

Contents



1 Introduction to the Joint Research Project CLEAN: CO₂ Large-Scale Enhanced Gas Recovery in the Altmark Natural Gas Field	1
Michael Kühn, Frank R. Schilling and Heinz Wendel	
2 Technical Aspects of CO₂ Injection	7
Robert Meyer, Gernot Voigtländer and Heinz Wendel	
3 Well Integrity	13
Kurt M. Reinicke, Mingxing Bai, Peter Bock, Carsten Fichter, Zhengmeng Hou, Ralph Krebs, Hans-Jürgen Kretzschmar, Udo Lubenau, Robert Meyer, Mohsen Rafiee, Rico Rockmann, Meinhard Schmidt, Günter Schmitt, Steffen Schmitz, Catalin Teodoriu, Martina J. Weichmann, Falk H. Weinlich, Patrick Were, Lars Wundram and Yucheng Zhang	
4 Evaluation of Geo-processes	53
Andrea Förster, Daniel Albrecht, Sebastian Bauer, Gunther Baumann, Christof Beyer, Norbert Böttcher, Roland Braun, Knut Behrends, Ronald Conze, Marco De Lucia, Leonhard Ganzer, Reinhard Gaupp, Uwe-Jens Görke, Yang Gou, Jan Henninges, Zengmeng Hou, Bernd Kohlhepp, Olaf Kolditz, Michael Kühn, Christof Lempp, Rudolf Liedl, Robert Meyer, Ben Norden, Thomas Nowak, Peter Pilz, Dieter Pudlo, Matthias Rateizak, Viktor Reitenbach, Khaled M. Shams, Haibing Shao, Ashok K. Singh, Susanne Stadler, Lutz Stecken, Joshua Taron, Wenqing Wang, Norihiro Watanabe, Joachim Wienand, Jeoungseok Yoon and Martin Zimmer	
5 Reservoir and Cap Rock Monitoring	99
Michael Kühn, Johannes AC Barth, Gunther Baumann, Veith Becker, Michaela Bock, Stefan Buske, Ralf Fritschen, Rüdiger Giese, Christine Groß, Jan Henninges, Lars Houpt, Dagmar Kock, Martin Krüger, Daria Morozova, Anssi Myrntinen and Hilke Würdemann	

6 Environmental and Process Monitoring	131
Dirk Schäfer, Said Al Hagrey, Esben Auken, Andreas Bahr, Matthias Beyer, Andreas Dahmke, Ingolf Dumke, Nikolaj Foged, Markus Furche, Michael Gräber, Jochen Großmann, Max Helkjaer, Ralf Köber, Jürgen Poggenburg, Gert Naue, Stefan Schlömer, Christian Seeger, Lars Tischer, Angelika Vidal, Carla Wiegers and Christian Wöhl	
7 Theoretical Test Case of the Injection of 100,000 t of CO₂ into the Altmark Depleted Gas Field	169
Michael Kühn, Robert Meyer, Kilian Nchungong Awemo, Michaela Bock, Stefan Buske, Leonhard Ganzer, Rüdiger Giese, Lars Haupt, Juri Perestjuk, Erhard Ribbe, Gerhard Rosenthal, Steffen Schmitz, Cori Schreyer, Lutz Stecken, Arron T. Singhe, Matthias Tantow and Gernot Voigtländer	
8 Public Outreach	187
Andreas Hübner, Tanja Kollersberger, Peter Pilz, Maja Tesmer and Michael Kühn	
Index	197