

CS 09 Modelling and reconstructing precipitation and flood frequency in the Meuse catchment during the late Holocene

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Project website			
Starting date	25 November 2004	Completion date	30 June 2009

Context / Social problem

The climate displays a natural tendency to change. This has happened on various occasions in the distant past. About 11,500 years ago, after the last Ice Age which lasted almost 100,000 years, the earth rapidly began to warm up and entered the warmer period we are now in. Most climate scientists no longer have any doubts that the rate of change in the climate has accelerated during the last few decades and that human activity has a part to play in this (IPCC, 2001). The climate system is highly complex and displays chaotic behaviour. which is why it took such a long time before climate scientists made unequivocal statements about human influence on the climate.

What do we know/not know?

Climate reconstructions are a prominent component of both the scientific and social debate about climate change. In the journal *Geophysical Research Letters* the Canadian researchers McIntyre and McKittrick criticised one of these temperature reconstructions of the last millennium (the 'hockeystick'). Their article caused considerable public consternation and uncertainty, and therefore agitation among those responsible for climate policy (Ministry of Housing, Spatial Planning and the Environment and others). The public commotion was largely unjustified because the IPCC's conclusion is based on various climate reconstructions, supplemented by scientific insights based on observations and modelling studies. However, it does show the importance of continually verifying climate observations and scenarios against reconstructions, and of improving these reconstructions. One of the areas for improvement is the reconstruction of precipitation characteristics from the past and the interaction with the hydrological cycle and land use. Given the geographical position of the Netherlands, below sea level in the delta of the Rhine,

Meuse and Scheldt rivers, these types of reconstructions are particularly relevant.

What is being studied?

Within the Climate changes Spatial Planning programme, project CS09 aims to compare climate scenarios with past fluctuations in the climate (especially precipitation). It will also examine the role played by changing land use and land cover in the climate system, and the effects on the hydrological cycle and water management. An important question arising from this is how can we apply the lessons learned to the possible implications of future changes in land use and climate change for water management?

What are the results, and who are they for?

Under the EU Water Framework Directive (FWD), water managers have to provide reference frameworks for the 'good ecological status' of water bodies in their river basin management plans. Until now these have been derived from reverse calculation and forecasting models using historical measurements. The use of paleoclimatological data (derived from reconstructions and models), the aim of the project, may provide water managers with a new instrument and a new source of knowledge in this field. The river basin plans, including the definition of good ecological status, must be ready in 2009, which matches the delivery date for results from this research.

