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Geothermal energy exploration for a Low Carbon Future using data driven solutions
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The emission of carbon dioxide (CO2) from the combustion of fossil fuels is recognized as one of the main causes of climate change. To address its negative impacts, the world is slowly transitioning to clean energy use and many countries have committed to achieving net-zero in the near future. Geoscience, as one of the major tools in the exploration and monitoring of the global environment, is playing an important role in energy transitions.

To characterize the geoscience phenomena, the raw data are collected with the acquisition techniques such as seismic, electromagnetic, gravity, remote sensing, GPR, and so on, and then processed with mathematical methods based on the physical laws. The amount of geoscience data increases dramatically with the development of acquisition techniques, which brings a big challenge for the physical-based methods.

With the advance in deep learning techniques, researchers have been actively exploring data-driven solutions for geoscience problems, including data processing, modeling, inversion, detection, classification, and so on. Traditional geoscience methods are usually time-consuming and require intensive human labor and expert knowledge, the implementations of AI in geosciences show good potential to overcome these bottlenecks.

The objective of this Research Topic is to provide a platform for new research and discussion on how machine learning techniques can be applied in geoscience to achieve a low carbon future, with the following topics:

• Oil and gas exploration
• Geothermal energy exploration
• Climate monitoring and prediction
• Renewable energy

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