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Process-based modelling of the surface water – soil – groundwater system at the catchment scale (AquaTerra)

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Catchment-scale modelling of water flow and solute transport is a major issue for management of water resources within the EU integrated project *AquaTerra*. The catchment-scale modelling activities aim at quantifying the impact of current and future climatic and anthropogenic conditions on the availability and quality of water. More specifically, the objectives of our work are:

1. derive similarities and differences between selected catchments and sub-catchments for comparing catchments in various European climate zones (e.g. northern maritime, mediterranean, continental, alpine),
2. identify potential water quality problems in these areas, thus supporting current and future water management strategies which may be specific to different European regions, and
3. support up-scaling of process characteristics to the river basin scale.

In the first stage of the project, the Tuebingen *AquaTerra* modelling group will study flow and transport scenarios related to the actual climatic conditions prevailing in a selected catchment (up to 100km^2 in size). Scientific modelling software to be used is *"Hydrosphere"* from University of Waterloo and the program system *"GeoSys"* from University of Tuebingen, which is developed and extended to the needs and requirements of the project. Results will be compared with the outcome of similar simulations performed by project partners in France and Italy for other catchments. All groups

will make use of a common database connected to a Geo Information System. In addition, data acquired in several other *AquaTerra* subprojects will be available from comprehensive research on compounds and processes. These will comprise the soil, ground- and surface water compartments and include, for instance, actual temperature and precipitation data, information on transport of persistent organic pollutants from atmospheric deposition to soils as well as degradation and sorption properties of these compounds in soil and groundwater. As a consequence, this comprehensive amount of data is believed to enable a process-based modelling approach which can later be extended to future climatic and environmental conditions.