

Planetary interior

Comparison of suggested mantle convection in Earth and Venus. Mobile-lid mantle convection in the Earth involves most surface plates (dark brown), which are recycled by sinking back into the deep mantle, where large low shear-wave velocity provinces (LLSVPs) exist (whitish). The ongoing plate destruction causes a more heterogeneous mantle and a surface of variable age, with young and thin oceanic plates and old and thick continental plates that remain at the surface. Mantle plumes (light red) tend to occur far away from sinking plates. By contrast, the mode of mantle convection on Venus is suggested to consist of a nearly immobile, mostly stagnant lid, and only localised, short sinking plate portions that are formed by (and thus spatially coincide with) hot mantle upwelling (light red). The resulting surface deformation matches observations from coronae on Venus. The short sinking portions do not, in contrast to Earth, significantly move their tail ends at the surface, which explains the uniformly aged, relatively thick surface plate (dark brown).

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