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Spatiotemporal patterns of population distribution as crucial element for risk management

Karin Gokesch (1), Catrin Promper (1), Cees J. van Westen (2), and Thomas Glade (1)

(1) University of Vienna, Department for Geography and Regional Research, Vienna, Austria (karin.gokesch@univie.ac.at),
(2) Faculty of Geo-Information Science and Earth Observation (ITC), University of Twente, Enschede, The Netherlands

The spatiotemporal distribution and presence of the population in a certain area is a crucial element within natural hazard risk management, especially in the case of rapid onset hazard events and emergency management. When fast onset hazards such as earthquakes, flash floods or industrial accidents occur, people may not have adequate time for evacuation and the emergency management requires a fast response and reaction. Therefore, information on detailed distribution of people affected by a certain hazard is important for a fast assessment of the situation including the number and the type of people (distinguishing between elderly or handicapped people, children, working population etc.) affected.
This study thus aims at analyzing population distribution on an hourly basis for different days e.g. workday or holiday. The applied method combines the basic assessment of population distribution in a given area with specific location-related patterns of distribution-changes over time. The calculations are based on detailed information regarding the expected presence of certain groups of people, e.g. school children, working or elderly people, which all show different patterns of movement over certain time periods.
The study area is the city of Waidhofen /Ybbs located in the Alpine foreland in the Southwest of Lower Austria. This city serves as a regional center providing basic infrastructure, shops and schools for the surrounding countryside. Therefore a lot of small and medium businesses are located in this area showing a rather high variation of population present at different times of the day.
The available building footprint information was classified with respect to building type and occupancy type, which was used to estimate the expected residents within the buildings, based on the floorspace of the buildings and the average floorspace per person. Additional information on the distribution and the average duration of stay of the people in these buildings was assessed using general population statistics and specific information about selected buildings, such as schools, hospitals or homes for the elderly, to calculate the distribution patterns for each group of people over time.