

#250. Single-cell reservoir model for CO2 storage planning

Alexey Khrulenko, Roman Berenblyum
NORCE Norwegian Research Center

About

This poster presents a single-cell reservoir model (SCRM) and its application to CO2 storage evaluation as a part of the CO2-SPICER project (see poster #227). The model is based on the material balance equation coupled with an analytical aquifer. We aim to demonstrate that this fast and simple model is a powerful tool that can fill the gap between volumetric estimates and full-field reservoir modeling and support the latter.

The field studied, Zar, is a small oil and gas field in the Czech Republic. The reservoir has long been produced by pressure depletion with limited water injection and is currently evaluated for a CCS pilot. The SCRM was employed for three tasks illustrating its potential use cases:

- (1) as a fast proxy model to support a full-field model's design and history matching
- (2) to estimate storage dynamics, and
- (3) to evaluate storage capacity for different reservoir parameters and storage scenarios.

Fig.1. History matching and comparison with a full-field model

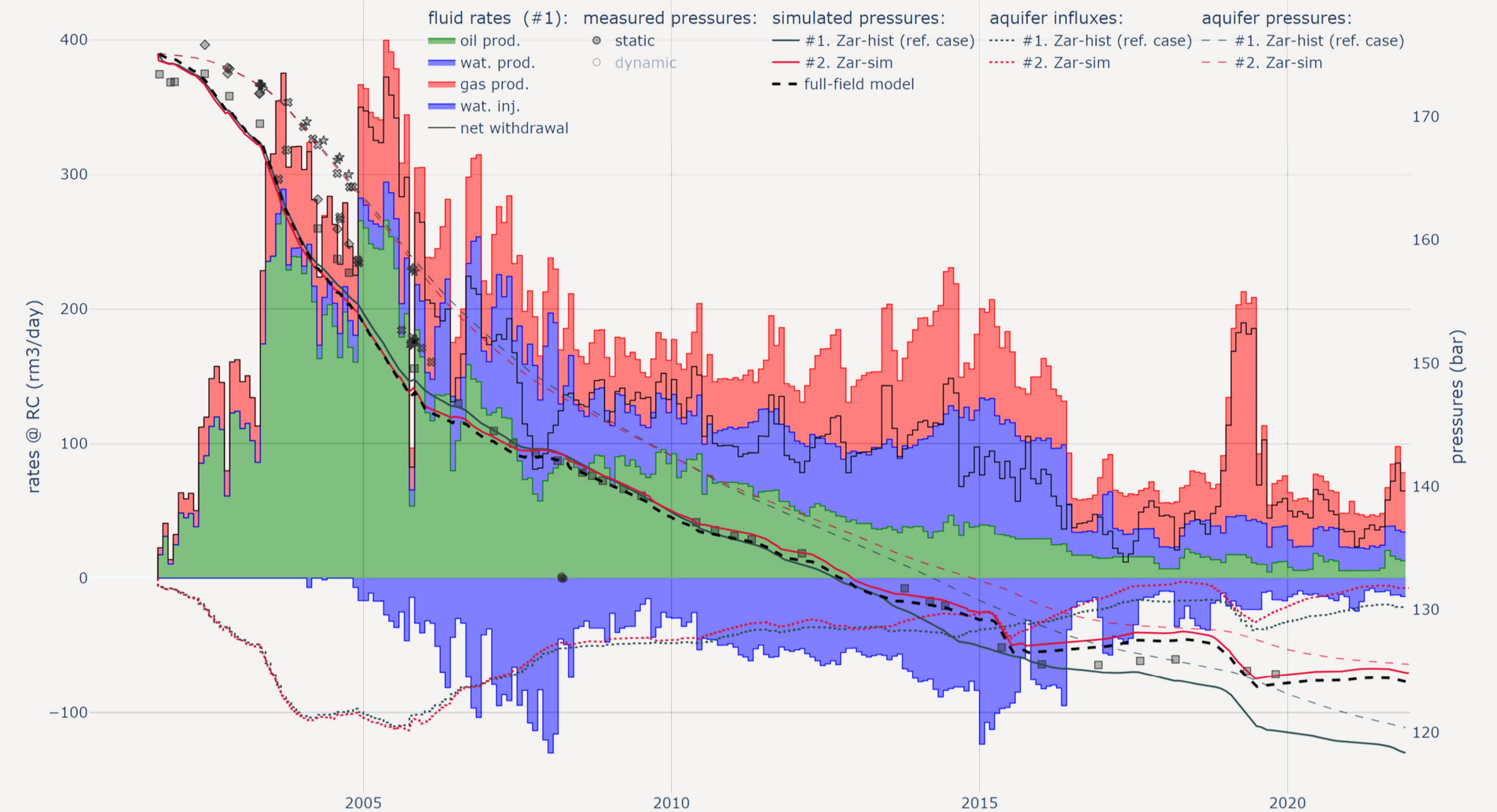


Fig. 2. SCRM runs to test different HM concepts and forecast CO2 storage

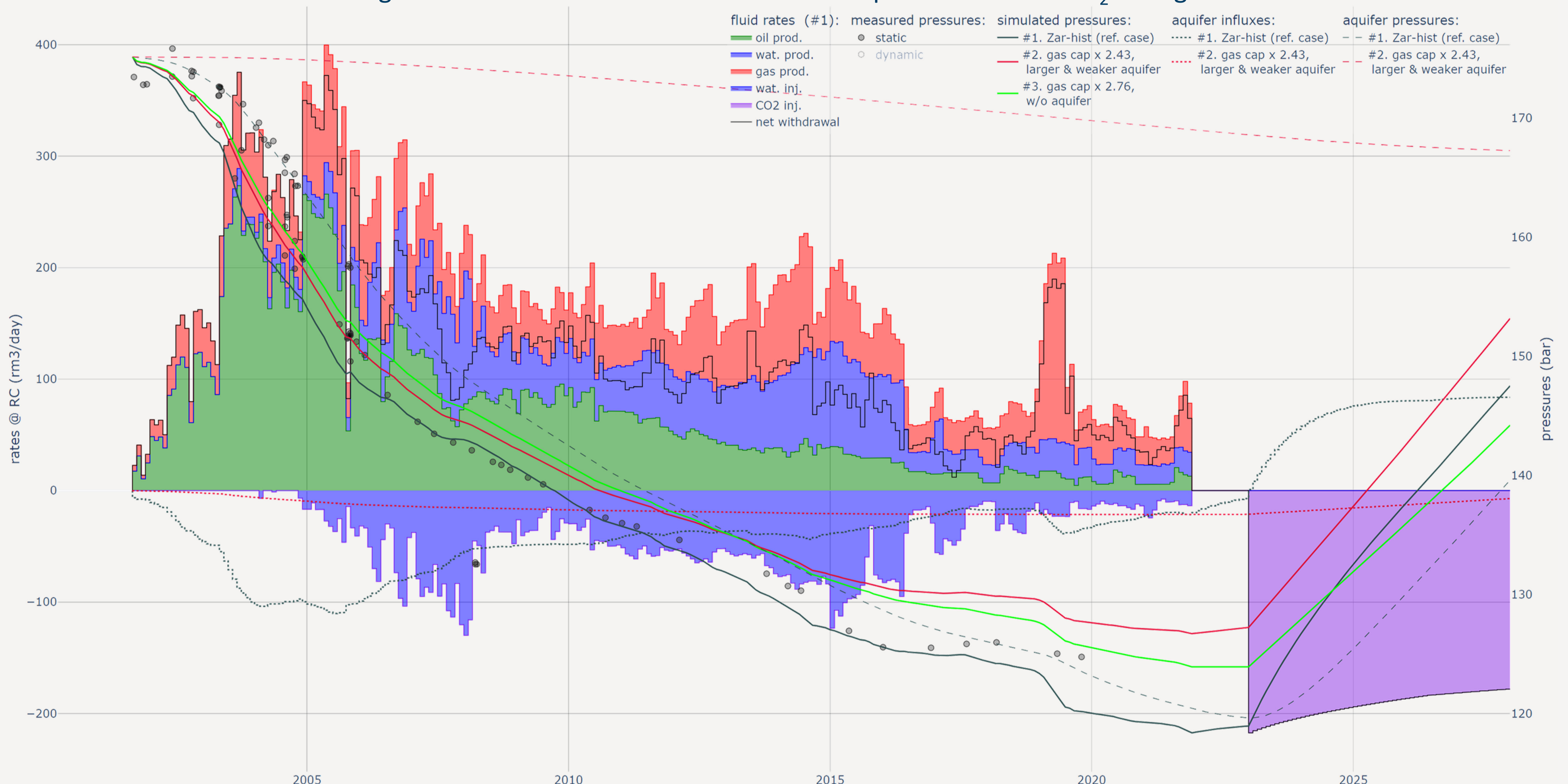
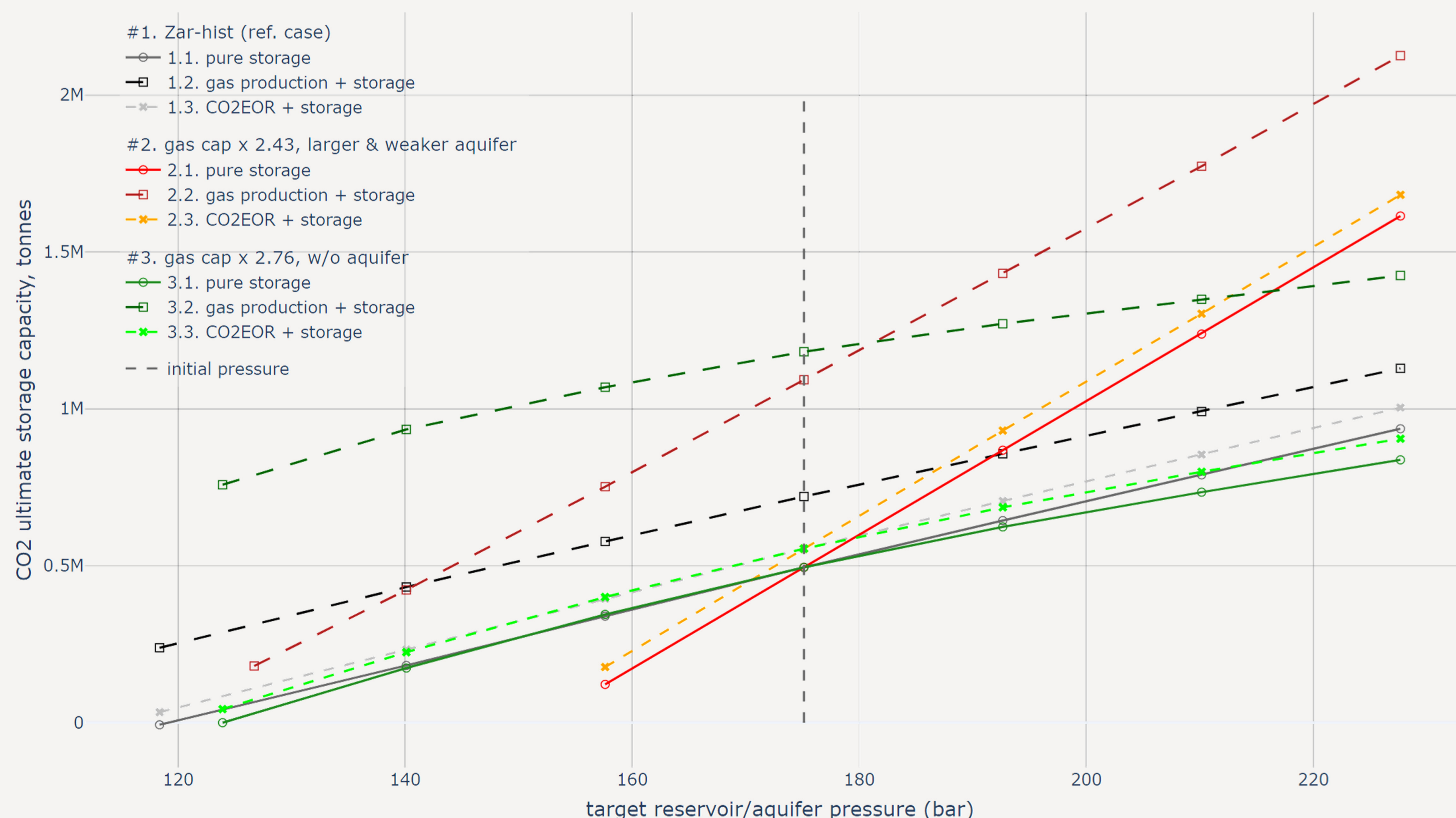


Fig.3. Ultimate CO2 storage capacity for the cases and various storage scenarios



Conclusions

SCRM has proven to be a valuable tool for screening, rapid testing, and making estimates. It can be used as a stand-alone tool if the full-field reservoir model is not available (e.g., due to data scarcity) or as its proxy model to support and speed up the simulation study.

The REPP-CO2 project was supported by Norway Grants from the CZ-08 Carbon Capture and Storage programme (Norway Grants 2009-2014). The STRATEGY CCUS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 837754. The CO2-SPICER project benefits from a € 2.32 mil. grant from Norway and Technology Agency of the Czech Republic. MND is acknowledged for permission to use the presented field data and results of the full-field model run.