Hydro-fracture in the laboratory: matching diagnostic seismic signals to fracture networks via new rock physics experiments

Fact Sheet

Project Information

FRACSEIS

Grant agreement ID: 333588

Project closed

Start date
1 March 2013

End date
28 February 2017

Funded under
Specific programme "People" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Total cost
€ 100 000,00

EU contribution
€ 100 000,00

Coordinated by
UNIVERSITY OF PORTSMOUTH HIGHER EDUCATION CORPORATION
United Kingdom

Objective

Fluids are a ubiquitous element of the Earth system, whether shallow aquifers, deeper crustal fluids (meteoric water, hydrothermal fluid and hydrocarbons), or deep fluids implicated in subduction zones via dehydration reactions. However, our understanding of the stresses imparted by fluids in the shallow crust (2 km) and how these over-pressurize the surrounding rock via the process of hydrofracture is not yet fully understood, especially in anisotropic rocks. In recent years, this topic has been the subject of much scientific interest in the light of the new opportunities surrounding the production of natural gas via shale reservoirs that must necessarily be fractured in order to release the gas in a controversial process known as ‘fracking’. This process has attracted considerable attention from the media, policy makers and the engineering community due to the challenges it poses.

The scenario above is further complicated by the fact that shale rock layers are anisotropic in nature, both in strength and in terms of material physical properties, making any assessment of how and where fracture propagate difficult. In addition, the use of active pore fluids (via temperature or acidity level) adds yet another factor to the process, especially from an engineering perspective. To investigate these issues, the FRACSEIS project aims to replicate the process in an laboratory environment that will allow stress, fluid pressure and temperature to be controlled. Measurements of the resulting seismicity (known as acoustic emission, AE) will then be made to generate an advanced “geophysical image” of the process for various types of shale rock, and different environmental conditions. Specifically the methods of AE location, P-wave tomography, and post-test X-ray computed tomography will all be employed in order to better understand how the fracture patterns evolve in space and time and with respect to the anisotropy of the rock and the imposed environmental conditions.

Fields of science (EuroSciVoc)

natural sciences > chemical sciences > organic chemistry > **hydrocarbons**

engineering and technology > environmental engineering > energy and fuels > fossil energy > **natural gas**

natural sciences > earth and related environmental sciences > geology > seismology > **plate tectonics**

Programme(s)

FP7-PEOPLE - Specific programme "People" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Topic(s)

FP7-PEOPLE-2012-CIG - Marie-Curie Action: "Career Integration Grants"

Call for proposal

FP7-PEOPLE-2012-CIG
See other projects for this call

Funding Scheme

MC-CIG - Support for training and career development of researcher (CIG)

Coordinator

UNIVERSITY OF PORTSMOUTH HIGHER EDUCATION CORPORATION

EU contribution

€ 100 000,00

Total cost

No data

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Region

South East (England) > Hampshire and Isle of Wight > Portsmouth

Activity type

Higher or Secondary Education Establishments

Links

Contact the organisation Website
Participation in EU R&I programmes
HORIZON collaboration network

Last update: 10 September 2017

Permalink: https://cordis.europa.eu/project/id/333588