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Water storage in Ca-clinopyroxene at great depths, an experimental and analytical study using nanoSIMS

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These last years, a considerable progress has been obtained in the knowledge of how Nominally Anhydrous Minerals (NAMs) store water as a function of the various thermodynamic and chemical variables. The water storage capacity of olivine and orthopyroxene is quite well known as a function of pressure while little is known in case of calcic clinopyroxene. The result is very important because clinopyroxene is the most water-rich NAMs that is observed in cratonic xenoliths and could have the same contribution as olivine to the total water storage capacity.

We thus performed multi-anvil experiments at pressures of 3 to 9 GPa and 1200 to 1350°C in multi-component peridotitic system in the form of sandwich experiments. The aim is to constrain the effect of pressure and temperature on the water storage in Ca-clinopyroxene. The water contents have been measured with nanoSIMS analysis and provide constraints on the partitioning of water between clinopyroxene and olivine at high pressure.