

# Time-Dimension in a Web-Based Disaster Management Solution; Implementing a Multi-Dimensional GIS Project for Flooding in Ammer Basin



CENTRE OF LAND  
MANAGEMENT AND  
LAND TENURE

## Introduction

### Problem Statement

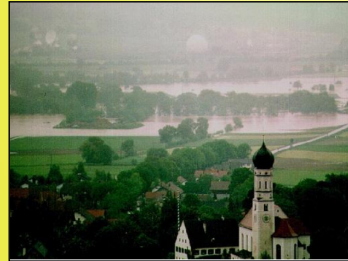
Flooding is as old as time among various type of natural hazards. However, it has been more and more important issue for humanity because of the expansion of human activity and the aggregation of people in larger urbanized areas. This has made the prevention of damages caused by flooding as well as the control and management of flood waters - a problem of vital necessity.

### Research Objective

This research focuses on the ways in which GIS based Disaster Management could be made multidimensional. It suggests extending GIS to incorporate the multi-dimensional GIS by using the variety of programming techniques, data formats, and software.

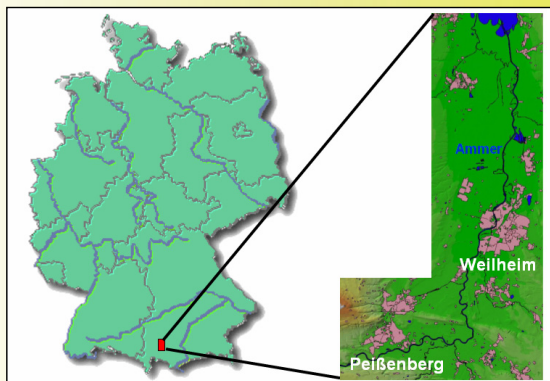
### Investigation Area – The Ammer Basin

The Ammer basin is selected for flood modelling and web-based decision making support system in disaster management studies.

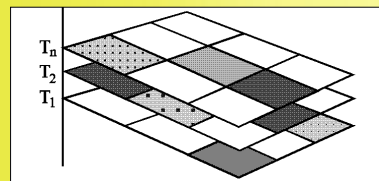


## State-Of-The-Art

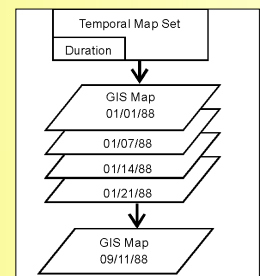
This research is based on the fundamental constituents of spatio-temporal data modeling by awareness of the concepts pertaining to space, time, space-time, similarities and differences between space and time, change etc.



### An example of Snapshot Model

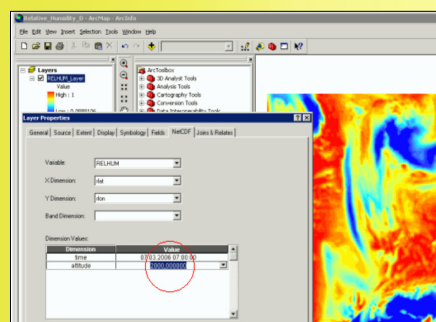
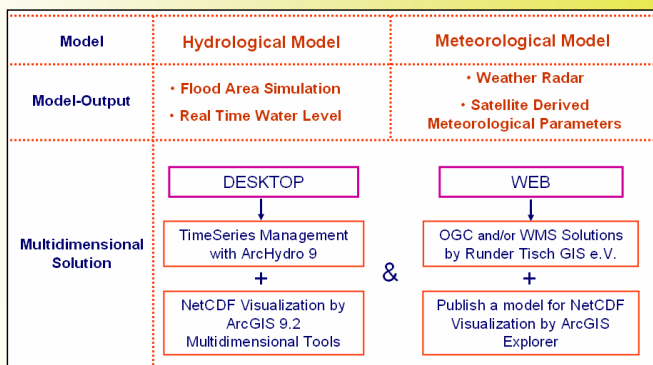


### An example of Temporal Map Set

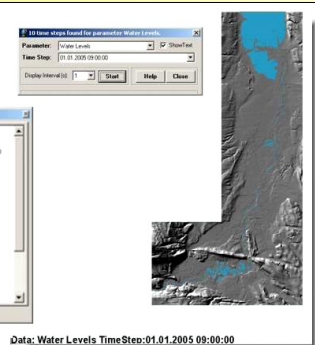


## Methodological Approach & Implementations

### Work-flow schema for the multidimensional GIS



Using ArcGIS 9.2 **Multidimensional Tools** for NetCDF data format ArcGIS Multi-dimensional tools for NetCDF visualization. This research focuses on the tools Make NetCDF Raster Layer, Make NetCDF Feature Layer, Make NetCDF Table View and Select By Dimension.



The Snapshot model: Time-stamping layers by using **ArcHydro 9**.

On each animated screen, user can see water heights with a snapshot which gives the exact time series with the explanation of variable.

## Conclusion and Recommendations

### Conclusion

Two major contributions are made:

- 1] the development of a desktop solution and
- 2] the modeling of web-based implementations.

Both are core issues in geo-information / computer science and in disaster management.

### Recommendations

- How to visualize space-time is another active area of research in cartography.
- The performance of the model should be checked with different data sets and more time series data.
- "Server GIS" can be a challenging issue to go forward to control the object libraries.
- Flood modelling techniques shall catch up the improvements on software technologies, and/or new trends in the market.