Geophysical Research Abstracts
Vol. 20, EGU2018-11544, 2018
EGU General Assembly 2018


# Core-exsolved $SiO_2$ dispersal in the Earth's mantle

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$SiO_2$ may have been expelled from the core directly following core formation in the early stages of Earth's accretion, a process that continues to the present day. $SiO_2$ is low density with respect to both the core and the lowermost mantle, and will not be confined to the core. Consequently, we examine the process of accumulation at the core-mantle boundary (CMB) and its release into the mantle by buoyant rise. The process primarily depends on the viscosity ratio of $SiO_2$ compared to the mantle. Today, if it is 100-10000 times more viscous than lower mantle material, the dimensions of $SiO_2$ diapirs formed by the viscous Rayleigh-Taylor instability at the CMB would cause them to be swept into the mantle as inclusions of 100 m - 10 km diameter. However, under early Earth conditions of rapid heat loss soon after core formation, diapirs of 1 km diameter could have risen independently of mantle flow to their level of neutral buoyancy in the mantle, trapping them there. Dispersed bodies could represent as much as 8.5 vol.% of parts of the lower mantle, which, at such low concentration, a minimal effect on aggregate seismic wavespeeds. However, their presence can account for small-scale scattering in the lower mantle due to the bodies' large velocity contrast. It is entirely feasible that the shallow lower mantle (700-1500 km depth) could harbor $SiO_2$ released in early Earth times.