



## Welcome to «Neutrons at the Frontier of Earth Sciences and Environment – NESE»

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### *Synopsis*

NESE is one of a series of conferences organized jointly by European, American and Japanese scientific institutions with a strong affiliation to Neutron Scattering. As Earth and Environmental Sciences rely more and more on a deep understanding of processes on the atomic scale neutron scattering becomes an increasingly important tool of investigation. NESE aims at identifying future scientific needs in these areas. The findings will help neutron facilities to further adapt their infrastructure to the requirements of the wider scientific community. The look forward into the future will be based on a thorough analysis of past and present experimental highlights. The outcome of the conference will be documented in a report.

### *Scope of NESE*

Modern societies increasingly influence the natural processes on Earth and at the same time are more and more dependent upon them. In order to achieve sustainable development it is essential to understand the mechanisms that regulate these processes. Such understanding requires in many cases the investigation of materials and their transformation on the atomic scale. Neutrons, due to their specific properties, are an ideal experimental probe for this purpose.

The picture that neutrons produce of atomic arrangements is at the same time precise and simple to interpret. The rather weak interaction of the neutron with matter, hence its highly penetrating power, is the foundation for a thorough and reliable sampling

of the bulk properties. Furthermore this property makes neutron scattering a unique probe enabling studies to be made at high temperature, pressure and magnetic field in complex and bulky sample environments. New generations of instruments and neutron sources will further extend the field of application towards higher pressures and temperatures as well as kinetic and high throughput studies. This is particularly important for geoscience research areas. Furthermore the spin of the neutron couples to microscopic magnetic fields and enables us to decrypt even the most complex magnetic structures and fluctuations.

The flagship experiments shown during the symposium will demonstrate how the precise knowledge of atomic arrangements and their dynamics provide unique information in geo-physical and environmental science. The symposium will cover a wide spectrum of topics with strong overlap in many EGU2005 conference topics including:

- . *Mineralogy, Petrology, Geochemistry & Volcanology*
- . *Magnetism, Paleomagnetism, Rock Physics & Geomaterials*
- . *Energy, Resources and the Environment*
- . *Planetary and Solar System Science*
- . *Cryosphere*

The symposium will bring together a distinguished panel of experts from Europe, the US and Japan: world experts in neutron science will share their expertise with researchers from the world of Earth Sciences and Environment. These two groups will have the unique opportunity to identify new areas of research in the Earth and Environmental Sciences where neutrons can play a relevant and even unique role.