Annual Jindřich Nečas Memorial Seminar
organized in the framework of the
Nečas Seminar on Continuum Mechanics
including the
8th Colloquium Lecture of School of Mathematics
delivered by

Paul J. Tackley (ETH Zürich)

Date:	Monday, December 16, 2013
Time:	15:40
Place:	Seminar room K1, Sokolovská 83, Prague 8

Program:

15:45 - 15:50	Welcome
15:50 - 16:00	**Geoscience and Jindřich Nečas** (by Ctirad Matyska, Head of Department of Geophysics)

16:00 - 17:00 Paul J. Tackley

The dynamics and evolution of terrestrial planets in our solar system and beyond

Abstract: Convection of the rocky mantle is the key process that drives the interior evolution and surface tectonics of terrestrial planets Earth, Venus, Mars and Mercury, yet these planets are quite different. Mantle convection in Earth causes plate tectonics, controls heat loss from the metallic core (which generates the magnetic field) and drives long-term volatile cycling between the atmosphere/ocean and interior. Plate tectonics is thus a key process, yet exactly how plate tectonics arises is still quite uncertain; other terrestrial planets like Venus and Mars instead have a stagnant lithosphere-like a single plate covering the entire planet. Here, numerical modelling of the interior dynamics and thermo-chemical evolution of Venus, Mars and Earth is presented, to develop a unified framework that can be applied to predicting the dynamics and possible habitability of terrestrial planets around other stars (super-Earths as well as smaller planets), of which astronomers have so far found ~10s.

***Paul Tackley*, Professor of Department of Earth Sciences, Institute for Geophysics, ETH Zürich** (previously at University of California at Los Angeles, Department of Earth and Space Sciences as well as Institute of Geophysics and Planetary Physics) is considered to be one of the world leaders in geophysics today. His research includes the thermo-chemical structure, dynamics and evolution of the interiors of solid planets and moons, focusing on convection in the solid mantle and the associated dynamics of the lithosphere. His main research tool is numerical simulation, using state-of-the-art numerical methods on high performance (massively-parallel) supercomputers to obtain more realistic, three-dimensional numerical models of dynamical processes than previously possible. His research is thus linked to areas such as material science, constitutive theory, continuum thermodynamics, numerical methods, scientific computing, initial and boundary value problems described in terms of systems of partial differential equations in the bulk and on its boundary.

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