

Geoinformation and Map Products for Urban Risk Assessment and the Insurance Market for Mexico City

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With reference to the management of natural resources as well as mitigation of natural and man-made disasters such as floods, land slides, volcanic eruptions and earthquakes or the uncontrolled development of urban agglomerations the generation of geo-information and mapping products for urban risk assessment but also for the insurance market is becoming more and more important. Reliable and up-to-date information on the growth and change of the big urban agglomerations are an indispensable input for urban risk assessment and for the risk evaluation of insurance companies. In case of disasters in places with high population density and dynamics natural and man made disasters have the maximum impact and result very often in loss of lives but also causing tremendous costs for individuals as well as companies and national economies. To perform urban risk assessment the basic task is the classification and analysis of spatial distribution and concentration of residential, commercial and industrial areas. Within these classes additional sub-classes are desirable, because e.g. informal settlements, terraced housing estates, villa quarters represent different damage patterns and distribution of value. Information concerning height of buildings could provide additional information on risk in case of earthquakes or hurricanes, but also regarding concentration of monetary and economic value within the cities. If accessible information on construction material can provide additional information on building security and stability. Within industrial areas a separation of industries with especially high risk (e.g. refineries, chemical industry, energy providers, and semi-conductor industry) is necessary and of great benefit. Also information on big, long-term construction sites is useful. For infrastructure facilities airports, harbours (with loading and unloading facilities) and railway installations are important. Finally the course of major power transmission lines would be of great use (but most likely hard to get) as well as facilities with high fire risk. In case of catastrophes occurring as well as for the validation of security facilities the location of hospitals, fire brigades and technical support organisations is useful. Apart the information on the inventory of a city all data supporting risk assessment e.g. information on ground stability (soft soils, reclaimed areas), historical streams of lava or tectonic structures are an important basis for risk assessment. By integrating elevation data the detection of slope areas with high risk for landslides and in a later stage surface roughness for 3-D hurricane simulation is possible. The whole process of data collection information extraction from different types of spacebased data and development of risk maps is presented for the example of Mexico City