Geophysical Research Abstracts
Vol. 17, EGU2015-15435, 2015
EGU General Assembly 2015

Growth and activity of reservoir microorganisms under carbon capture and storage conditions

Jana Rakoczy (1), Claudia Gniese (2), and Martin Krüger (1)

(1) Department of Resource Geochemistry, Federal Institute for Geosciences and Natural Resources – BGR, Hannover, Germany , (2) Institute of Biosciences, TU Bergakademie Freiberg, Germany

Carbon capture and storage is a technology to decelerate global warming by reducing CO_2 emissions into the atmosphere. To ensure safe long-term storage of CO_2 in the underground a number of factors need to be considered. One of them is microbial activity in storage reservoirs, which can lead to the formation of acidic metabolites, H2S or carbonates which then might affect injectivity, permeability, pressure build-up and long-term operability.
Our research focused on the effect of high CO_2 concentrations on growth and activity of selected thermophilic fermenting and sulphate-reducing bacteria isolated from deep reservoirs. Experiments with supercritical carbon dioxide at 100 bar completely inhibited growth of freshly inoculated cultures and also caused a rapid decrease of growth of a pre-grown culture. This demonstrated that supercritical carbon dioxide had a certain sterilizing effect on cells. This effect was not observed in control cultures with 100 bar of hydrostatic pressure. However, when provided with a surface for attachment, CO_2-inhibited cells restarted growth after CO_2 release. The same was observed for organisms able to form spores. Further experiments will examine physiological and molecular properties of the model organism allowing for prediction of its sensitivity and/or adaptability to carbon dioxide in potential future storage sites.