Geophysical Research Abstracts,
Vol. 11, EGU2009-13215, 2009
EGU General Assembly 2009

Challenges and Lessons in the Bayesian calibration of a deglaciation model

L. Tarasov
Memorial University of Newfoundland, Dept. of Physics and Physical Oceanography, Canada (lev@physics.mun.ca)

The glaciological, climate, and earth system modelling communities have been slow to incorporate, in any statistically self-consistent way, the objective determination of model and data uncertainties into their results. Though ensemble calculations offer a first step, statistically self-consistency requires the propagation of model parameter and constraint data uncertainties into the ensemble results. Bayesian model calibration addresses this key issue. I'll describe a Bayesian framework for model calibration based on a combination of artificial neural networks and Markov Chain Monte Carlo methods. The calibration provides a posterior distribution for model parameters (and thereby in my case modelled glacial histories) given observational constraint data sets. This methodology therefore also takes into account constraint data uncertainty. This approach is highly applicable to cluster computing environments in which one can generate order 100 model runs per month of real time with dozens of ensemble parameters. It also allows the incorporation of large and diverse sets of constraint data into the calibration procedure and is suitable for complex non-linear models. The presentation will focus on the on-going issues and challenges encountered in the real-world application of this methodology to the calibration of the 3D MUN/UofT Glacial Systems Model.