

An experimental perspective on formation of early Earth's system

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Several important processes of formation the Earth system occurred in the early Earth. These processes include accretion, formation of magma ocean, and core formation, and heavy meteoritic bombardment, i.e., late veneers. Geochemistry of the mantle implies that planetesimals built the Earth were depleted in volatile elements relative to C1-chondrite. Magma ocean formed by accretion accelerated core formation. Abundances of siderophile elements in the mantle suggest that the depth of magma ocean was 600-900km and core forming metal separated after metal-silicate equilibrium at the bottom of magma ocean. Highly siderophile element abundance in the mantle may be explained by accretion of the late veneer, which might have brought sea water and organic materials into the Earth.