When continents formed

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A new way to calculate the age of the Earth's crust has been developed by researchers from the University of Bristol and the University of St Andrews.

The continental crust is the principal record of conditions on the Earth for the last 4.4 billion years. Its formation modified the composition of the mantle and the atmosphere, it supports life, and it remains a sink for carbon dioxide through weathering and erosion. The continental crust therefore has had a key role in the evolution of the Earth, and yet the timing of its generation remains the topic of considerable debate.

It is widely believed that the juvenile continental crust has grown from the depleted upper mantle. One common way to assess when new crust was formed is to determine the radiogenic isotope composition of any

crustal sample, and to compare its isotope signature with that of the depleted mantle. In other words, radiogenic isotopes can be used to calculate 'model ages' of crust formation, which represent the time since a crustal sample was separated from its mantle source.

The concept of 'model age' has been widely used in crustal evolution studies for the last three decades. However it is increasingly clear that using the isotope composition of the depleted mantle as a reference for the calculation of model ages of continental crust generation can lead to incomplete interpretations.

In a paper published today in *Science*, Dr Bruno Dhuime of Bristol's School of Earth Sciences and colleagues describe a new methodology for the calculation of model ages, based on the isotope composition of the average new continental crust.

Dr Dhuime said: "Ages calculated this way are significantly younger than model ages calculated from the isotope composition of the depleted mantle. New ages obtained are more consistent with the geological record, which opens new perspectives in crustal evolution studies based on radiogenic isotopes."

Provided by University of Bristol

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