Application of Machine Learning for Fast Prediction of CO_2 Plume and Pressure Buildup in Geological CO_2 Storage

S. A. Hosseini and J. S. G. Nobrega

ABSTRACT

Geological CO_2 storage has become a hot topic in response to the global interest to achieve net zero emissions. Lack of information in many geological settings, especially for saline storage, requires extensive fluid flow simulations to understand risk and design mitigation plans. Ultimate goal is to run these simulations fast and accurate, allowing us to visualize and demonstrate the confidences in our injection scenarios to various stakeholders. We have proposed a deep learning algorithm that use numerical simulations from high-fidelity models to train, learn and predict the behavior of the CO_2 plume movement in an offshore Gulf Coast reservoir. In addition, our model can accurately predict the pressure buildup in the formation, which is another critical element in a successful CO_2 storage project. Our models offer 1000x speed up compared to high-fidelity numerical simulations

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