

THEMES and SESSIONS  
The 29<sup>th</sup> Nordic Geological Winter Meeting – 11-13<sup>th</sup> of January 2010, OSLO, NORWAY

**THEME 1: ENDOGENIC GEOSCIENCES:  
Materials and Evolution**

This session covers endogenic geosciences in the broadest possible sense: From planetary accretion and meteorite studies, through earth differentiation, processes in the core and mantle and geodynamics, to the evolution of the continental crust, metamorphic processes, magmatic and volcanic processes - ancient and recent. Fluid-rock interaction, geochemistry, isotope geology are subjects of importance for most of these fields, as is the characterization of the Earth's materials: Minerals and rocks.

- **Anorogenic and rift-related magmatism and volcanic processes**  
*Under this very broad heading, we wish to present results from ongoing research into diverse aspects of anorogenic magmatism, spanning a time-range from the Archaean to the present. For example: The petrogenesis of large anorogenic granite complexes within the Precambrian Shields, granitic magmatism related to orogenic collapse, magmatic processes in continental rift systems, ocean islands and on mid-ocean ridges.*
- **Fennoscandia**  
*The Fennoscandian shield contains the evidence of almost 4 billion years of geological evolution. This session will present results of research related to the evolution of the Fennoscandia continental crust and subcontinental lithosphere in the broadest possible sense.*
- **Arctic and Antarctic geology**  
*The International Polar Year has led to a vigorous renewal of geological research in the Arctic and Antarctic regions. The 2010 winter meeting provides a welcome opportunity to sum up what has been done during the Polar Year, and what still remains to be done.*
- **Minerals from core to outer space**  
*Minerals are the fundamental building blocks of the Earth and terrestrial planets, and an understanding of their structure, stability and genesis is fundamental for the understanding of the planetary system as a whole. This session invites contributions related to mineralogy in its widest possible sense.*
- **Impact craters**  
*The session in Planetary and Impact Crater Geology will present studies of the closest planets and the Earth. The session will include descriptions, analysis and mechanisms of formation of impact structures and ejecta.*
- **Caledonides**  
*The Caledonian orogeny encompasses events that occurred from the Ordovician to Early Devonian, roughly 500-390 million years ago (Ma). It was caused by the closure of the Iapetus Ocean when the continents and terranes of Laurentia, Baltica and Avalonia collided. This session will present results of research related to the evolution of the Caledonides in the broadest possible sense.*
- **Metamorphic processes**  
*In this session we invite contributions related to the understanding of metamorphic processes and fluid rock interaction in a wide sense: From field studies via phase petrology and thermobarometry to experimental studies on mineral equilibria and on rock deformation. The fluid phase is an integral part*

of the metamorphic phase assemblage. Fluids can be studied by direct observation and analysis of fluid inclusions, mass transfer analysis and by thermodynamic modelling. Groups representing the two approaches have not always communicated very well, but we hope this session will be a forum for discussion of the strengths and weaknesses of the two lines of approach.

- **NE Atlantic plate tectonic evolution - revisited**

*Since Talwani and Eldholm's (1977) paper on NE Atlantic plate tectonic development a large amount of new data have been acquired, and a number of new plate models been suggested addressing parts of the region. The 2010 NGWM represents a good opportunity to gather the relevant people and compile a 'complete' picture of the plate tectonic puzzle.*

- **Volcanic rifted Margins - what has been learned the last 25 years?**

*Volcanic rifted margins constitute as much as 30-40% of the rifted margins worldwide. Over the past 25 years the conceptual models for rifted margin formation has developed based on new information made available through academic and industry data and interpretations. This session aims on covering the range of topics including plume vs. non-plume models, crustal structure, tectono-stratigraphy, igneous history, timing and magnitudes of vertical motion and environmental impact. The prime focus is on the North Atlantic Volcanic Province (NAVP) where the mid-Norwegian Margin, the Faeroes and East and West Greenland are target provinces, but where analogues from other parts of the world will be appreciated.*

## **THEME 2: EARTH-BIOSPHERE-CLIMATE-ENVIRONMENT: Systems, Interactions and Evolution**

This session appeals to those concerned with all exogenic processes which have provided us background for understanding evolution of life and the processes shaping Earth's surface. The following topics (but not limited to) are relevant: Geobiology, Palaeontology, Stratigraphy, Sedimentology, Palaeoclimatology, Marine geology and Quaternary studies. Keywords: Early life, Ice ages, Sea level change, Sedimentation, Climate change, Faunal Diversity.

- **Palaeoclimatic change – proxy and model data, systems and triggers**

*Rapid climatic and environmental changes are recognized from many episodes in the Earth's history, like the Paleocene-Eocene Thermal Maximum (PETM), the Toarcian, the end-Permian, at the Triassic-Jurassic boundary, and the Quaternary. The last decade has seen an increasing awareness and interest in these changes and their causes. Whereas marine and continental sedimentary strata has provided proxy data that shed light on the causes of the changes, comparatively little has been done on identifying and understanding the actual geological processes leading to such changes. High-resolution palaeoclimate proxy data from the Plio-Pleistocene and Holocene are available from marine and terrestrial archives and allow the dynamics of the climate system to be studied in detail. Improved understanding of interactions between land-atmosphere-ocean and the dynamics of the Earth's climate system relies on comparing coeval marine and terrestrial proxy data with data from climate model simulations. In this session we would like to welcome contributions that put emphasis on geological processes that may trigger rapid global changes (volcanic, metamorphic, oceanographic, tectonic processes, fires, impacts), as well as contributions that reconstruct climate by comparing proxy data from independent archives or different proxies from the same archive, contributions that synthesize marine, terrestrial and model data, contributions with spatial integration of proxy data, and contributions that integrate instrumental and proxy data.*

- **Glacial periods and cryogenic processes**

*The recognition and interpretation of glacial sediments in the rock record is important for understanding causes of pre-Quaternary glaciations, their similarities and contrasts to Quaternary glaciations, patterns of climate change, as well as potential geobiological triggers and environmental impact. Reconstructions of Quaternary environments based on sedimentary and fossil records, geochemistry, DNA analysis, and ice-sheet modelling are continuously being refined. New dating tools and improved precision on existing ones are important aspects of this trend. The land-ocean interaction is highly relevant for understanding the dynamics between ice sheets, ice streams, and ocean circulation during inception, expansion and decay phases of ice sheets. Improved understanding of the retreat and melting of ice sheets and glaciers, melting of permafrost, glacial sedimentary processes, as well as formation of glacial and periglacial geomorphology is vital for reconstructing the past. Present-day processes in polar and alpine environments are modern analogues we need to understand in order to interpret past environments and climate changes. This session aims to better comprehend development of glacial periods and implications of cryogenic processes in a broad sense. We welcome contributions with emphasis on one or several of the topics described above.*

- **International Polar Year – New geoscientific results**

*The International Polar Year (IPY) has been an ambitious international science programme involving a wide range of research disciplines as well as outreach and communication. We welcome IPY projects to present geoscientific results, geoscience education and communication initiatives and projects, the post-IPY fate of data, observatories and other relevant project outcome, and outline the IPY legacy and future prospects. With this session we hope to gain an overview of the extent of the Nordic geoscientific IPY activities.*

- **GeoBiology and Early Life**

*Geobiology is a subject which in recent years has produced some of the most exciting results in which research combines the application of paleontology, mineralogy, geochemistry, sedimentology, microbiology and biochemistry. The study of ancient and modern sedimentary records has thrown light on the early evolution of life and the role played by bacteria and other organisms in environments with or without oxygen. Thus geobiology explores all aspects of the interaction between the biosphere and lithosphere and can be extended to include extraterrestrial studies in search for life on other planets.*

- **Phanerozoic Stratigraphy and Palaeontology**

*This broad session invites contributions on all aspects of regional stratigraphy and palaeontology in the Nordic region (including Svalbard and Greenland). The emphasis should involve the use of faunas and facies developments and their application in solving problems of geological and biological interest as well as global correlations.*

- **The Lower Paleozoic Succession in Scandinavia – A tribute to David L. Bruton**

*David L. Bruton, Professor of Palaeontology, has dedicated many of his 45 years at the Museum of Natural History in Oslo to the understanding of Lower Palaeozoic faunas and stratigraphy in Scandinavia, and in the Oslo Region in particular. Although trilobites have been his life-long passion, he has contributed scientifically to the understanding of a diverse range of other faunas and depositional environments. In addition to his many scientific contributions including more than 120 scientific articles, he is also known for his dedicated, enthusiastic and helpful approach towards students and the public in general. His many news articles like “testing the eyesight of a trilobite” illustrate his ability to communicate scientific knowledge and stimulate the curiosity of both young and old. This session is a tribute to a remarkable man and his science and welcomes contributions from all aspects of Lower Palaeozoic Palaeontology and Stratigraphy in Scandinavia with the aim of summarizing our current understanding of this significant and unique interval in Earth history.*

### **THEME 3: EARTH RESOURCES: Exploration and Management**

Our civilisation builds on the use of geological resources for much of our energy needs and a large part of the raw materials essential for modern industry and daily life. Increased demand from emerging economies dictates greater awareness of issues of supply and self-sufficiency. Sustainability and public acceptance necessitate new approaches to waste management. Long-term needs can only be met by technological advances and new resources.

- **Conventional and Unconventional Energy Sources for the Future**

*Oil and gas will continue to be our major energy source for many years, but enormous investments are necessary in order to gradually reduce the earth's dependency on oil. Our dependency on oil is unsustainable because resources are limited, and for environmental reasons. The theme for this session is to look at the "geological" energy supply from the Nordic countries. Which sources are available, how large are these resources, how can they be developed, and to which cost in terms of investment and influence on the environment. What are the challenges for the geoscience environment? What plans exist to meet the future energy challenge? The session will deal with resources such as conventional oil and gas, unconventional oil and gas, e.g. gas hydrates, shale gas, coal bed methane and tar sand, coal, geothermal energy and nuclear fuels.*

- **Minerals, Metals and Mankind**

*The EU Raw Materials Initiative highlights the dependency of large sectors of European industry on mineral and metallic resources. Western Europe consumes >20% of global metal production but produces only 3%. It is anticipated that the Nordic countries will have a major role in this EU program commencing in 2010 and aimed, i.a., at improvements in the data available for prospecting, better models for key metallogenic provinces, relevant basic and applied research and steps to improve recruitment, with the overall aim of increased European self-sufficiency. The session will highlight new concepts, provinces and deposits which will become important in this context.*

- **Terrestrial heat flow: From Geodynamics to Society**

*The thermal state of the Earth controls a wide range of processes spanning from global plate dynamics and tectonic deformation to maturation of organic matter in sedimentary basins and ore formation. As such, terrestrial heat flow studies are of prime importance for understanding the past, present and future of our planet and for planning the use of its natural resources. The growing demand for new and clean energy sources has, in addition, renewed the interest from society in geothermal energy, in particular in Nordic countries. The goal of this session is to give an overview on the recent progress made in the field, as well as on the future of geothermal energy as a potential solution to the energy crisis.*

- **Environmental Impact and Challenges**

*Exploitation of mineral and energy resources may lead to considerable environmental impacts, disturbing terrestrial and marine ecosystems. Scientifically based assessments of the actual impact of past and current mining and energy operations relative to those of larger-scale geochemical processes are of vital importance in understanding their environmental impact and in predicting those of future activities. Public acceptance of mineral and energy industry and operations necessitates optimal utilization of resources and secure, sustainable management of waste. Other anthropogenic activities cause additional waste handling and pollution of soil, water and sediments. The session welcomes papers dealing with the wide spectrum of topics related to environmentally sustainable exploitation of mineral and energy resources and to management of waste and pollution in geo-systems in general, including nuclear waste, contaminated harbour- and fjord sediments, soil and groundwater pollution, and remediation methods.*

- **Hydrogeology**

*Groundwater is an important resource both for household supply and agricultural and industrial needs, as expressed in the EU Water Framework Directive. There is a need for hydrogeological mapping and monitoring in the Nordic countries to protect groundwater resources and avoid expensive problems when pressure from the society threatens. The session welcomes papers dealing with mapping and exploration methods, monitoring, pollution and groundwater quality, groundwater models and flow behaviour in porous and fractured media, GIS applications and the need for precise data, groundwater quality and urban hydrogeology. Coastal and sub-marine aquifers are literally a research strand within hydrogeology and more knowledge about this phenomenon from the continental shelves are needed. Groundwater also plays an important role in many geology-related issues such as i.e. landslides, flooding, permafrost, ground source heating and cooling, radon and geo-medicine.*

- **CO<sub>2</sub> storage**

*This session addresses feasible CO<sub>2</sub> storage in the subsurface, which depends on reservoir performance, cap rock sealing properties, monitoring techniques and consequences for the environment, including marine ecosystems. In order to develop CO<sub>2</sub> storage into an environmentally acceptable option, research has to close knowledge gaps by experimental work on rock properties, analysis of samples from outcrops and case studies, development of mathematical models, modelling activities, and testing in case study environments. An important aspect is to bridge gaps from details to concepts and applications. CO<sub>2</sub> storage applies the common evaluations of the petroleum industry, with geo-science capacity covering subjects such as sedimentology and structural geology, fluid flow and petrophysics, basin and reservoir modelling, rock experiments, mineral reactions and geochemistry, geomechanics, and marine geology.*

## **THEME 4: LIVING WITH GEOLOGY: Geohazards and anthropogenic impact**

This theme aims at incorporating contributions related to the broad aspect of residing on a planet under the influence of both geo- and man-made hazards. In this context Geohazards should be understood in the broadest possible sense as any hazard affecting life on Earth, from Earthquakes to Radon gas and naturally polluted waters that are caused by geological processes. Furthermore, many areas of the world are growing more and more densely populated, which increases the risk and possible impact resulting from potentially fatal geological processes. Moreover, the global, regional and local anthropogenic impact constantly affects air-, water- and soil quality. Do we know enough about these processes and their impacts to provide and implement safe guidelines for the Society?

- **Geohazards – the Nordic perspective**

*The Nordic countries face a varied spectre of geohazards, spanning from geophysical types such as volcano eruptions and earthquakes at Iceland to quick clay landslides in Norway and Sweden. This session aims at presenting a wide range of geohazard studies in the Nordic countries, including case studies from various geographical, geological and topographical settings and more general evaluations of geohazards from a Nordic perspective. The session is open for all types of geohazards present in the region.*

- **Risk assessment and management of geohazards**

*In recent years there has been an increased interest in the study of risk assessment and risk management in relation to geohazards. This interest is reflected both at international level, through UN organizations and the World Bank, and at regional and local levels. The world continues to see the development of extremely densely populated areas, depending on sophisticated infrastructure in*

order to secure necessary resources (e.g. food, water and energy). Such areas are, in many parts of the globe, exposed to threats from, i.a. earthquakes, tsunamis, rising sea level, floods and shortage of (ground) water. Smaller communities are exposed to more local threats, e.g. landslides in Norway. The key questions are: How should societies, on a large or a small scale, handle the risk posed by geohazards? What should the role of geoscientists in the risk management process be? Contributions addressing issues such as risk, hazard, vulnerability, coping capacity etc. are welcome.

- **Offshore, near-shore and coastal geohazards**

*As prospecting for hydrocarbons move into increasingly deeper waters of the world's continental margins, offshore geohazards become a topic of great importance. Main offshore geohazards include slope instability, underground blowouts, and effects of shallow gas and gas hydrates. In recent years, geohazards in near-shore and coastal settings, especially instability of slopes in coastal areas, have also received increasing attention. In this session we invite contributions from the offshore industry as well as from researchers and planners working on land-use plans in a coastal setting.*

## **THEME 5: PETROLEUM GEOSCIENCE AND EXPLORATION**

With the recent acceptance of peak oil, and with highly fluctuating prices and markets, the Global petroleum industry is facing significant challenges in order to secure the resource demand from an evolving society, at sustainable costs. A process from which the extensive exploration and production activity seen along the North Atlantic Margin is not excluded. This theme is restricted to geoscientific contributions that specifically target and address topics associated with Petroleum geosciences applied to present and future exploration and production in the North Atlantic – Arctic region.

- **Exploration in the mature petroleum provinces of the North Atlantic region**

*Most of the Danish and Norwegian sector in the North Sea and the shelf areas in the Norwegian Sea are in a mature stage for petroleum exploration with well developed infrastructure and a huge geological and geophysical data base. In this session, results from petroleum geological studies and exploration activity in these areas will be presented. Contributions on case studies, play concepts, basin studies and new or improved methods and techniques are particularly welcome.*

- **Research and exploration on the NE Atlantic margins**

*The petroleum industry has over the past 30 years acquired a tremendous amount of 2D and 3D seismic and well data from the Norwegian Sea, Faeroes, Jan Mayen Ridge and offshore East Greenland. In the plate tectonic picture these provinces constitute one basin province that by nature should be evaluated as one entity and by looking for analogues. The aim of this session is to cover the range of scale from regional geological setting to details from onshore exposures, 3D data and wells. We in particular encourage papers on research and exploration targets such as new basin models, paleogeography and sand fairway systems, high pressure reservoirs, source rock presence and maturation and sub basalt exploration.*

- **New Frontiers: Petroleum Geology and Exploration in the Arctic**

*The Arctic region represents one of few remaining underexplored provinces with high hydrocarbon potential and the political and economic interest in the region also comprises its petroleum resources. Many companies are actively exploring in the circum Arctic basin provinces. Large areas are, however, not open for exploration and data from these areas are important for our understanding of sedimentary systems and petroleum geology. The new phase of exploration in the Norwegian sector of the Barents Sea has changed previous concepts of the Barents Sea as mainly a gas province, and focus is changing from the Jurassic to the Paleozoic, Triassic and Cenozoic play models. It is still a major challenge to predict the preservation of hydrocarbons in the traps. This session is aimed on the*

*Norwegian and Russian Barents Sea, Svalbard and North Greenland including their offshore regions, and we encourage papers covering a wide range of topics from plate tectonics and geophysical data and modelling, rift and shear zone development, basin subsidence and erosion history, reservoir development and quality and maturation of source rock intervals.*

## **THEME 6: COMMUNICATING GEOSCIENCES: Managing and Informing**

This includes the justification for geoscientific knowledge and how scientific results are stored for the use by future generations. It should be our collective responsibility to make sure that the Society is correctly informed and up-to-date on matters of general or current interest. This entails popular science and the education of the public in general, the establishment, availability and care of databases and reference collections.

- **Databases, Reference collections, Archives and their retrieval**

*Large amounts of geological data, now housed in museums and other institutions have been collected over the years. This knowledge is sought after by commercial geological industry, educational institutions and other bodies. New computer techniques affordable by most users allow digital treatment, visualization and other forms of re-use of such information. Furthermore, many geological localities have become inaccessible or even destroyed by urbanization and or new infrastructure – in which case material and data need to be made available to the public; digital or “real”. This session calls for papers on geological data management, administration of museum and other collections, computer techniques designed to optimize storage, batch treatment, retrieval and presentation of geological data, geological resources on the internet as well as other related topics.*

- **Topical science and the contact with the media**

*Recent years have shown an increasing interest in geological and or geoscientific topics in the media and the society in general. Very often this results from catastrophic and violent geological events (earthquakes, volcanic eruptions, tsunamis and landslides) or from geological topics of political or environmental relevance. In such cases it is important that geoscientific institutions play an active role in providing the public with accurate and scientifically based information and explanations. But are we taking this task seriously enough? Conversely, we seldom see the media addressing geoscientific topics out of pure fascination, curiosity or the desire to provide their audience with general educative knowledge. The question that should be on every geoscientists lip is: “How can this be?” This session aims at providing geoscientists with insight on how the media thinks and operates. How to approach the Media? What is a good story? What is the Medias view on geosciences? What do the Media expect when communicating with scientists? These and other relevant questions will hopefully be answered in this session where the geoscientific communities will have a unique possibility to learn how to improve the communication of geosciences to society by means of media coverage. This somewhat untraditional session will be based on talks from journalists representing various Media channels (i.e. TV, Radio, Internet and Newspapers).*

- **Educating the Educators – means, motivation and research**

*Reviews of geoscience educational research shows that the most effective way to develop geoscience education worldwide involves a two-stage process. First there must be opportunities for teaching geoscience, either through geoscience as part of a national curriculum or through optional geoscience courses. Secondly, when these opportunities are available, well designed curriculum materials must be integrated with professional development and a well constructed research program. The session welcomes descriptive papers dealing with teaching geosciences in particular countries and general papers on research in geosciences education.*

## INTERDISCIPLINARY SESSIONS

- **ID:1 Fluid processes**

*The role of fluids is vital to both exogenic and endogenic geological processes. Improved understanding of the migration of reactive geological fluids and its coupling to deformation such as fracturing and pore collapse is critical to understand important geological processes including weathering, primary and secondary migration of hydrocarbons, a variety of seepage processes, serpentinization, most metamorphic processes, and the formation of hydrothermal ore deposits. Recent studies of gas seeps offshore Norway provide data on the interplay between gas, water and sediment in the subsurface and at the sea bed. The migration processes from reservoir to trap to seep is one important part of the Fluid Processes session. It is also directly relevant for applications towards CO<sub>2</sub>-sequestration, and exploration of geothermal energy. Some fluid processes are 'violent' and may catastrophically produce a substantial change in the earth's surface configuration. Examples of these are asteroid impacts, phreatic and phreatomagmatic volcanic eruptions, and landslides. We propose a session on fluid processes including contributions from field, modelling and experimental approaches. Topics may vary from any aspect of reactive fluid migration, to fluid and gas expulsion in marine and terrestrial environments, to any fluid-controlled violent process within the Earth or near the Earth's surface.*

- **ID:2 Deformation processes**

*Deformation processes operate on all temporal and spatial scales, from tectonic plates to single crystals, sometimes over millions of years and other times in fractions of seconds. The involved materials are often complex and may exhibit several of the following properties: heterogeneous, granular, porous, anisotropic, brittle, ductile, and non-linear. In addition these material properties may change as a function of temperature, pressure, stress, strain, presence of fluids, reactions, and phase changes. Deformation processes shape the way our planet looks, the Earth surface in concert with climatic and erosional processes, the Earth interior through feedbacks between brittle-ductile and small-large scale processes. Hence, if we really want to understand how the Earth works we cannot subdivide it into categories such as mantle, crust, mountain, fold, fault, fracture, shear zone, basin, or reservoir. Instead, the different branches of deformation process research have to be brought together in order to bridge the gaps in between, which is the aim of this session. We welcome submission on all aspects of deformation processes and especially encourage contributions from quantitative and/or integrated field, laboratory and theoretical studies.*

- **ID:3 Data acquisition, Modelling and Visualization**

*Rapid developments in geophysical and remote sensing methods as well as modelling approaches provide excellent opportunities to better reveal the earth subsurface and its evolution. Improved data acquisition and mapping is a real possibility if users of different methods applied for example at laboratory, field and global scales exchange knowledge. We welcome contributions on methods used for petroleum and mineral exploration and production, such as seismic methods, electromagnetic, magnetotelluric, gravity, remote sensing and surveying. In addition, we encourage contributions on novel approaches to imaging evolving geological processes, structures, strains, forces and fluid flow, including laboratory and numerical modelling approaches. Case studies and novel visualization of results are particularly welcomed.*

- **ID:4 Scandinavian Geodynamics – deep processes and surface response**

*New geophysical data of the crust and mantle are available from the TopoScandia Deep/Eurocores project. These allow quantification of the processes leading to the present-day topography observed over the Scandes and the adjacent margin (including the Danish and Norwegian shelf), and provide a means of linking the surface to depth. Denudation, weathering and sedimentation are combined responses to changes in lithosphere and sub-lithosphere processes and climate. Data from offshore sedimentary basins provide detailed information about the Cenozoic denudation rates, climate, timing and nature of tectonic events and location of drainage systems. Glacial erosion has to a variable degree modified the pre-existing topography and the glacial isostatic adjustment is yet active. Understanding the present-day topography, thus, calls for a cross-disciplinary approach, spanning from mantle to glacial processes, and covering time spans from thousands to tens of millions years.*

*The aim for this session is to bring together scientists with cross-disciplinary background to provide insight on geodynamic mechanisms with both qualitative and quantitative measures on rates and magnitudes of vertical motion. Denudation and sedimentation rates from on-shore and off-shore observations must be integrated with pre-glacial and glacial landscape development models. The pre-glacial models should be derived from the geological record incorporating rift and post rift subsidence and sedimentation history, possible influence of the Iceland mantle plume and/or components of far field stresses, and plate motion with respect to sub-lithosphere velocity/density anomalies. Contributions on observations and modelling of global and regional sea-level changes during the Cenozoic, last interglacial-glacial cycle, late-glacial to Holocene, and predictions for the near future are also encouraged.*

- **ID:5 Continental Scientific Drilling in the Nordic countries**

*Many key scientific questions in Earth Sciences require direct access to the subsurface by scientific drilling. However, technological complexity and the entailed costs make drilling projects difficult to arrange for individual researchers/research groups. During recent years, the Nordic countries experienced a great interest in scientific drilling, originating from a diversity of scientific fields including, amongst others, geological sciences, geophysics, biology, hydrology and engineering sciences & technology. Today, four Nordic countries - Iceland, Finland, Norway and Sweden - are members of the International Continental Scientific Drilling Program (ICDP). Finnish, Icelandic and Norwegian ICDP projects have already been implemented or are operational. The Swedish national initiative, the Swedish Deep Drilling Program, comprises six projects in varying stages of development, involving 80 scientists from 14 countries, including all Nordic countries. In 2009, several workshop proposals have been submitted to ICDP from Nordic research groups. This session aims to depict the current state of scientific drilling in the Nordic countries. Invited are presentations about past, present and future drilling projects and about all drilling-related research. Encouraged are also presentations about outstanding new knowledge (that will be) acquired by scientific drilling and its societal and industrial benefits.*

## **WORKSHOPS (Post- or Pre-Conference)**

- **Geophysical tools and methods in petroleum exploration, production and reservoir characterization (post conference Short course)**

*3D seismic visualisation has developed immensely over the past years and experts in the field have demonstrated that the data we normally work on contain a lot more information than we traditionally are able to extract and utilize. In addition, industry standard software applications are becoming more and more sophisticated and provide users with optimized workflows in a seamless desktop environment. This provides oil companies with tools enabling constant monitoring and data sharing from early exploration to tail-end production. Parallel to the constant development of*

commercial products, highly specified cutting edge applications are developed locally at Universities and research institutions. The proposed workshop/short course aims at presenting the most recent advancements within this field and will hopefully stimulate to a closer cooperation between academia and industry.

- **Geological and paleontological Data Analysis (post conference Workshop)**

*Statistical treatment of data is becoming a standard part of the geologist's tool box. This includes not only traditional hypothesis testing, but also statistical modelling and visualization methods. We welcome both theoretical contributions and applications to this session. Subjects include, but are not limited to: Geostatistics (spatial analysis), time series analysis (including climate series and cyclostratigraphy), multivariate methods in geochemistry and paleoecology, directional analysis, quantitative biostratigraphy and morphometrics in paleontology.*

- **Modelling deformation and fluid processes (post conference Workshop)**

*The proposed workshop will focus on modelling of deformation and fluid processes applicable to a wide range of natural geological environments. The workshop will provide an Introduction into solving of major types of partial differential equations using finite differences and finite element methods in Matlab. Other topics include: theoretical and numerical models of transport and reactive processes in porous media, upscaling the porous flow using effective media theories, direct resolution of the Stokes flow in a complex pore space and validation of the effective medium theories by unstructured finite element models, resolving different temporal scales for the diffusion, advection and reaction processes using tailored numerical methods, and introduction to porosity waves and modes of thermo-chemo-mechanical coupling.*

- **The future of geoscientific research – management, recruitment, funding and directions (conference Workshop/discussion)**

*As with other dominantly government-funded research activities, university based geoscientific research has seen a shift in focus and an overall decline in funding over the last decade. Although new possibilities have arisen through the possibility of securing long-term funding for large projects (both national and EU based), this is not representative for most geoscientific research communities. There is also a significant mismatch between the number of PhD graduates and the number of scientific positions made available at Universities and other research institutions, making recruitment to the universities difficult. With declining recruitment to geoscience studies and an already emerging global deficit in geoscientific expertise, the way today's research and education is managed, funded and organized needs thorough evaluation in order to secure the future of geoscientific research of excellent quality. For countries depending on geoscientific expertise, such as the Nordic countries, failure in solving these issues will have dramatic consequences with respect to the ability to maintaining existing industry as well as developing new industries for the future.*

*With this informal afternoon workshop we encourage Nordic researchers to meet and share experiences as well as discuss possible solutions to the above challenges. This workshop will also serve as a venue for discussing potential future research collaboration among Nordic colleagues and institutions.*