학위논문 연구계획서

(학과 보관용)

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연구 제목	국 문	수치 해석 모델을 활용한 토양 환경 내 이산화탄소의 거동 특성 연구 - 음성군 소재의 부지를 중심으로
	영 문	Understanding the Dynamics of Natural Background CO_2 Fluxes at CO_2 Release Site Located in Eumseong, Republic of Korea

As the CO_2 concentration in the air is increasing, the international community have adopted the Geological Carbon Storage is one of the ways to reduce CO_2. However, the stored CO_2 in targeted storage site can be released through the unexpected faults or abandoned wells. If the abundant CO_2 is released to the surface, elevated CO_2 concentration at the surface will significantly damage the surface water and the ecological system. Therefore, detecting initial flux of released CO_2 is important. However, when monitoring CO_2 flux, there also exist the natural background CO_2 produced by the respiration of plant roots and microorganisms. Hence, the prediction of the natural CO_2 level at storage site is practical for making a distinction between the natural background CO_2 fluctuation and anthropogenic release of CO_2.

In Eumseong, Republic of Korea, controlled CO_2 release site was developed by the Korea CO_2 Storage Environmental Management (K-COSEM) Research Center. CO_2 was released from the 50 m length PVC pipe buried at 2.5 m-depth, and CO_2 fluxes were monitored. Extra parameters such as meteorological data, soil moisture and temperature were monitored at the same time. Two simulators were used to simulate the dynamics of CO_2 at the unsaturated zone: HYDRUS with SOILCO2 package for natural background CO_2, and TOUGH3 EOS7C for anthropogenic CO_2 release. Furthermore, simulated surface CO_2 fluxes were compared with field-observed data to validate the CO_2 transport model and evaluate CO_2 release process with more precision.

Our research concluded that, without the CO_2 release, Hydrus-SOILCO2 simulator provided more precise prediction of the background soil-surface CO_2 flux. In addition, both measured and simulated data identified atmospheric temperature and precipitation to be major environmental factors controlling the CO_2 fluxes.

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(부족시 별지사용)