

Coastal fracture assessment and geological storage of CO₂

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The international scheme of Kyoto Protocol began. Reducing gases of global warming are necessary in reducing mostly carbon dioxide(CO₂) for which the geological storage has been considered as the effective tool. Recent trend to the geological storage of CO₂ emphasizes the cost performance and the risk assessment because the perfect containment in subsurface geological bodies should be hard to actualize. Considering the business trend of geological storage internationally, Japan has demerits in active island arc region. Hence we are afraid that Japan does not keep the effective position of international CO₂ reduction business. During the long term period that is considered to be in the geological storage, there are so many apprehensions of hazardous earthquakes, tsunamis and volcanic eruptions in Japan. If we want to avoid the one-sided business of CO₂ reduction by other countries, we have to explain how possible the geological storage in active island arcs is especially in Japan. Important issue is the cost evaluation in the coastal areas with aquifers that provides the exposures of factories and many industrial facilities. Even if CO₂ is a component of atmospheric materials, it is possible to take place severe environmental problems when it extraordinarily desequstrates to atmosphere. Risks of deteriorated wells of storage and fractures with leakage should be estimated. For example, it is necessary to study on micro-scale physical chemistry and earth sciences both of storing rock formations and the cap rocks with fractures and faults, and the continuous monitoring of them. Risk assessment of CO₂ leakage with simulation is important, too, as well as reflective seismic monitoring, electromagnetic subsurface observation, remote sensing, and so on. We organized a committee to discuss the studies of the reasonable underground planning for geological storage and risk assessment applied by the survey results of geological structure and underground water movement in order to make planning safely of the factory and pipe line locations and to investigate the environment of coastal areas. We proposed the concepts to integrate spatial databases among multi-organizations and the higher reliability of the source data with traceability. Metadata of source data of subsurface were collected in coastal areas among organizations that regularly published geological structures. Collaboration of building inter-organizational databases integrated and the dissemination with appropriate costs will enable to utilize them in new business models of geological storage of CO₂ and the dispatch of valuable information from Japan. International leadership should be established that contributes to the new economic and industrial activities in Japan. Collaboration among industries, universities and research institutes, public sectors and all organizations who are working to maintain subsurface data will enable to extend the business chances of Japan in this issue.