THE BREAKUP OF THE L-CHONDRITE PARENT BODY AND ITS SIGNATURE IN ORDOVICIAN SEDIMENTS - AN UPDATE. B. Schmitz, C. Alwmark, A. Cronholm and M. Tassinari, Department of Geology, Lund University, SE-22362 Lund, Sweden. E-mail: birger.schmitz@geol.lu.se.

Introduction: Edward Anders, in 1964, was the first to propose that K-Ar gas retention ages of ca. 400-500 Ma (now revised to 470 Ma [1]) for a major fraction of recently fallen L chondrites indicated a major breakup event in the asteroid belt at that time [2]. Although this idea became generally accepted based on subsequent refined K-Ar dating of many meteorites [3], for a long time no one considered that this event could have left any coeval traces in Earth's geological record. During the past fifteen years, however, substantial evidence has accumulated for that there is a major physical signature from this event in the sediments on Earth [4-6]. The distribution and abundance of both fossil meteorites and sediment-dispersed extraterrestrial chromite grains provide strong, of each other independent, evidence for a two orders-of-magnitude increase in the flux of L-chondritic matter to Earth for at least 2-3 Myr after the breakup.

Mid-Ordovician Fossil Meteorites: In a search project, pursued together with quarry workers since 1993, a total of 87 fossil meteorites (∅= 1-21 cm) have now been found in condensed, marine limestone in the Thorsberg quarry, southern Sweden [4]. For about 60 of these an L-chondritic origin has been established, for the remainder analyses still need to be performed. The meteorites have been found over ca. 4 m of strata, representing deposition during ca. 2 Myr. They represent a mixture of petrographic types from L3 to L6, in about similar proportions as recently fallen L chondrites [7]. Their cosmic-ray exposure ages increase upward in the strata [8]. They definitely represent a large number of individual falls.

Extraterrestrial Chromite Grains: Abundant sediment-dispersed L-chondritic chromite (EC) grains (>63 μm) have now been recovered from mid-Ordovician limestone worldwide [5, 6]. These grains originate primarily from micrometeorites that decomposed on the seafloor [8]. Their first abundant appearance in the strata represents the breakup event. Distribution trends have now been reproduced in two sections 350 km apart in Sweden and one section in the Hubei province, central China [6]. At these sites, in strata representing the ca. 5 million years before the breakup we found only 8 EC grains in 614 kg of limestone. In the strata representing the ca. first 2-3 million years after the breakup we found 954 EC grains evenly distributed through 536 kg of limestone.

Questions: Would one expect to find material also from a body that collided with the L-chondrite parent body? Was the Earth and the Moon hit also by an L-chondrite asteroid shower? Why are shocked L chondrites still so common among recent falls?