

Micrometeorites from Triassic and Jurassic bedded cherts of the Mino and Chichibu belts, Southwest Japan.

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Micrometeorites, which are submillimeter-sized extraterrestrial particles that survive atmospheric entry, originate from dust-producing objects such as comets and asteroids. Ancient micrometeorites found in sedimentary rocks are of key interest as a historical record of meteoroid populations in the solar system. We report the recovery of well-preserved micrometeorites, older than 240 Ma, in radiolarian chert from the Chichibu Belt on Ajiro Island (Middle Triassic) and Mino Belt on Inuyama area (Late Triassic to Early Jurassic). These study sections consist of rhythmic alternations of chert and shale beds. Samples were mechanically crushed and passed through 1.0 mm mesh sieve until less than 5 g of the fine fraction was collected. We also used a hydrofluoric acid dissolution method for determining micrometeorite content of chert samples. However, no micrometeorites have been recognized using this method. Magnetic components were separated using the method for liquid-suspended particles with a magnetic field strength of ~500 mT. Micrometeorites were handpicked from the magnetic components. The collection of micrometeorites comprised 72 cosmic spherules, which are particles that totally melted during atmospheric entry. Analysis of the accretion rate for cosmic spherules reveals high accretion rates of small spherules in the Middle Triassic (Anisian) and Early Jurassic (Hettangian). However, the possible link between the enhancements in the accretion rate of cosmic spherules and variations in the flux of extraterrestrial matter to the Earth requires further scrutiny.

Keywords: micrometeorite, Middle Triassic, Early Jurassic, Chichibu Belt, Mino Belt, bedded chert