



MiReCOL: developing corrective measures for CO₂ storage

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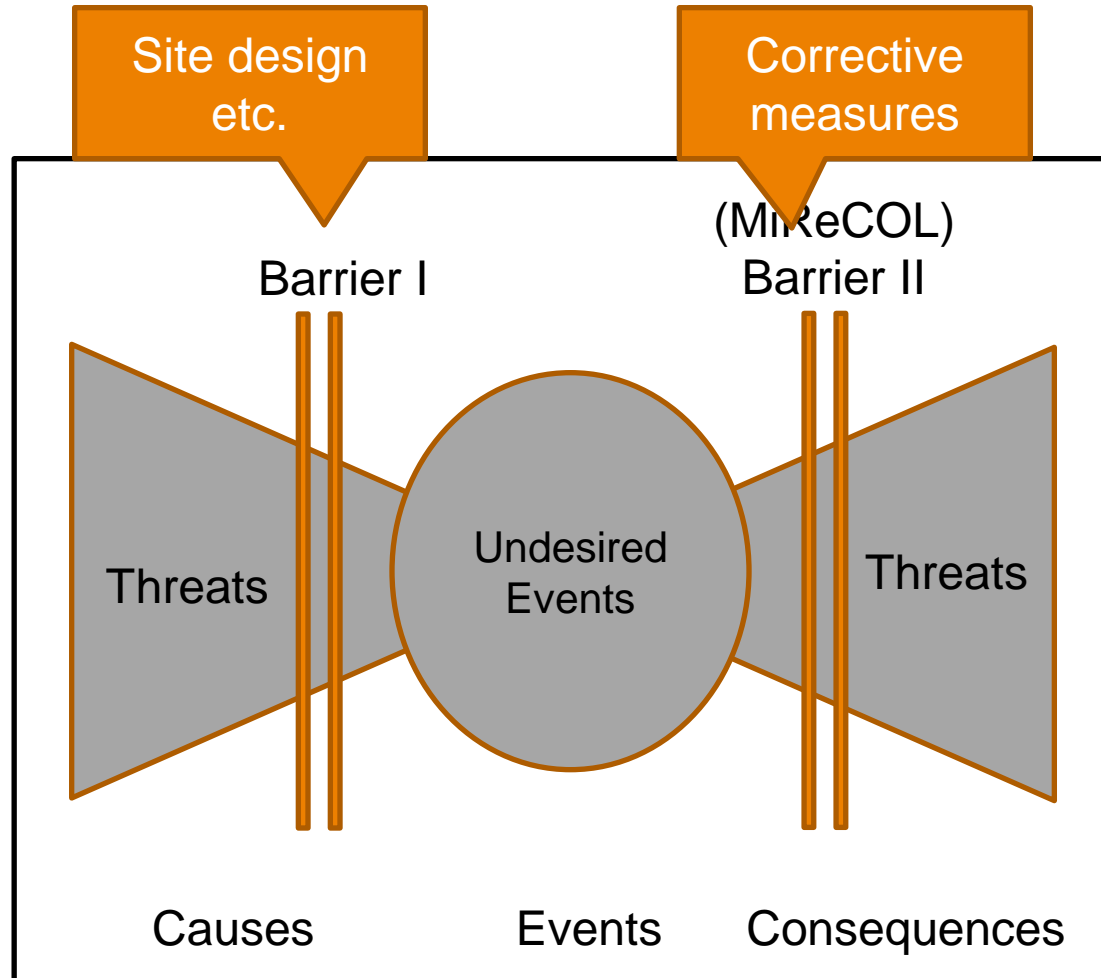
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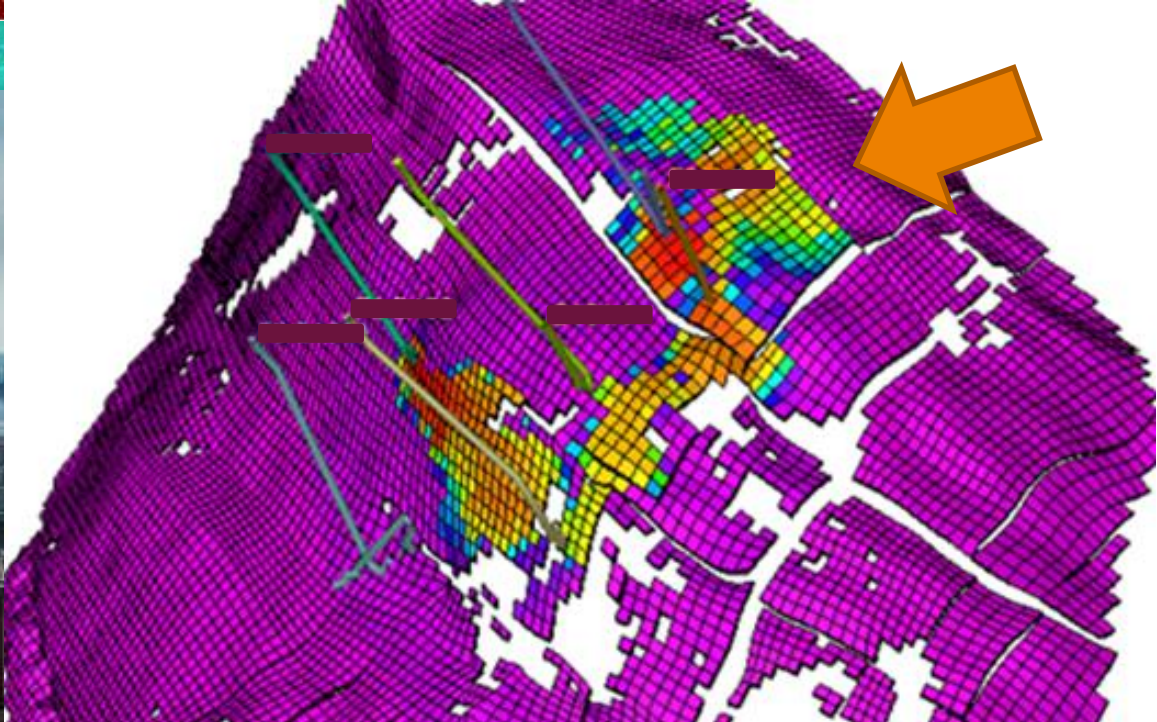
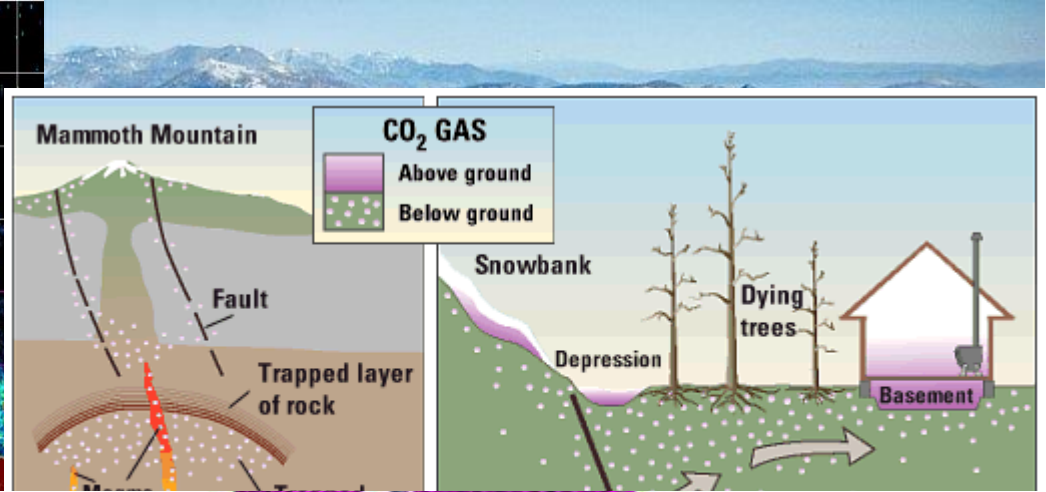
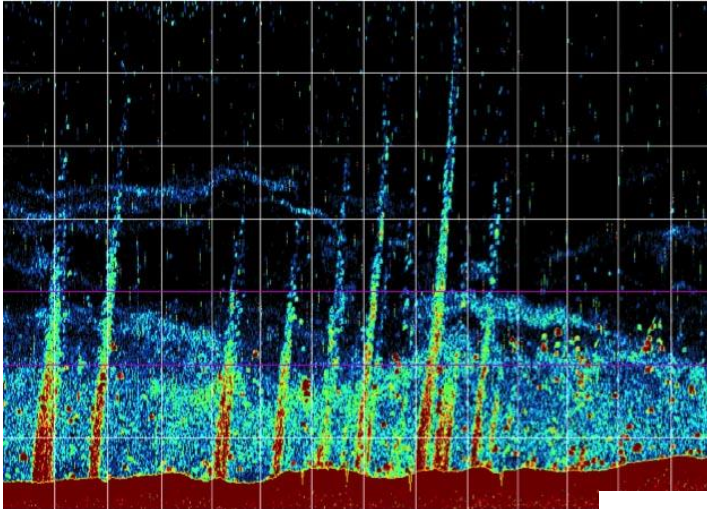
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Significant irregularities?

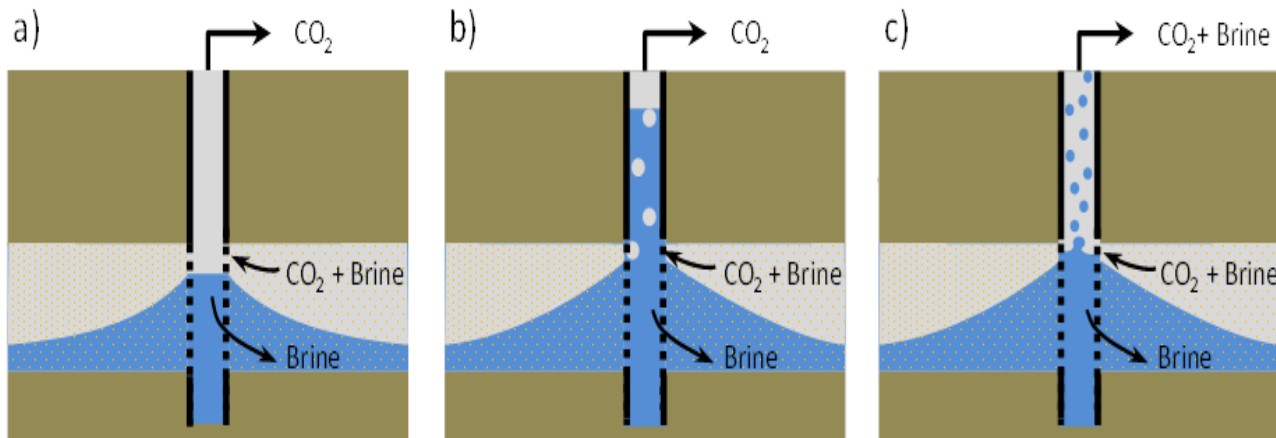


Nagylengyel, Hungary, 1998



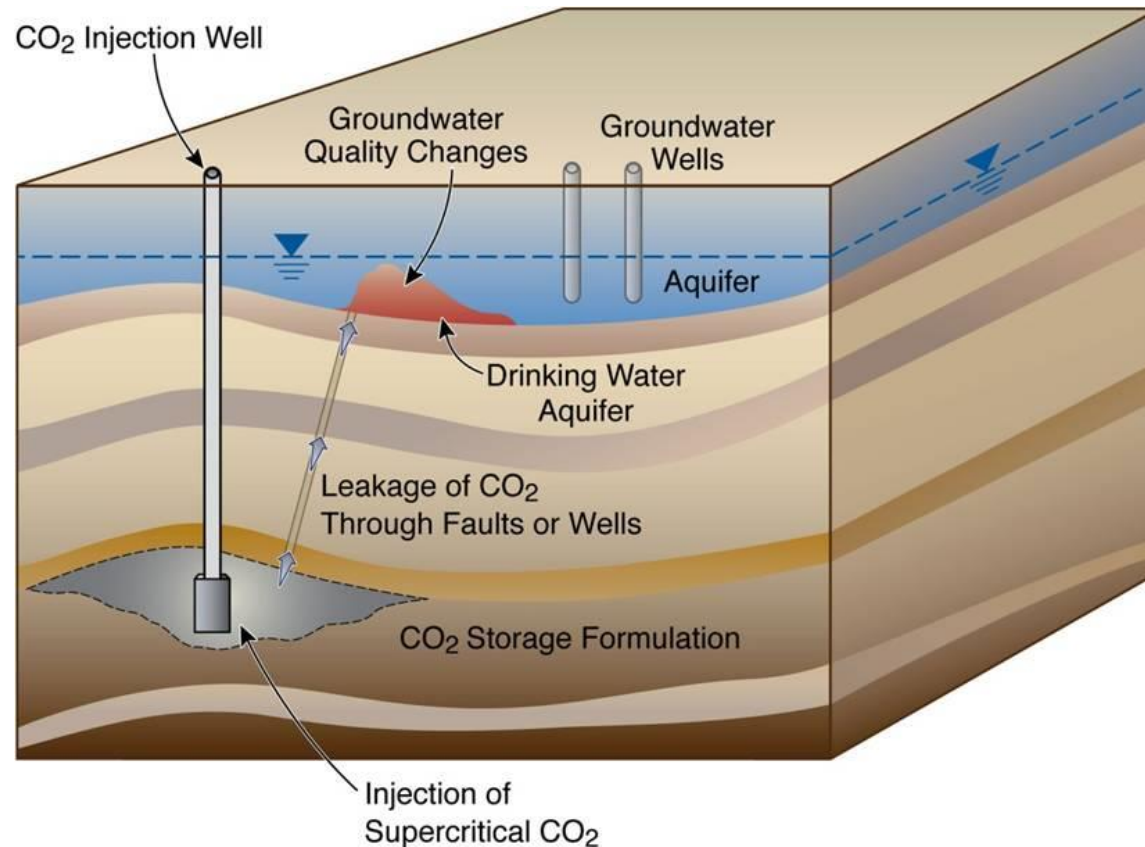
Currently available techniques

- › Existing techniques
 - › Pressure management
 - › Back production of CO₂
 - › Well remediation techniques



MiReCOL objective

- › To develop a toolbox of techniques available to mitigate / remediate undesired migration or leakage of CO₂
 - › Support the definition of corrective measures plans
 - › Help building confidence in deep subsurface storage of CO₂



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Div.*

Project approach

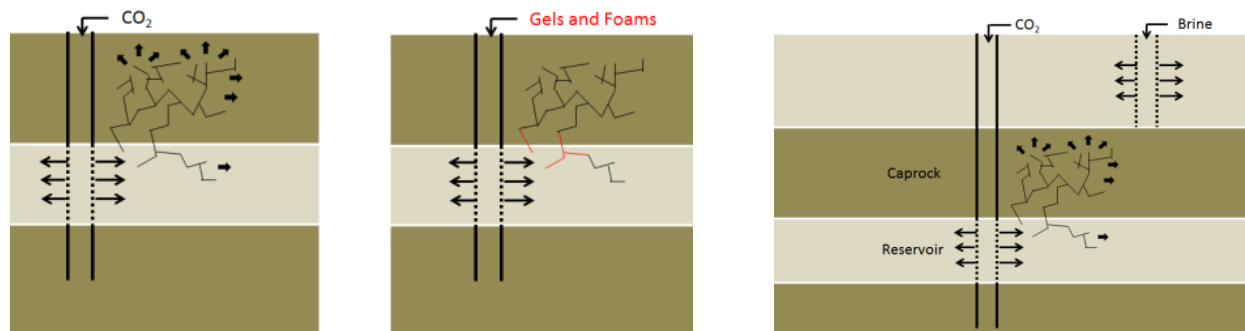
1. Create an inventory of **existing** remediation techniques
 - › Study merit for number of real / realistic storage complexes, e.g.:
 - › Fluid migration control through pressure management
 - › Remediation techniques for leakage along well
2. Add **new** remediation techniques
 - › Study merit for number of real / realistic storage complexes, e.g.:
 - › Sealants
 - › Smart materials in wells
3. Focus is on mitigation and remediation techniques in **deep subsurface**
 - › Corrective measures in (near-) surface region: use literature overview and other projects

Project approach

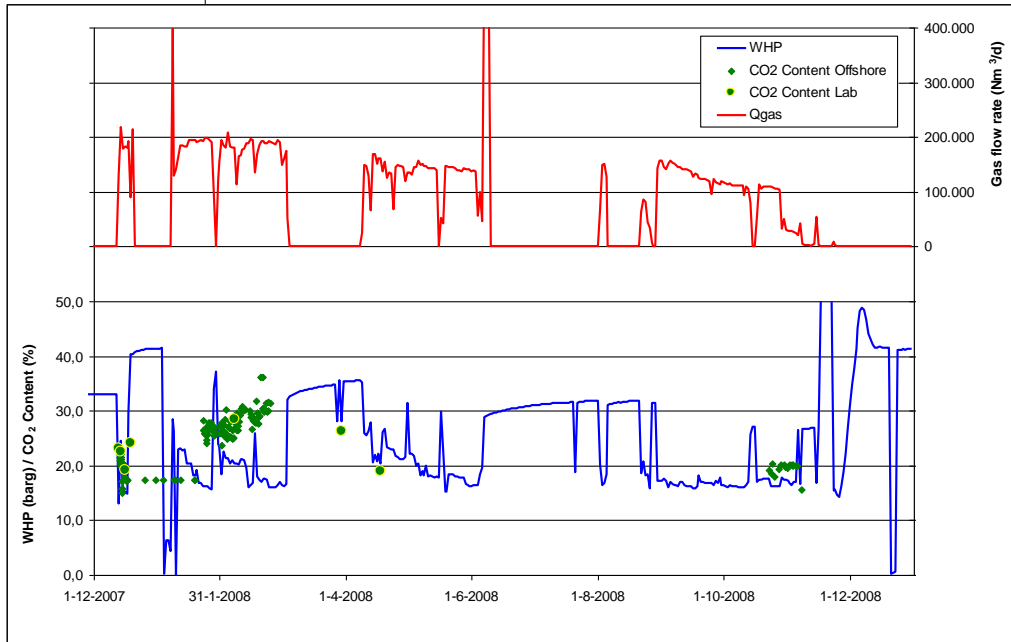
- › Central concept is **risk level**
- › Merit of mitigation or remediation technique is obtained by establishing overall risk level *before* and *after* deployment of the technique
 - › **Unmitigated risk** (i.e., threat or leak has occurred, but no action is taken)
 - › **Mitigated risk** (i.e., residual risk of threat or leak after deployment of mitigation or remediation technique, plus the impact of the deployment of the technique on the risk level of the storage site)
- › A mitigating or remediating action should be taken only when the mitigated risk is lower than the unmitigated risk

Project approach

- › **Site specificity vs general guidelines**
 - › The details of threats to safe and secure storage, and of leakage events are strongly **site specific**, and so are the options to mitigate or remediate
 - › The project will study mitigation and remediation techniques on a range of real or realistic storage complexes, to derive a range of *site-specific results*, from which more general conclusions will be drawn



Example: back production



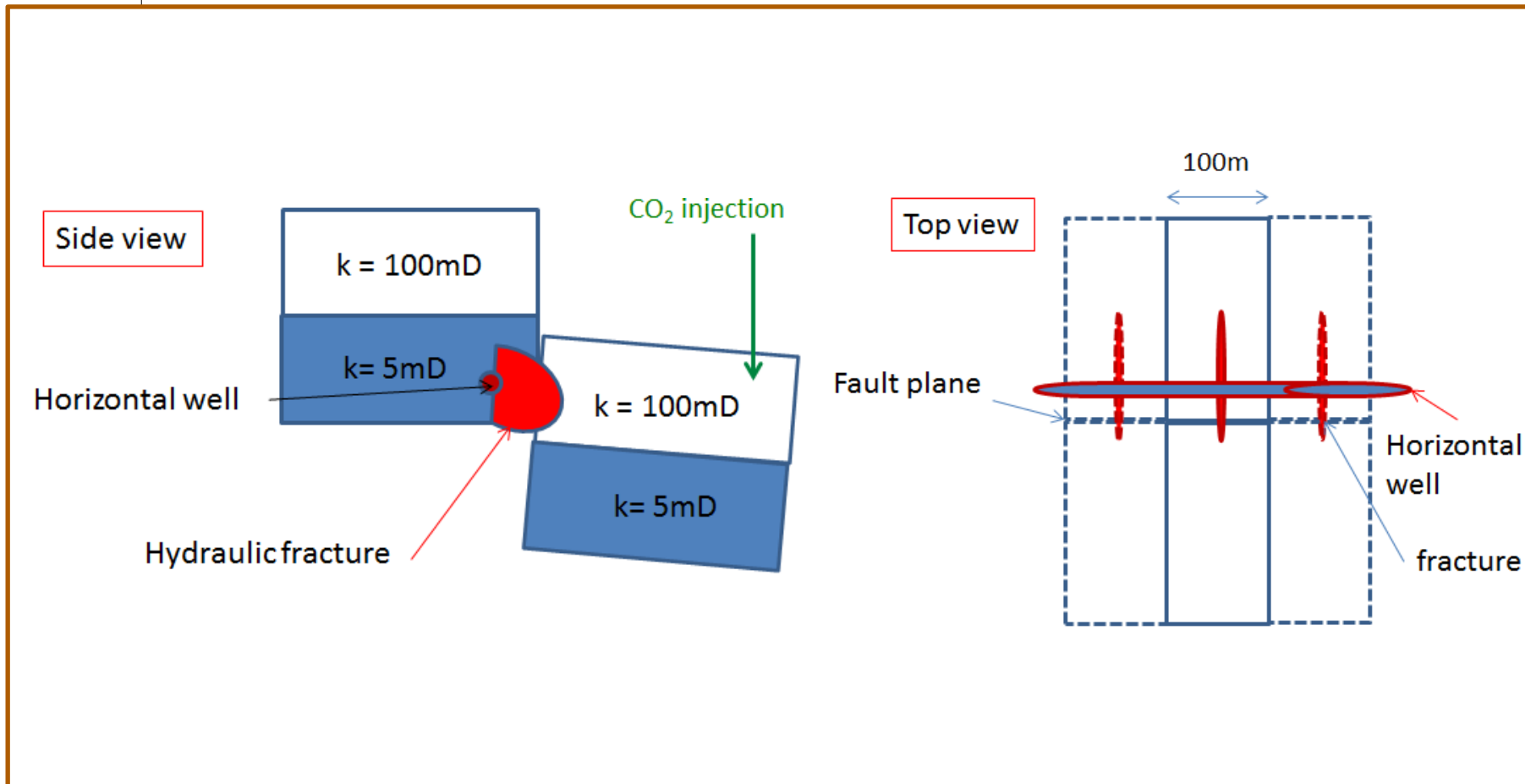
Installations at Ketzin (Germany)
For back-production test.
Data to be used to assess feasibility
Of back producing stored CO₂.

Gas back production data at K12-B.
Data used to assess feasibility of back-producing injected CO₂ as corrective measure

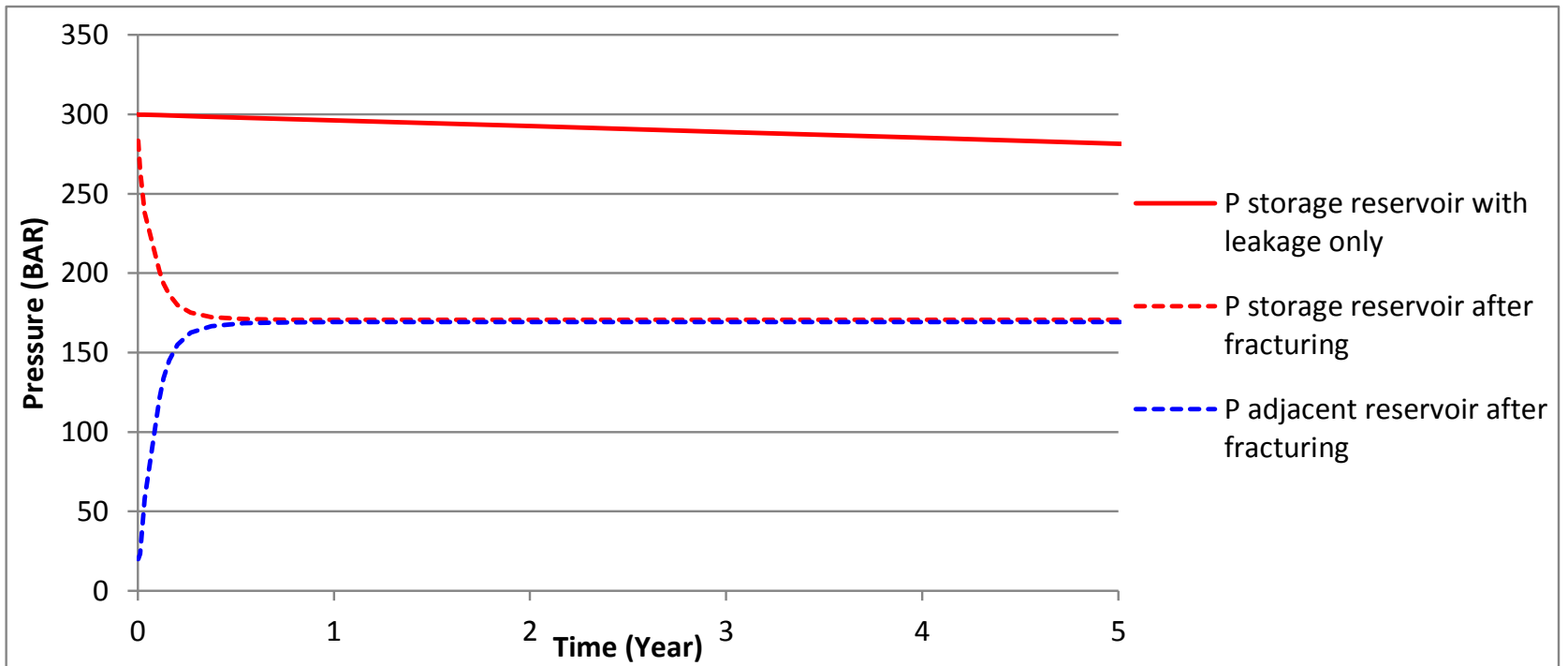


Picture courtesy T. Kollersberger, GFZ

Example: flow diversion



Example: flow diversion



Result of the project

- › “**Handbook**” of remediation and mitigation options that can be applied in different parts of storage complex, against various leakage scenarios.
 - › *Handbook to inform operators, regulators, public*
 - › *Results in handbook based on modelling for specific sites, to illustrate value of remediation & mitigation options*
- › The Handbook will also be implemented in a **web-based tool** that allows easy access to the project’s results
 - › This tool will also support operators in setting up a corrective measures program

MiReCOL Mitigation and Remediation of CO₂ Leakage

Mitigation and Remediation of CO₂ Leakage

Project granted under

EU FP7 Energy – Theme 5.2

Mitigation and remediation of leakage from geological storage



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