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## Noble gas signature of the late heavy bombardment in the Earth's atmosphere

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**Abstract.** The Lunar cratering record is consistent with the occurrence of a late heavy bombardment (LHB), which marked the end of terrestrial planet accretion 3.8 billion years ago. However, clear evidence of a LHB on Earth has not yet been identified. Here it is shown that the LHB did indeed occur on Earth and that we are breathing its aftermaths. The terrestrial atmosphere and hydrosphere is enriched in noble gases relative to the abundance of volatiles in the mantle. This enrichment is consistent with the mass delivered to Earth during the LHB only if this material consisted of ~0.5% Kuiper-belt objects mixed in with a population of largely chondritic (i.e. asteroidal) impactors. This places strong constraints on dynamical models for early Solar System evolution.

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