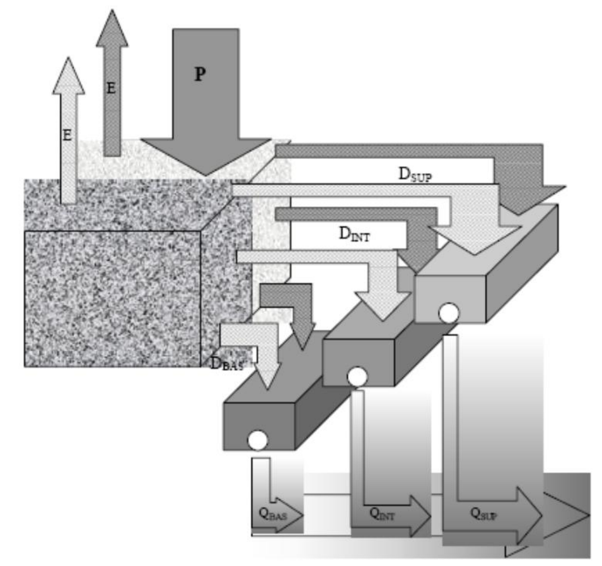
This study will be conducted in the watershed of the Tapajos s River. This is located in the Amazon and covers the states of Mato Grosso, Para and a small portion of the Amazon. Its coordinates are between 2 and 15 South and 53 and 61 West. The main tributaries are the Tapajos, Juruena and Teles Pires Rivers.

In the basin is inserted the highway BR-163 (D) that connects important soybean production regions and major population centers in Mato Grosso to the international port of Santarém in Pará State.

The distributed hydrological model for large basin (MGB) developed by Collischonn (2001) will adjust, verify and simulate.

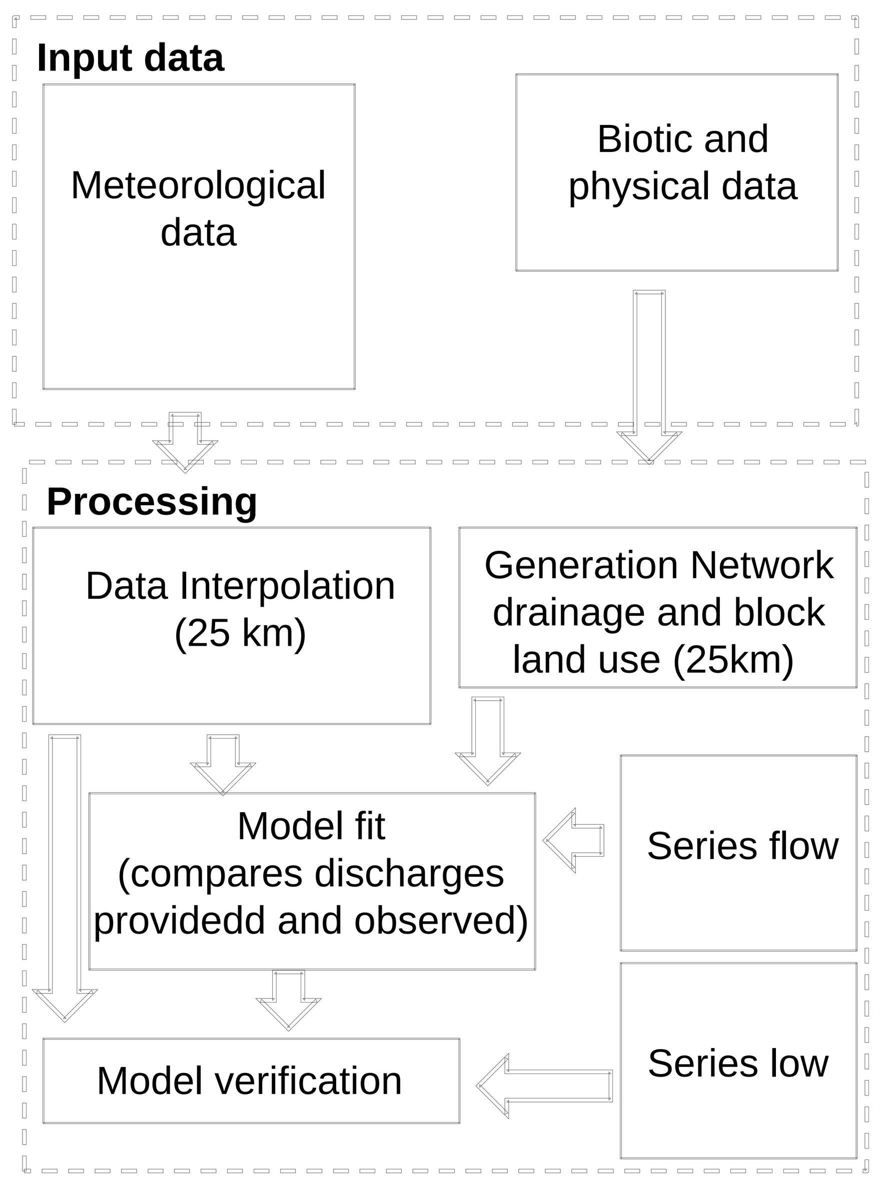
The MGB showed good results in Brazilian basins (Silva, 2005; Collischonn, 2006).





The MGB-IPH is composed of modules for soil water balance, evapotranspiration, runoff, surface and sub-surface flow in the cell and drainage network.

To feed the model will be used data of relief (SRTM-Shuttle Radar Topographic Mission), vegetation (Project Prodes, Project Proveg, Leite (2008) and Soares-Filho et al. (2006)), soil (IBGE-Brazilian Institute of Geography and Statistics) and climate (CPTEC/INPE). The historical series of flow will be purchased from the ANA (National Water Agency).



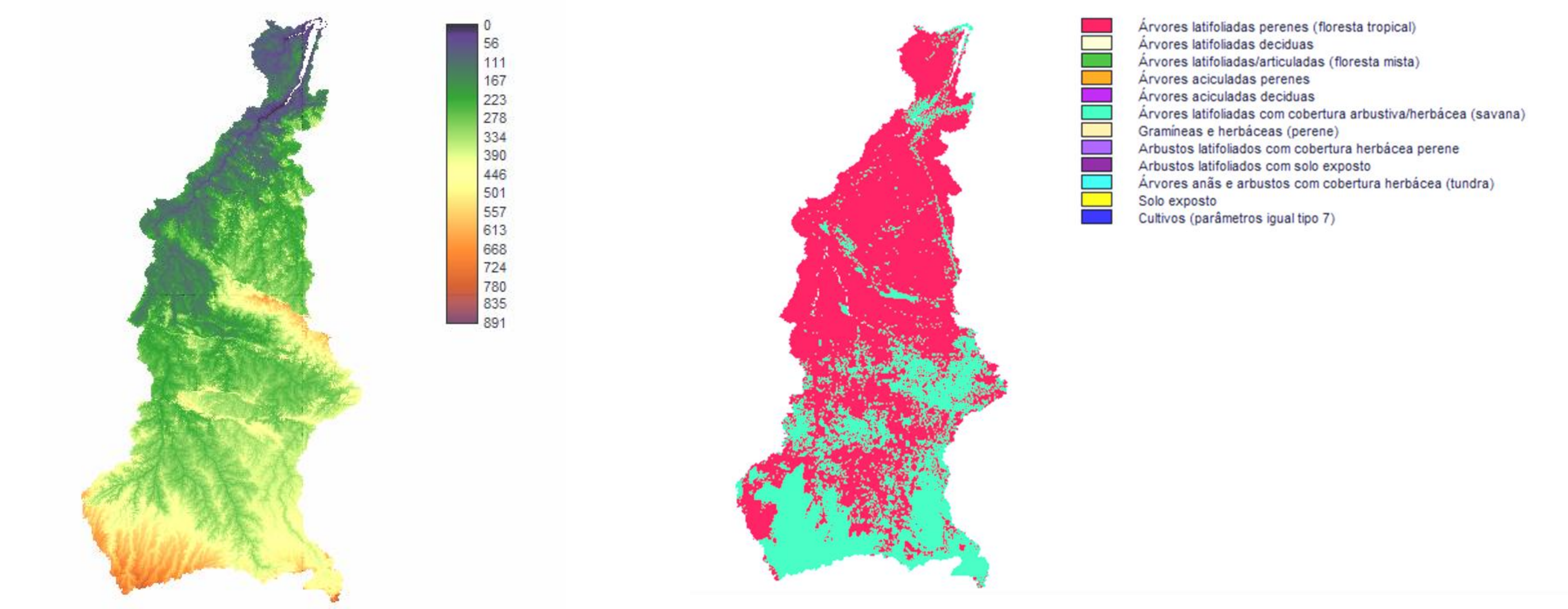
1 Set the input data, adjustment and subsequent verification of the model to simulate observed series.

2 Analyze the performance of the model ETA during the current climate, 1960-1990, to reproduce the flows in the basin.

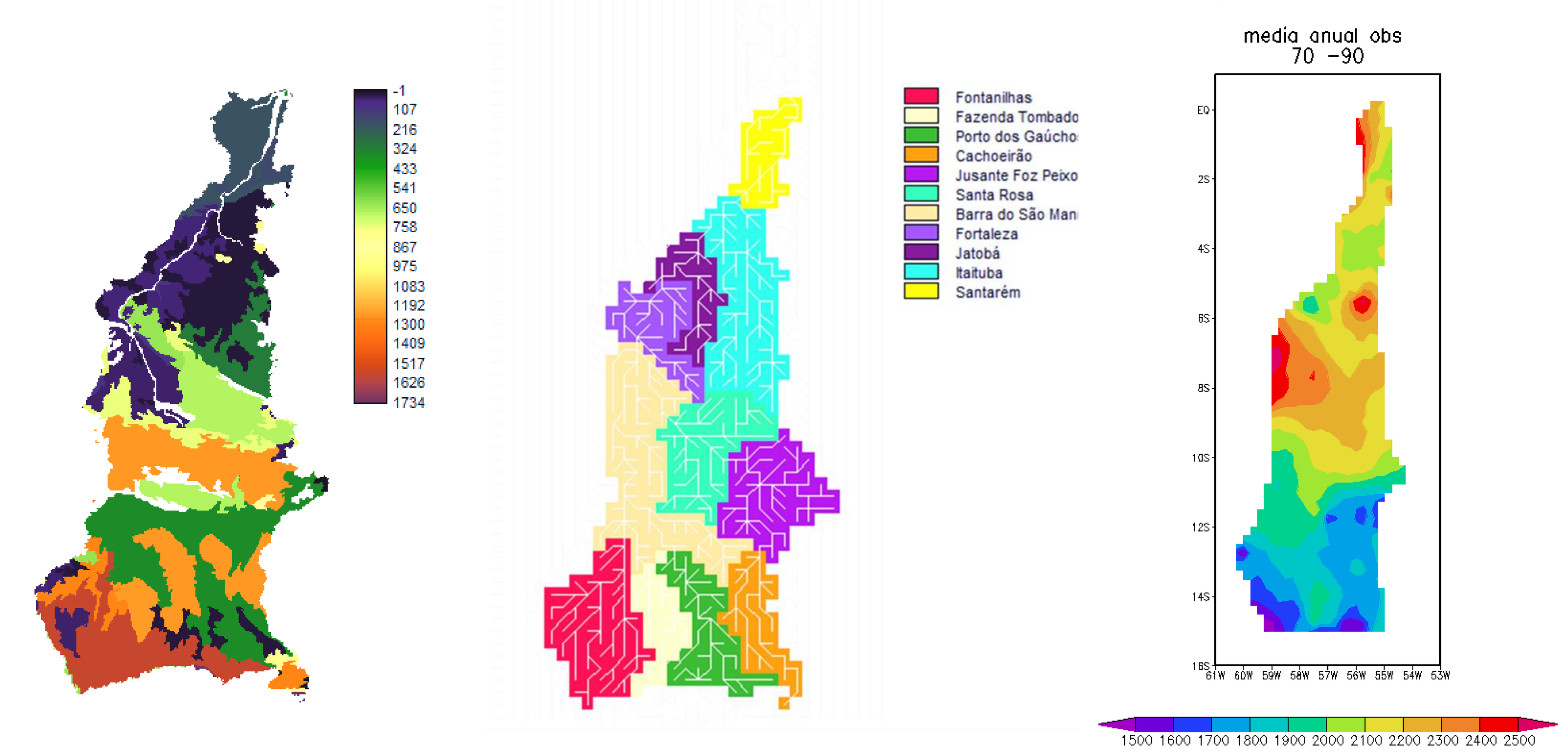
3 Simulate the future hydrological behavior of the watershed for the period 2010 to 2099.

The study of behavior of hydrological processes in the watershed will be possible through the interpretation of the properties of flow, the paths of flows, the characteristics of hydrographs and response time of the basin.

RESULTS



Station name	Latitude ( )	Longitude ( )	Drainage area (km2)
Santarém	-2.4136	-54.7378	493000
Itaituba	-4.2756	-55.9822	458000
Jatoba	-5.1525	-56.8539	387000
Fortaleza	-6.0453	-57.6428	363000
Barra do São Manuel-jusante	-7.3397	-58.1553	333000
Santa Rosa	-8.8578	-57.4019	131000
Jusante Foz Peixoto de Azevedo	-9.6425	-56.0183	81600
Fontanilhas	-11.3583	-58.3428	55900
Porto dos Gaúchos	-11.5364	-57.4228	37100
Cachoeirão	-11.6458	-55.7017	34600
Fazenda Tombador	-11.7644	-58.0364	24700



Verify whether changes in climate and land use causes some impact on water resources in the region.

To obtain information about the hydrological processes in different parts of the basin for future scenarios, which will reveal how the integration of the basin hydrologic response happens, and how related the variables involved in the hydrological processes, atmospheric processes and patterns of use of land.