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# Comparison of equations of state for carbon dioxide for numerical simulations

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**Abstract** In this work, we compare four equations of state for carbon dioxide with a large number of measurement data taken from literature. This comparison showed that complex equations of state are more accurate than simple ones. To see if the differences in accuracy have an influence on numerical simulations, we implemented the equations in the scientific software OpenGeoSys and performed comparative simulations of a compressible gas flow scenario. We found out that the difference between ideal gas and real gas behaviour is quite large, but the differences among the real gas equations have no significant influence on the simulation results.

**Key words** equation of state; compressible fluid flow; carbon dioxide; numerical simulation; gas storage; supercritical fluid