

## HITEC Methods Day

**Title:** Inverse Modelling

**Date:** 5 June, 2013

**Time:** 9:00 – 17 o'clock  
afterwards *get together* with snacks and drinks

**Location:** [University of Cologne](#) ► [Seminar Build., Build. 106, R 004](#),  
Universitätsstraße 35, 50931 Köln  
<http://www.uni-koeln.de/bin2/where.pl?parent.geb106>

Inverse modelling is a key technique in all geosciences and meanwhile also many engineering sciences. The combination of model information with measurements has long been identified as a prerequisite of skillful weather forecasts. The use of remote sensing techniques of instruments, mounted both on ground and space borne platforms, is increasingly used for atmospheric studies. The analysis of composition of the earth interior, and even other interior planets, never admissible to direct observations, is only amenable by inverse modelling. Further examples include deposit reconnaissance for oil and other realms of economic geology.

The approach has spread across nearly all geophysical disciplines, most notably oceanography, and atmospheric trace gases. In engineering, non-destructive tests often rest on related techniques. Tomographic approaches play a key role, a technique which is also used in medical diagnostics. The HITEC day *Inverse modelling* will give an overview on these techniques with emphasis placed on atmospheric analyses, but will also include tomographic approaches for other areas.

### You will learn about

- the basics of inverse modelling and data assimilation
- problems and problem solving
- the application for atmospheric research
- tomographic approaches for other areas

### Contents:

- Introduction to inverse modelling and data assimilation
- Ground based remote sensing of cloud water, temperature and humidity profiles
- Retrieval of atmospheric trace gases by inverse modelling of radiative transport
- Inverse problems for acoustics and electromagnetics
- Data assimilation at the German Weather service
- Atmospheric chemistry data assimilation

### Who should attend:

HITEC Ph.D.-fellows;  
Postgraduate-, Ph.D.- and postdoctoral fellows from the fields of energy and climate research

### HITEC Days

HITEC Days are an inherent part of the graduate school Helmholtz Interdisciplinary Doctoral Training in Energy and Climate Research (HITEC). They devote a whole day to a method or a scientific topic with lectures and discussions. The methodological days serve to encourage scientific interdisciplinarity and will enable the PhD students to extend their range of methods with respect to their own scientific work. HITEC Days always end with a 'Get together', some snacks and drinks. HITEC Days are open for HITEC Ph.D. students and other interested young scientists.