

## **CONTRASTS BETWEEN EARLY PRECAMBRIAN AND PHANEROZOIC IMPACT SPHERULE LAYERS**

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Layers rich in sand-size spherules of former silicate melt occur in early Precambrian strata of South Africa and Western Australia. At least 4 layers were deposited between ca. 3.24-3.47 Ga (Lowe, Byerly et al.), and 3 to 5 layers between ca. 2.63-2.49 Ga. There are systematic differences between these Precambrian layers and well-documented Phanerozoic strewn fields and impact spherule layers. Phanerozoic spherule layers rarely reach one centimeter in thickness, whereas the thicknesses of the Precambrian spherule layers are commonly more than a centimeter and can exceed one meter. In addition, many Precambrian spherules contain pseudomorphs of fibrous to lath-shaped crystallites (typically in fibroradial aggregates), whereas most Phanerozoic spherules either consist entirely of glass or have dendritic crystals. These contrasts must reflect time-related differences in the impacts which generated them, the surface environments where the spherules were deposited, and/or the diagenetic to metamorphic conditions they experienced after burial. The greater thicknesses of the spherule layers suggest early Precambrian impacts were larger on average. The contrast in internal textures may reflect a progressive shift in target material from dominantly oceanic or mafic to more continental material as continents grew larger through geologic time. Although the restriction of known spherule layers to narrow time bands within the early Precambrian could reflect variation through time in the flux of large impactors, the fact that they occur in some of the most pristine early Precambrian successions on earth suggests this is simply a preservational bias.