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An introduction to the application of GANs in hydrogeology

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Generative adversarial networks (GANs) is very popular in deep learning realm, and it is definitely a milestone in deep learning motivated by the need to model high-dimensional, multi-modal distributions. These needs are also existed in hydrogeology domain. The estimation of high-dimensional geological field while conditioning on some limited actual measurements is usually a headache to hydrogeologists. However, the appearance of GANs brings about some new perspectives, for example, reconstructing the traditional parameterization of complex high-dimensional field via data generating process, leveraging image-to-image translation framework to discover parameter-state mappings in subsurface models. I will give a brief introduction to the recent applications of GANs in hydrogeology.