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Floods, as part of the water cycle, have already posed a threat to the early human settlements and will in future still put at risk people and their assets, the urban and the ecological environment. Regularly occurring flood events do also have a history in Santiago de Chile, the capital city of Chile and study area for this research. It is the political and economic centre of Chile with approx. 6 million inhabitants and it is undergoing a rapid process of urbanization with changes in land use and urban morphology in a planned but also in an informal way.

Such land use/land cover (LULC) changes frequently lead to an increase of hazards, both natural and man-made. This research is first focused on investigating the influence of LULC changes on flood hazard. The growing amount of sealed surface, amongst others in the region of the Andean piedmont, is associated with decreasing infiltration capacities and leads to faster surface runoff and therewith increases the flood hazard in the urban area. Not just an increasing hazard is the result of LULC changes associated with urban expansion, but also a growing number of people and values exposed to the hazard of floods. The merge of flood hazard, elements at risk and their vulnerability leads to a certain level of flood risk. This relation can also be expressed as function:

$\text{Risk} = f(\text{Hazard, Elements at Risk, Vulnerability})$

Using satellite, GIS, hydro-meteorological and census data, a comprehensive flood risk assessment is done for the catchment of Quebrada San Ramón in the eastern part of the city. Based on present and future LULC patterns, the dynamics of flood risk are modelled and mapped. The hydrological precipitation-runoff model HEC-HMS will be applied to balance the runoff in the upper part of the catchment area, where afforestation is planned. The hydraulic model HEC-RAS will be employed in the lower, urbanized part of the catchment to simulate the surface runoff processes after precipitation events. Very high resolution (VHR) satellite data (Quickbird) are used in combination with GIS and census data to delineate the elements at risk (e.g. buildings, infrastructure, people). These same data are furthermore analysed to obtain information about the vulnerability of those elements located in the hazard zones. One research goal is to investigate the potential use of VHR satellite data for physical and social vulnerability analysis by comparing them with socio-economic census data and results from field surveys. The result from this part of the study is a risk map for the study area considering precipitation events of different probabilities.

As it is practically highly challenging to remove people, buildings and infrastructure from the hazard zones, it seems more practicable to focus on risk prevention measures and hazard reduction. Part of the thesis is therefore the analysis of relevant planning institutions, instruments and processes with regard to urban floodings in Santiago de Chile. Various land use scenarios as possible risk prevention measures will be presented.