

## Seminar

25. November 2009 15:30h HS 44-465



zu folgendem Vortrag wird herzlich eingeladen:

### **Antarctic ice shelves: floating, flowing, fracturing – changing?**

Angelika Humbert

University of Muenster

About 90% of the Antarctic inland ice is drained by glaciers and ice streams into ice shelves, which are floating ice masses. Ice shelves, sandwiched between warming atmosphere and ocean, are sensitive elements of the climate system. The retreat and disintegration of various ice shelves on the Antarctic Peninsula showed the potential of ice shelves to become unstable. It is therefore important to understand their dynamics, especially how they react to changes influencing their mass and temperature such as may accompany regional climate change.

The flow of ice shelves is simulated applying a three-dimensional, thermodynamically consistent dynamic model for ice-shelf flow using a general, continuum mechanical approach in which the polycrystalline ice is assumed to be an incompressible fluid. The elliptic boundary-value problem for the horizontal velocity is solved diagnostically in the shallow-shelf approximation (SSA). The deformation of ice is modelled using Glens flow law. In this talk modelling results for selected ice shelves will be presented.

The solid nature of ice shelves is on the other hand demonstrated in the appearance of crevasses and rifts. In radar satellite imagery cracks appear as zones with altered reflectivity. Using high-resolution radar satellite imagery fresh few meter wide cracks of some tenth of kilometres length (Wilkins Ice Shelf) will be compared to wide rift zones developed over decades (Fimbulisen).

The talk will be completed by a discussion of the observed changes of ice shelves and the potential causes.



Prof. Dr.-Ing. habil. Sven Klinkel  
Fachgebiet  
Statik und Dynamik der Tragwerke  
TU Kaiserslautern



Dr.-Ing. Sigrid Leyendecker  
Emmy Noether Group  
Computational Dynamics and Control  
TU Kaiserslautern



Prof. Dr.-Ing. habil. Ralf Müller  
Lehrstuhl für Technische Mechanik  
TU Kaiserslautern