

Liverpool scientist discovers new layer of the Earth

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A University of Liverpool scientist has discovered a new layer near the Earth's core, which will enable the internal temperature of the Earth's mantle to be measured at a much deeper level than previously possible.

Dr Christine Thomas, from the Department of Earth Sciences, has found a previously undetected seismic layer near the Earth's core-mantle boundary. Her discovery will allow geophysicists to measure variations in the Earth's internal temperature near the boundary between the rocky mantle and fluid core, about 2,900 km below the Earth's surface.

Dr Thomas developed a model with colleagues at University of California Los Angeles (UCLA), which uses a recently discovered phase change (when atoms are compressed into crystals under high pressure) in the lowest part of the Earth's mantle. They propose that temperature changes in this area can result in the creation of two seismic layers near the core-mantle boundary, the second of which has been recently discovered by Dr Thomas.

The two seismic layers can provide a sensitive thermometer with which researchers can take the temperature of the Earth's lowermost mantle. The layers also enable scientists to examine whether cold subducted lithosphere (cold areas beneath a plate which can cause earthquakes) is reaching the core-mantle boundary, and whether hot material rises from the area between the core and mantle.

In the first case, the two seismic layers should be visible in seismic

waves that travel through the Earth; the latter case would not show any layers. This would be a strong case for the convection of the whole mantle that is still a highly debated issue in the Earth Sciences.

Dr Thomas said: "Our discovery marks an exciting stage in earth science research as it provides the possibility to test the debated issue of whole mantle convection, the largely unconstrained heat flow from the Earth's core to the mantle and the fate of subducted lithosphere with seismic data."

Source: University of Liverpool

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