

# Researchers discover missing ingredient from Earth's continental crust

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Researchers from Curtin University have identified a missing ingredient in the composition of the continental crust, opening up a new chapter in the Earth's geological history.

The paper, published in *Nature Communications*, sheds new light on an inconsistency that until now had baffled experts because the high levels of nickel and [chromium](#) in the continental crust could not be explained by current models of continental crust formation.

Lead Curtin researcher Dr. Andreas Beinlich, from the School of Earth and Planetary Sciences, said models explaining the [composition](#) of the continental crust lacked one important ingredient, known as ultramafic rock, which has eroded over time thus contributing to the continental crust composition and formation.

"Our current understanding is that the continental crust formed only by magmatic processes, meaning that igneous rocks formed by the crystallization of melt and eventually lumped together to form the crust," Dr. Beinlich said.

"This theory is certainly true, but other processes are also important and contribute to the formation of the continental crust and its chemical evolution.

"Our research was able to explore a new theory that the chemical composition of the crust can be more fully explained by the addition of

weathered and eroded ultramafic rock, which is rich in magnesium, nickel and chromium but poor in silica."

Dr. Beinlich explained that the team, made up of international researchers, was able to determine this by analysing rock samples collected in Western Australia, Norway and Canada.

"We were able to determine that the amount of eroded rock required for compensating the nickel and chromium imbalance is small but still has a distinct effect on the [chemical composition](#) of the Earth's crust," Dr. Beinlich said.

"Our research indicates that the transfer of nickel and chromium from the rock to the continental crust had to occur through weathering and erosion, essentially driven by chemical reactions between rocks and fluids including ocean water, rain water and ground water.

"Considering these fluid-[rock](#) reactions as a process that contributes to the formation of the [continental crust](#) offers a new explanation to understanding the formation of the Earth's [crust](#) and its geological history."

**More information:** Andreas Beinlich et al. Peridotite weathering is the missing ingredient of Earth's continental crust composition, *Nature Communications* (2018). [DOI: 10.1038/s41467-018-03039-9](https://doi.org/10.1038/s41467-018-03039-9)

Provided by Curtin University

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