


## Chapter 5

# From Macro to Micro: Two Approaches to Study Urban Mobility in a Brazilian Municipality

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## ABSTRACT

*This chapter discusses urban mobility considering two main analyses approaches. Based on the relationship between mobility and vulnerability, the first approach analyzed commuter's vulnerability using basin as unit of analysis. The second one analyzes variables related to land use such as population density and its relation with job offer in the city and people's income using traffic zones as unit of analysis. The two scales dialogue and can be used concurrently. The municipality of São José dos Campos (Brazil) was used as a case study. Origin-destination research was the main database used in the analyses. Authors used geospatial tools, like spatial join*

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*operation and thematic maps, which enable the in-depth analysis of important data for urban studies or transport planning and can be replicated in any study area. The analysis of mobility data aggregated by basin contributed to an understanding of the implications of the urban configuration, with its displacement patterns related to water courses if any flooding or landslide occurs and interrupts people's flow.*

## **INTRODUCTION**

Historically, early civilizations emerged near the banks of rivers in search of greater agricultural productivity and to facilitate transportation. Over the years, the relationships between transport infrastructures and hydrological processes became complex, especially because they happen at the same geographic location.

Relations between water resources and transport are explored in the literature (Santos, Bacelar, & Santos, 2017; Tucci, 2007), and some works deal with the impact of hydrological extremes on highways and in urban mobility. These works also highlight the possibility of using urban mobility data to infer exposure (time dynamics and heterogeneity in space) of different population groups at different hydrological risks (Cavion & Lombardo, 2014; Doll et al., 2014; Eidsvig, Kristensen, & Vangelsten, 2017; Londe, Santos, Soriano, Tomás, & Carvalho, 2015; Pregnolato, Ford, Wilkinson, & Dawson, 2017; Santos, Londe, Soriano, Souza, & Coelho, 2015; Santos et al., 2017).

However, in a scenario of climate change, with increasing frequency and intensity of extreme rainfall, it is important to develop scientific research at the interface between water resources and urban mobility from the perspective of sustainable development.

This chapter considered two main analyses approaches. Considering environmental topics, the first approach presents a hydrographic scale to analyze data on urban mobility. The second one discusses and analyzes variables related to land use such as population density and its relation with job offer in the city and people's income, using Traffic Zones (TZs) as unit of analysis. The municipality of São José dos Campos (Brazil) was used as a case study. This chapter also emphasizes the use of geoprocessing as an auxiliary tool in urban planning and shows the matter of occupation in environmentally fragile areas.

## **BACKGROUND**

Urban mobility, “the whole of trips generated daily by the inhabitants of a city, and the methods and conditions associated with such trips (modes of transport selected,

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