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EVALUATING AND IMPROVING THE ACCURACY OF SALT CAVERN THERMODYNAMIC MODELS USING IN SITU DOWNHOLE DATA

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Abstract

Thermodynamics models of salt caverns are used for gas storage monitoring and storage performance assessment. In recent years, new operating modes of salt cavern gas storages put forward thermodynamic studies and supported the development of simulation tools. Indeed, thermodynamics models need to be more and more accurate in order to operate UGS efficiently and to use the capacities of the facilities at their maximum.

Thermodynamics models are worth little if not backed up by real operation data. Cavern volume, pressure and temperature are the most valuable data for model calibration, but these measurements are costly and time-consuming. Models are then usually calibrated with a limited set of in-situ data (sonar surveys and cavern pressure and temperature loggings).

In order to improve the precision of its models, Storengy has conducted long-time in-situ measurements surveys between 2007 and 2013, thanks to pressure and temperature memory gauges let in place inside four salt caverns for several months of gas operation.

This paper presents some of the results of these measurement surveys and the calibration of salt cavern models with these data. Storengy‘s advanced simulation tool DEMETHER is used to create the models presented below. First results show that the models fit accurately with measured data. This simulation tool can then be used with confidence for advanced cavern performance assessment studies and cavern monitoring.

Key words

Caverns for Gas Storage, Computer Modeling, Computer Software, Instrumentation and Monitoring.