



Mantle-atmosphere evolution in the Hadean

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Extinct and extant radioactivities that produced noble gas isotopes indicate that The Earth was much hotter in the Hadean than from 3.8 Ga ago to Present. In the Hadean, the mantle was convecting and degassing at a rate one order of magnitude higher than at Present, and had been processed at least 6 times during this period compared to only ~ 1 time afterward. The atmosphere had been escaping into space during ~ 200 Ma after start of solar system formation. As a results of these combined processes, the Earth became depleted by 3 orders of magnitude in volatile elements, mostly during the first 100 Ma. The Late Heavy Bombardment that took place 4.0-3.8 Ga ago, presumably consisting in icy planetesimals from beyond the orbits of the giant planets, might have left an imprint in air we are still breezing.