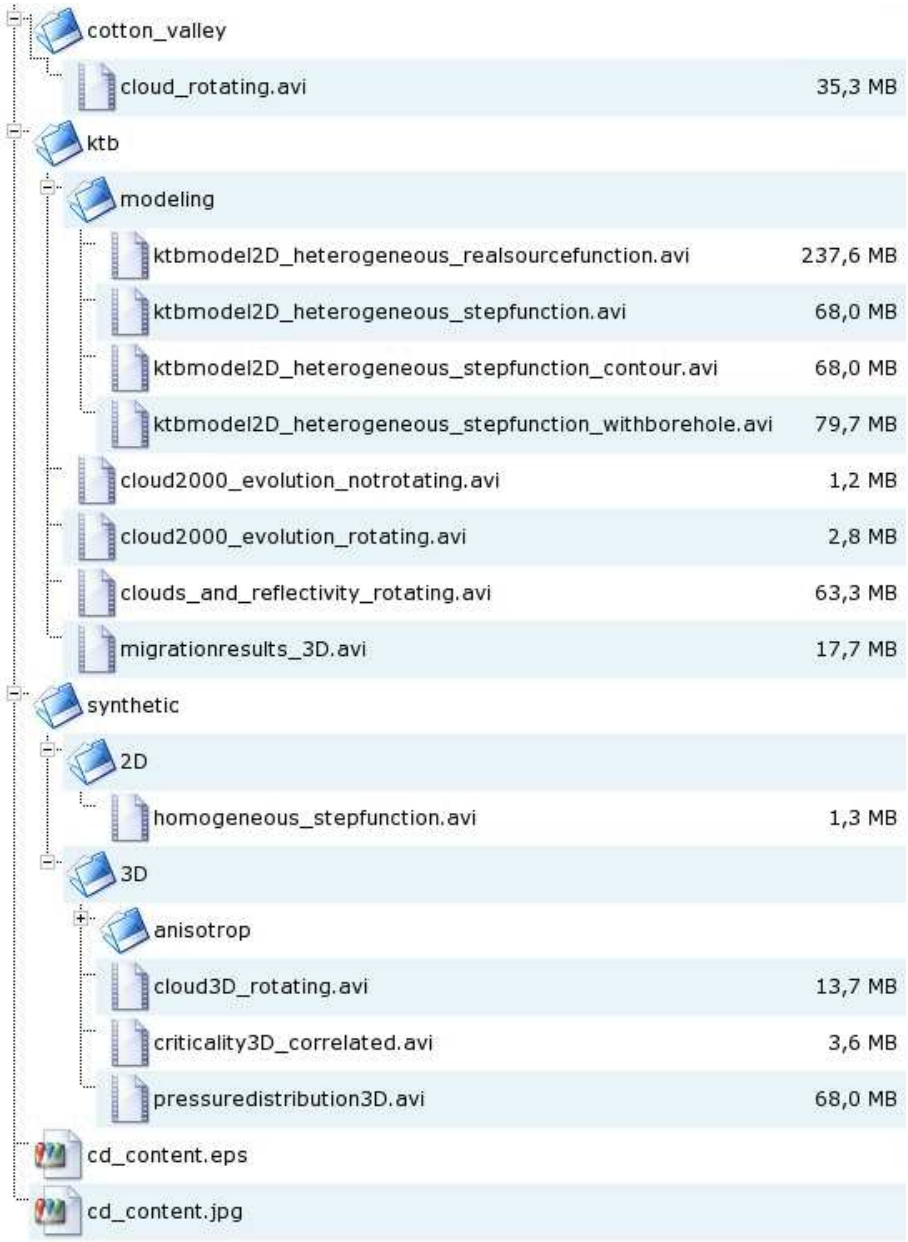
Appendix B

Contents of enclosed CD-ROM

The results presented in this thesis are primarily based on three- and four-dimensional data of fluid-induced microseismicity (3D hypocenters and times) and numerical simulations (time-dependent pressure distribution in 3D). Moreover, especially for the case study of KTB (chapter 4) and Cotton Valley (chapter 5) the interesting results would not have been obtained without an intensive 3D visualization. For nearly all analyses, movies and animations of the data tremendously helped to interpret the spatio-temporal evolution characteristics of microseismicity clouds. In particular, for the KTB case study 3D visualization was necessary in order to find the correlations of seismic reflectivity and microseismic hypocenter locations. On the enclosed CD-ROM, several supplemental movies in AVI format are included to clarify the results found and presented in this thesis for the reader. In the following, the directory structure and file locations are shown. Three directories are included in the root directory, containing supplement movies for chapters 3, 4 and 5 of this thesis:

`synthetic`	supplement movies for chapter 3
`ktb`	supplement movies for chapter 4
`cotton_valley`	supplement movies for chapter 5


cotton_valley
cloud_rotating.avi 35,3 MB
ktb
modeling
ktbmodel2D_heterogeneous_realsourcefunction.avi 237,6 MB
ktbmodel2D_heterogeneous_stepfunction.avi 68,0 MB
ktbmodel2D_heterogeneous_stepfunction_contour.avi 68,0 MB
ktbmodel2D_heterogeneous_stepfunction_withborehole.avi 79,7 MB
cloud2000_evolution_notrotating.avi 1,2 MB
cloud2000_evolution_rotating.avi 2,8 MB
clouds_and_reflectivity_rotating.avi 63,3 MB
migrationresults_3D.avi 17,7 MB
synthetic
2D
homogeneous_stepfunction.avi 1,3 MB
3D
anisotrop
cloud3D_rotating.avi 13,7 MB
criticality3D_correlated.avi 3,6 MB
pressuredistribution3D.avi 68,0 MB
cd_content.eps
cd_content.jpg

Detailed explanation of the single movies

`cotton_valley/cloud_rotating.avi`
Microseismicity cloud induced during the Cotton Valley injection experiment rotating around the vertical axis. Colors correspond to the event occurrence times.

`ktb/modeling/ktbmodel2D_heterogeneous_realsourcefunction.avi`
Solution of pressure distribution for 2D FEM model. This movie shows the time-dependent pressure perturbation for the hydraulically heterogeneous KTB model shown in figure 4.10. For the model, the real KTB 1994 injection function was used. Time slices of the pressure distribution are shown in figure 4.12.

`ktb/modeling/ktbmodel2D_heterogeneous_stepfunction.avi`
Solution of pressure distribution for 2D FEM model. This movie shows the time-dependent pressure perturbation for the hydraulically heterogeneous KTB model shown in figure 4.10. For the model, a step function like injection signal was used. Time slices of the pressure distribution are shown in figure 4.11.

`ktb/modeling/ktbmodel2D_heterogeneous_stepfunction_contour.avi`
Solution of pressure distribution for 2D FEM model. This movie shows the time-dependent pressure perturbation for the hydraulically heterogeneous KTB model shown in figure 4.10. For the model, a step function like injection signal was used. Time slices of the pressure distribution are shown in figure 4.11. In this movie, additional isolines of constant pressure are included.

`ktb/modeling/ktbmodel2D_heterogeneous_stepfunction_withborehole.avi`
Solution of pressure distribution for 2D FEM model. This movie shows the time-dependent pressure perturbation for the hydraulically heterogeneous KTB model shown in figure 4.10. For the model, a step function like injection signal was used. Time slices of the pressure distribution are shown in figure 4.11. The solid line corresponds to the KTB main borehole location.

`ktb/cloud2000_evolution_notrotating.avi`
Visualization of the time-dependent hypocenter evolution of the cloud of microseismicity observed during the KTB injection experiments in the year 2000. Colors correspond to the event occurrence times up to 70 days after the fluid injection was started. The injection function and event rate are shown in figure 4.2b.

`ktb/cloud2000_evolution_rotating.avi`
Visualization of the time-dependent hypocenter evolution of the cloud of microseismicity observed during the KTB injection experiments in the year 2000. Colors correspond to the event occurrence times up to 70 days after the fluid injection was started. The injection function and event rate are shown in figure 4.2b. For clarification of hypocenter locations this movie is rotating around the z-axis.

`ktb/clouds_and_reflectivity_rotating.avi`

Cloud of events induced during the year 1994 and 2000 injection experiments at the KTB together with a subvolume of seismic reflection intensities. For clarification of hypocenter locations and the correlation with reflection amplitudes this movie is rotating around the z-axis. The red boxes correspond to the year 1994 seismicity, green spheres denote events induced during the year 2000 experiment. Compare with figure 4.6 in this thesis.

`ktb/migrationresults_3D.avi`
Animation of the results of 3D prestack Kirchhoff depth migration at the KTB. Seismic reflection amplitudes are shown on two static and one moving slice. Red colors correspond to high seismic reflection intensities, blue colors to small reflection amplitudes. Compare with figure 4.5b in this thesis.

`synthetic/2D/homogeneous_stepfunction.avi`
Time-dependent pressure distribution for a homogeneous 2D FEM model using isotropic hydraulic diffusivity. Compare with figure 3.5 in this thesis.

`synthetic/3D/cloud3D_rotating.avi`
Event cloud triggered in 3D after numerical modeling. The movie shows the hypocenter location of the events for a hydraulically homogeneous model and Gaussian correlated criticality (compare figure 3.19 and 3.20). Colors correspond to the event occurrence times up to t=100s after the step-function like injection was started.

`synthetic/3D/criticality3D_correlated.avi`
Movie of criticality in 3D. On the top, a Gaussian correlated criticality is shown. On the bottom the same correlation length was used for the exponential correlation function. For triggering of events, the criticality is compared at each point for each time step of modeling with the pressure distribution shown in movie.

`synthetic/3D/pressuredistribution3D.avi`
Time-dependent pressure distribution for a homogeneous 3D FEM model using isotropic hydraulic diffusivity. A step function like injection signal with source in the center of the model was used. For triggering of events and generation of event distribution like shown in movie `synthetic/3D/cloud3D_rotating.avi`, the pressure perturbation is compared at each point for each time step of modeling with the criticality distribution shown in movie `synthetic/3D/criticality3D_correlated.avi`.

`cd_content.eps / cd_content.jpg`
Contents of CD-ROM and directory structure in `EPS/JPG`-format.