Geophysical Research Abstracts, Vol. 9, 09651, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-09651
© European Geosciences Union 2007

Geological Storage of CO_2 : New Concepts from Storage Capacity Evaluation in Belgian Westphalian Rocks

J.M. Baele (1), V. Raucq (1), G. De Weireld (1), H. Legrain (1), P. Billemont (1), K. Tshibangu (1) & C. Dupuis (1)

(1) Faculté Polytechnique de Mons (jean-marc.baele@fpms.ac.be / Fax: +3265374610 / Phone: +3265374622)

A new approach for assessing the CO_2 storage capacity in coal deposits in South of Belgium is exposed. In this approach Westphalian siliclastics are regarded as potential reservoirs along with the adjacent coal. Coal represents only 1 to 5% in vol. of the deposit and occurs as thin layers ($\sim$1m in average). In addition, most of the coal seams in the targeted areas are extremely folded and faulted. This situation seems unfavourable to single coal seam injection schemes and leads us to have a closer look to the possible contribution of other Westphalian rocks for CO_2 storage.

In this preliminary study, only the storage as free CO_2 in the rock porosity was taken into account. Other likely processes such as mineral trapping and adsorption on both scattered coal particles and clay minerals were neglected but they can substantially increase the storage capacity as well as they may have an impact on porosity/permeability change.

The contribution of each of the three Westphalian lithologies, namely coal, sandstone and shales, to the total storage capacity is of the same order of magnitude if we use petrophysical values chosen in accordance with general geological assessment. This result is important not only because it shows that the storage potential might be higher in other lithologies than in coal alone but also because it opens new perspectives for the design of improved solutions for safe CO_2 storage in “poor” and complex coal deposits. As an example, sandstone layers which are thicker than coal seams and are expected to have greater permeability may serve as conduits allowing 1) high rate injection and 2) greater CO_2 access to adjacent coal seams (providing, as it is theo-

retically expected, that sandstone layers are overlying or even cutting the coal seams). Additional porosity/permeability may also be created if CO_2 is reacting with rocks to form denser minerals.

Further work for more accurate evaluation of the storage potential strongly needs detailed and reliable petrophysical and more general reservoir data not only for the coal but for all other lithologies associated with it. In particular, porosity and accessibility need to be better constrained and likely storage processes, mainly adsorption and mineral trapping, to be investigated in more details. Additional porosity of tectonic origin (fractures, fold hinges, etc.) is a site-specific, but also crucial parameter to be taken into account as it may contribute to increase both the storage capacity and accessibility coefficients but in turn it may affect caprock integrity.