Did Earth's first supercontinent form the inner core?

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The supercontinent cycle—periodic assembly and dispersal of the continents—is both an effect and a cause of whole mantle convection. It is unknown when the present long-wavelength mantle structure was established, but supercontinent formation is commonly invoked to achieve such large-scale mantle flow. Here we report a succession of state shifts taking place in the crust (2.1 billion years ago [Gyr ago]), the mantle (2.0 Gyr ago), and the core (1.5 Gyr ago) that are associated with the assembly and lifecycle of Nuna, arguably Earth's first supercontinent. We interpret the progressive state shifts as the cause, manifestation, and effect, respectively, of the enhanced convective vigor associated with supercontinent induced, large scale mantle convection. The elevated heat flow due to the start of the supercontinent cycle may have advanced the time when the centre of the core fell below its freezing temperature and nucleated the solid inner core. If this association is proved correct, it would represent an unexpected coupling between Earth's innermost and outermost spheres.