

## Applying MIKE SHE to define the influence of rewetting on floods in Flanders

MARK HENRY RUBARENZYA<sup>1</sup>, PATRICK WILLEMS<sup>2</sup>, JEAN BERLAMONT<sup>3</sup>, &  
JAN FEYEN<sup>4</sup>

<sup>1,2,3</sup>Hydraulics Laboratory, Department of Civil Engineering, Katholieke Universiteit Leuven, Kasteelpark  
Arenberg 40, Heverlee 3001, Belgium;

[MarkHenry.Rubarenzya@bwk.kuleuven.ac.be](mailto:MarkHenry.Rubarenzya@bwk.kuleuven.ac.be)

<sup>4</sup>Laboratory of soil and water, Department of Agriculture and Applied Biological Sciences, Katholieke  
Universiteit Leuven, Vital Decosterstraat 102, B-3000 Leuven, Belgium.

**Abstract** The last century has witnessed a change in the landscape of Flanders, and an increase in flooding intensity and frequency that has been observed in Europe over the last decade. Reverting to states existing prior to the introduction of intensive farming practices is being considered as a potential remedy for mitigating these flood events. Rewetting is one such, which is believed to have environmental benefits including flood mitigation. However, such actions need to be built on sound scientific arguments, and here there exists a gap. This research study builds on the need for scientific arguments for or against restoration. A MIKE SHE model was built incorporating a root zone component, a comprehensive three-dimensional groundwater component, and a river component. The surface water – groundwater interactions within the catchment could then be deciphered. The study established a positive flood mitigation effect of restoration.

**Key words:** Calibration, Hydrological modeling, MIKE SHE, Nete river basin, Validation

### INTRODUCTION

Over the last century, the land use map of Flanders has been dramatically altered with large areas of agricultural land being drained and put into intensive agricultural production. At the same time Europe has experienced a number of unusually long-lasting rainfall events in the last decade that produced severe floods, *e.g.* in the Netherlands, Belgium, France and Germany (1993, 1995), the Czech Republic, Poland and Germany (1997), in North Italy (1994, 2000), in the UK (*e.g.* 1998, 2000), and recently in Germany, Austria, the Czech Republic, Slovakia, Russia, and Romania (2002) (Institute for Environment and Sustainability, 2004). The issue of restoring wetland areas is now receiving increasing attention as a means of promoting the environmental benefits that are thought to be associated, including the mitigation of severe flooding. Water retention within catchments is an emerging concept that

















