

HIGHLIGHTS AND BREAKTHROUGHS
Mineral evolution and Earth history

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Abstract: The field of mineral evolution—a merger of mineralogy and Earth history—coalesced in 2008 with the first of several global syntheses by Robert Hazen and coworkers in the *American Mineralogist*. They showed that the cumulative abundance of mineral species has a stepwise trend with first appearances tied to various transitions in Earth history such as the end of planetary accretion at ca. 4.55 Ga and the onset of bio-mediated mineralogy at ca. >2.5 Ga. A global age distribution is best established for zircon. Observed abundance of zircon fluctuates through more than an order of magnitude during successive supercontinent cycles. The pulse of the Earth is also recorded, albeit imperfectly, by the ⁸⁷Sr/⁸⁶Sr composition of marine biogenic calcite; the Sr-isotopic ratio of this mineral reflects the balance of inputs of primitive strontium at mid-ocean ridges and evolved strontium that drains off the continents. A global mineral evolution database, currently in the works, will greatly facilitate the compilation and analysis of extant data and the expansion of research in mineralogy outside its traditional bounds and into more interdisciplinary realms. **Keywords:** Mineral evolution, Earth history, detrital zircon geochronology