The continents as a heat blanket

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Drifting of the large tectonic plates and the superimposed continents is not only powered by the heat-driven convection processes in the Earth's mantle, but rather retroacts on this internal driving processes. In doing so, the continents function as a thermal blanket, which leads to an accumulation of heat underneath, and which in turn can cause the break-up of the super-continents.

These results of numerical modelling have been published by scientists from the GFZ German Research Centre for Geosciences in the latest volume of the journal *Physics of the Earth and Planetary Interiors* (Vol. 171, S. 313-322).

Alfred Wegener's theory of continental drift was turned up when the driving forces for continental drift were discovered during the 50s and 60s: The enormous heat in the Earth's core and Earth's mantle generates the flow of rocks within the Earth's mantle, a process similar to the movement of warm water in a cooking pot. This heat-driven mass transport is called convection. On the Earth's surface, this process leads not only to plate movement but also to drifting of the continents floating on the plates.

To date however, there has been no realistic mathematical-physical theory describing the interaction between the convective movement in the Earths mantle and the continental drift. V. Trubitsin, M. Kaban und M. Rothacher from the GFZ have now developed a numerical model, based on the current position of the continents, the structures of the Earth's mantle obtained through geophysical measurements, and the

current displacement rates on the surface. Hence they were able to calculate the future position of the continents in hundreds of millions of years.

It could be shown that the enormous heat in the Earth's interior does not generally lead to a chaotic mass transport within the Earth's mantle. On the contrary, the continents influence the heat distribution within the Earth's mantle and the associated convective mass flow. In other words the continents act as a thermal blanket causing heat to accumulate beneath. A self-regulating system develops, beginning and ending with a super-continent. This super-continent breaks apart due to heat accumulation which in turn leads to a reorganoization of mantle convection with the pieces ultimately joining again to form a large super-continent.

Paper: V. Trubitsin, M. Kaban and M. Rothacher: "Mechanical and thermal effects of floating continents on the global mantle convection", *Physics of the Earth and Planetary Interiors* (Vol. 171, S. 313-322).

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