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Division Energy, Resources & Environment, ERE

## Energy, Resources and the Environment: Meeting the challenges of the future

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### Abstract

The European Geosciences Union (EGU) brings together geoscientists from all over the world covering all disciplines of the Earth, planetary and space sciences. This geoscientific interdisciplinarity is needed to tackle the challenges of the future. One major challenge for humankind is to provide adequate and reliable supplies of affordable energy and other resources in efficient and environmentally sustainable ways. This Energy Procedia issue provides an overview of the contributions of the Division on Energy, Resources & the Environment (ERE) at the EGU General Assembly 2017.

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### 1. Introduction

The EGU General Assembly 2017 was held from 23-28 April 2017 in Vienna, Austria. The total number of participants was 14,496 scientists of which 53% were under the age of 35 years. They came from 107 countries and

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joined 649 unique scientific sessions, 88 short courses and 322 side events. Presentations were given in the form of 11,312 posters, 4,849 orals and 1,238 interactive content (PICO).

The EGU scientific activities are organized through divisions encompassing all studies of the Earth, its environment and of the solar system in general. The 2017 scientific program of the Division on Energy, Resources & the Environment (ERE) included six subprograms:

- Integrated studies,
- Impact of energy and resource exploitation on the environment,
- Non-carbon based energy,
- Carbon based energy,
- Geo-storage for a sustainable future,
- Geo-materials from natural resources.

The ERE division hosted 19 sessions and co-organized another 14 with other divisions. In total, 529 presentations came from the ERE division in the lead, corresponding to 3% of all contributions at the EGU General Assembly 2017. This special issue includes a collection of contributions, comprising a variety of topics that were presented in the ERE sessions [1]. Comparable overview issues were published in Energy Procedia in previous years [2-5].

## 2. Integrated studies

The subprogram “Integrated studies” contained four sessions with ERE in the lead. The first one on “*Energy, Resources & the Environment*” provided an overview of the interdisciplinarity of the ERE division needed to tackle the challenges of the future. One of the main challenges is to provide adequate and reliable supplies of affordable energy and other resources, obtained in efficient and environmentally sustainable ways, essential to economic prosperity, environmental quality and political stability around the world.

The session “*Energy and environmental system interactions - Policy and modelling*” addressed the fact that the transition to a low-carbon energy regime to mitigate greenhouse gas emissions and combat climate change, together with the need to meet future demands and security of energy supply, presents a challenge for many governments. Meeting these challenges would require significant changes to the whole energy system, including the deployment of new technologies, expansion of power generation capacity and significant levels of demand-side management. This multidisciplinary session discussed novel approaches for analyzing energy and Earth/environmental systems interactions and their implications for policy and society.

The session “*Fracture, mechanics and flow in tight reservoirs*” presented the results of experimental, numerical and field studies on fracture network formation and control on fluid flow of naturally- and hydraulically-fractured systems. Better prediction of subsurface fracture arrangements and their mechanical and flow response has become an increasingly relevant field of research.

The session “*Securing sustainable supplies of mineral resources for the low carbon economy*” highlighted the challenges to sustainable mineral exploration in developed and developing economies and the critical role that partnership working and community engagement can play.

## 3. Impact of energy and resource exploitation on the environment

With the subprogram “Impact of energy and resource exploitation on the environment”, ERE was in the lead for two sessions. The first one on “*Environmental impacts of hydraulic fracturing: Measurements, monitoring, mitigation and management*” emphasized that the accelerated growth of oil and gas production from shale formations is accompanied by growing public concern on the environmental impacts. These concerns are related to hydraulic fracturing, required for oil and gas production from unconventional reservoirs, like, e.g., shale gas. This session presented studies from all over the world, where environmental impacts of hydraulic fracturing were measured and monitored. Scientists from various disciplines discussed the numerous processes that control the environmental impacts which shale gas exploitation and production will or may have on the subsurface, surface and atmosphere.

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