

## LATIS: THE TOOL FOR FLOOD RISK CALCULATIONS IN FLANDERS

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In Flanders' recent history, flood events caused several times substantial damage to buildings and infrastructure. Those floods originated from small non navigable waters, small navigable rivers and even from the Scheldt, the Meuse or the North Sea (1953). Scientists predict that these flood events could even become more frequent and more dramatic in the future, as climate is changing and sea level is rising. In the past, the solution of Flemish water managers to prevent flooding was evacuating the water as fast as possible and heightening the dikes along the river banks, but experience showed that this was a far from ideal situation. Therefore, a new approach was proposed during the late 1990's. The focus was no longer on protecting against all floods and the highest water levels, but changed to avoidance of serious economic damage. This meant that for the evaluation of different protection scenarios, a new objective methodology was needed to assess the damage, caused by floods, in a quantitative way.

Therefore, Ghent University developed in cooperation with Flanders Hydraulics Research a risk-based methodology. This methodology defines flood risk as the product of the probability of a flood event and the damage caused by that event. The damage is a function of the water depth and the maximal damage, which is dependent on the land use of the flooded area and the socio-economic context. In a second phase, this methodology was implemented in a tailor-made GIS-based flood risk assessment tool called LATIS. This tool integrates a variety of land use information and socio-economic data with potential inundation maps to calculate the damage and risk of certain flooding events. In addition, LATIS is also able to calculate the casualties of a flood and the additional damage caused by high flow velocities. These high flow velocities cause collapse of buildings inducing much higher damage. Recently, a new module that specifically calculates the casualties and damage on the sea wall (which is a special situation because a lot of people and buildings are concentrated there) was also implemented in the software.

In the past years, LATIS was used for several studies in Flanders, varying from assessments of the impact of different climate change scenarios on flood risk (Willems *et al.*, 2009) to studies on coastal defence alternatives within the framework of the Integrated Masterplan for Flanders' Coastal Safety (Mertens *et al.*, 2008). In the near future, LATIS will continue to play an important role when Flanders will have to fulfil the requirements of the European Flood Directive (EU Commission, 2007).

Keywords: Flood risk, risk calculations, GIS, LATIS

### References

- EU Commission, 2007. European Flood Directive, 2007/60/EG.
- Mertens T., P. De Wolf, T. Verwaest, K. Trouw, L. De Nocker and K. Couderé. 2008. An integrated master plan for Flanders future coastal safety. In: 31st International Conference on Coastal Engineering: Meeting Coastal Challenges, 31 August to 5 September 2008, Hamburg, Germany.
- Willems P., P. Deckers, Ph. De Maeyer, W. Vanneuvillie, J. Brouwers and B. Peeters. 2009. Wetenschappelijk rapport Klimaatverandering & water, Milieuverkenning MIRA-S 2009, VMM.