Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

HRE28-07 Room:105 Time:May 25 11:00-11:15

An attempt of geostatistical modeling for spatial mud content: a case study of the Nagaoka pilot site, Japan

ITO, Takuma[1*] ; NAKAJIMA, Takahiro[1] ; CHIYONOBU, Shun[2] ; XUE, Ziqiu[1]

[1]Research Institute of Innovative Technology for the Earth, [2]Faculty of International Resource Sciences, Akita University

The geological storage of carbon dioxide is considered one of the technologies for mitigation of greenhouse gas emissions. The storage of CO_2 in saline aquifers is the most favorable option. The reservoir characterization such as lithology, petrophysical properties and geological modeling is important for assessing laterally and vertically reservoir heterogeneity, which affects on CO_2 behavior inside the reservoir rock. It is known that reservoir heterogeneity of lithology has effects on CO_2 behavior. Therefore, detailed reservoir characterization is essential to estimate the CO_2 behavior for a long-time scale and storage capacity. Here we present 1) depositional environments, and 2) lithologic model in terms of mud content using geostatical modeling technique under the sequence stratigraphic framework as a case study of the Nagaoka pilot site.

The CO_2 reservoir is interpreted as deltaic or coastal plain deposits characterized by upward-shallowing successions from shelf to shoreface environments. It is known that sedimentary facies agrees with mud content in shallow depositional environments (e.g., Ishihara et al., 2013). At the Nagaoka pilot site, the sediment core analysis indicates that mud content is available for the classification of the depositional environments; mud content in outer shelf is 62.0 % in average, that in inner shelf is 33.7 % in average, and that in shoreface is 20.4 %, respectively. This fact implies that spatial mud content distribution can be regarded as a lihtologic model. The lithologic model estimated by geostatistical modeling technique indicates the heterogeneity of mud content distribution. This lithologic model is reasonable for explaining the geophysical monitoring results showing the heterogeneity of CO_2 distribution inside the reservoir rock. This result indicates that the lithologic model in terms of mud content is a useful for prediction and estimation of the injected CO_2 distribution.

Keywords: CO2 geological storage, Mud content, Geostatistics, Sedimentology, Nagaoka