Leopold-Franzens-Universität Innsbruck
Fakultät für Bauingenieurwissenschaften
Institut für Infrastruktur
Arbeitsbereich für Wasserbau

Einladung zu einem Gastvortrag

Leiter des Arbeitsbereiches für Wasserbau	Geschäftszahl - Ablage	Datum
Univ.-Prof. DI Dr. Peter Rutschmann	060712 Olsen Vortrag	10. Juli 2006

Am **Mittwoch, 12. Juli 2006, 16:15 Uhr** spricht

Herr Univ.-Prof. Dr. Nils Reidar **OLSEN**,

The Norwegian University of Science and Technology, Universität Trondheim,

im **Hörsaal HSB 8** über

3D Computational Fluid Dynamics with Sediment Transport

In recent years the science of computational fluid dynamics (CFD) has increasingly been used to investigate sediment transport problems in rivers and reservoirs. The current presentation will give examples of our research in this topic. First, the main numerical algorithms for water and sediment flow are briefly introduced. Then, as the first example, results are shown for 3D modeling of bed changes in a 5.5 km long section of the Danube river in Austria during the flood in 2002. The data from the numerical model are compared with measurements. The second example is more oriented towards fundamental research and involves idealized flow over dunes. Comparisons are made between results of PIV measurements, LES and RANS with the k-epsilon model. Then it is described how the CFD results can be used to predict the roughness of the dunes and the effect of the dunes on the sediment transport capacity of the channel. Comparisons are made with existing 1D empirical formulas. The third example is a benchmark study from the UK, where four 3D CFD programs are tested on a meandering laboratory channel with overbank flow. Computed bed shear stresses of the different models are compared with experimental data. Computing the correct bed shear stress is essential for the prediction of sediment transport. The four CFD programs are FLUENT, TELEMAC-3D, SSIIM and PHOENICS. The fourth example describes a 3D morphological computation of how a straight channel evolves into a meandering planform. A dynamic unstructured grid is used, where cells are removed/added in areas where wetting/drying takes place. The fifth case is a 3D computation of local scour around a cylinder. Visualization of the pressure field in front of the cylinder shows the non-hydrostatic component. Further work on this project will be performed in Norway in the coming 4 years, and the plan for this will be outlined in the presentation. The final example is 3D morphological computations of changes in a freshwater delta. This project has not started yet, but it has already been awarded funding from the Research Council of Norway and plans for the project will be described. Visualization of existing field data for the bed geometry and sediment deposition will be shown.

Gäste sind herzlich willkommen!

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