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“The Deep Carbon Cycle Revealed in Superdeep Diamonds”

Abstract: Volatile elements such as carbon are key to the long-term habitability of Earth's surface. On geological timescales the cycling of carbon through the mantle will have impacted the surface reservoir in ways that are as yet unclear. Here I will discuss the cycling of carbon in the mantle on the basis of observations from so-called 'superdeep' diamonds and their mineral inclusions, which provide direct evidence for the deep carbon cycle at transition zone and lower mantle depths. I will provide evidence for the important role of subducted carbon, and will show how melting of carbonated lithologies is a critical mechanism in the deep mantle carbon cycle.