

Evidence for Early Planetary Shake-Up

Evidence indicates that the timing of the radial migration of the Solar System giant planets was much earlier than previously understood.

- There is ample evidence throughout the Solar System that the giant planets migrated inwards around 700 million years after formation, and this migration was thought to be linked to the lunar Late Heavy Bombardment, which caused many of the large basins on the Moon.
- New research, based on the Patroclus–Menoetius binary asteroid, indicates that this planetary migration happened very early in the Solar System history (within the first 100 million years). This binary formed in a massive debris disk beyond Neptune, that had to have been disbursed early in order to keep the binary together.
- The comets and asteroids that were released by planetary migration would therefore have impacted terrestrial worlds early as well, and therefore cannot be responsible for most lunar craters. Many of these later large impactors may have come from within the terrestrial planet region itself.



Artist's concept of the Patroclus–Menoetius binary Jupiter Trojan