Geophysical Research Abstracts,
Vol. 11, EGU2009-9619, 2009
EGU General Assembly 2009

2D/3D velocity model for the high resolution 2D and 3D seismic data from the CO2SINK Ketzin Project

A. Ivanova (1), G. Asch (2), S. Lueth (3), and J. Goetz (4)

(1) Deutsches GeoForschungsZentrum, Potsdam, Germany (aivanova@gfz-potsdam.de), (2) Deutsches GeoForschungsZentrum, Potsdam, Germany (asch@gfz-potsdam.de), (3) Deutsches GeoForschungsZentrum, Potsdam, Germany (slueth@gfz-potsdam.de) , (4) Deutsches GeoForschungsZentrum, Potsdam, Germany (jgoetz@gfz-potsdam.de)

Seismic traveltime inversion, traveltime tomography and seismic reflection techniques have been applied for two dimensional (2D) and three dimensional (3D) data acquired in conjunction with characterization and monitoring aspects at a carbon dioxide (CO2) geological storage site at Ketzin, Germany (the CO2SINK project) (S.Yordkayhun, 2008). A seismic source comparison from the 2D pilot study regarding acquisition parameters have been tested at the side has shown the weight drop source is suitable concerning the signal penetration, frequency content of the data and minimizing time and costs for the 3D data acquisition. For the Ketzin seismic data, the ability to obtain an accurate 2D/3D interval velocity model is limited by the acquisition geometry, source-generated noise and time shifts due to the near-surface effects producing severe distortions in the data. Moreover, these time shifts are comparable to the dominant periods of the reflections and to the size of structures to be imaged. Therefore, a combination of seismic refraction and state-of-the-art processing techniques, including careful static corrections and more accurate velocity analysis, has resulted in key improvements of the images and has allowed new information about the 2D/3D interval velocities. The results from these studies together with borehole information, hydrogeologic models and seismic modeling will be combined into an integrated 2D/3D velocity model. After that a careful 2D/3D depth migration is to be provided. It can be used as a database for the future monitoring program at the site.