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Does Jupiter form super early?

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Meteorites display an isotopic composition dichotomy between noncarbonaceous (NC) and carbonaceous (CC) groups, indicating that planetesimal formation in the solar protoplanetary disk occurred in two distinct reservoirs. The prevailing view is that a rapidly formed Jupiter acted as a barrier between these reservoirs. We show a fundamental inconsistency in this model: If Jupiter is an efficient blocker of drifting pebbles, then the interior NC reservoir is depleted by radial drift within a few hundred thousand years. If Jupiter lets material pass it, then the two reservoirs will be mixed. Instead, we demonstrate that the arrival of the CC pebbles in the inner disk is delayed for several million years by the viscous expansion of the protoplanetary disk. Our results support the hypothesis that Jupiter formed in the outer disk (>10 astronomical units) and allowed a considerable amount of CC material to pass it and become accreted by the terrestrial planets. An expanding young solar gaseous disk model better explains the formation and isotopic composition of meteorites and planets.