CO2 SEQUESTRATION CAPACITY IN DEEP UNMINABLE COAL SEAMS AND BOREHOLE MINING

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CO2 sequestration into coal seams is one of the favored options for reducing atmospheric CO2 emissions from power and industrial plants. The authors reanalyzed the data of 1956 nationwide systematic survey of coal reserves to estimate CO2 sequestration of remaining coal seams in old coal mines in japan. As all coal mines except only one mine have been closed in Japan, it is difficult to get coal specimens now for measurement of gas adsorption capacity. Fortunately, one of the authors measured methane gas adsorption capacity of coals of many coal mines when the mines were still active. CO2 sequestration capacities of coalfields in Japan were estimated from old geological and experimental data. Remaining coal seams in old coal mines are estimated to be able to adsorb about 625Mt of CO2 in Japan.

Recently explored but untapped coal seams are rather appropriate for early application of CO2 storage. A preliminary field test on CO2-ECBM is made in the coalbed methane-rich Ishikari coalfield in Hokkaido. The 6 undeveloped areas of the Ishikari coalfield in Hokkaido may store 78Mt of CO2 and produce 35Gm3 of coalbed methane. The Kushiro-oki offshore coalfield, Hokkaido, may sequestrate 67Mt of CO2. The Ariake inland sea coalfield in Kyushu may store 32Mt of CO2. The Nisi-Sonogi offshore coalfield in Kyushu may sequestrate about 100Mt of CO2.

Recent systematic exploration of oil and natural gas revealed that huge volumes of coal seams lie in deep Paleogene sedimentary basins along the Japanese islands. Deep coal and coaly shale attract attention as source rocks of natural gas and oil. In the central Hokkaido, unmineable coal seams deeper than 1000m and shallower than 3000m are found to reach as much as 68Gm3 in volume that may store more than 3Gt of CO2 and contain possibly 900Gm3 of coalbed methane. Coal bearing Paleogene sedimentary basins spread widely offshore of the Honshu and Kyusyu islands, but deep coal seams are not surveyed enough to allow even rough estimation of capacity of CO2 sequestration. Young Neogene sedimentary basins, too, contain peat layers and abundant organic matters. Tertiary sedimentary basins have large possibility of CO2 sequestration and methane production in and around Japan.