



## Runoff inundation hazard cartography

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Between 1998 and 2004, Europe suffered from more than hundred major inundations, responsible for some 700 deaths, for the moving of about half a million of people and the economic losses of at least 25 billions Euros covered by the insurance policies.

Within this context, EU launched the 2007/60/CE directive.

The inundations are natural phenomenon. They cannot be avoided. Nevertheless this directive permits to better evaluate the risks and to coordinate the management measures taken at member states level.

In most countries, inundation maps only include rivers' overflowing. In Wallonia, overland flows and mud-flows also cause huge damages, and must be included in the flood hazard map.

Indeed, the cleaning operations for a village can lead to an estimated cost of 11 000 €.

Average construction cost of retention dams to control off-site damage caused by floods and muddy flows was valued at 380 000€ and yearly dredging costs associated with these retention ponds at 15 000€.

For a small city for which a study was done in a more specific way (Gembloux), the mean annual cost for the damages that can generate the runoff is about 20 000€. This cost consists of the physical damages caused to the real estate and movable properties of the residents as well as the emergency operations of the firemen and the city. On top of damages to public infrastructure (clogging of trenches, silting up of retention ponds) and to private property by muddy flows, runoff generates a significant loss of arable land. Yet, the soil resource is not an unlimited commodity. Moreover, sediments' transfer to watercourses alters their physical and chemical quality. And that is not to mention the increased psychological stress for people.

But to map overland flood and mud flow hazard is a real challenge. This poster will present the methodology used to in Wallonia.

The methodology is based on 3 project rainfalls: 25, 50 and 100 years return period (consistency with the cartography of the overflowing hazard map), with a rain duration set at 1h. The arable lands are considered as bare, except for the permanent meadows. The worst situation is envisaged, the hydrologic effect of the soil cover in the farming area being variable from a year to another according to the vegetative development and to the cultural operations. The peak discharge is chosen as the more critic parameter because it synthesizes the watershed propensity to stream, its size, and its flow network.

The cartographic representation is done in a linear way along the concentrated runoff axes. Whereas this first approach at regional scale includes uncertainties, the aim of this map is currently to prompt consideration of the runoff inundation hazard during the design of urban development projects.