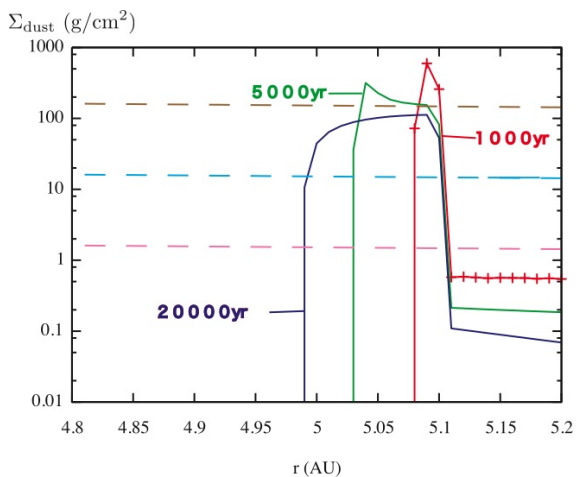


Planetesimal formation by sublimation and fragmentation of icy dust aggregates

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The planetesimal formation is still one of the most important unresolved problem in planetary science. I propose a scenario of planetesimal formation in this study. Sublimation of H_2O ice in an icy dust aggregate leads to concentration of silicate dust particles at a particular heliocentric distance. I show that the dust column density can reach the critical density required for the self-gravitational instability of the dust layer. The dust surface density increases locally by a factor of 10 in 10000 yr for 10-cm sized aggregates. If fragmentation of dust aggregates occurs, the timescale is shortened to several decades. Fragmentation is a key mechanism for planetesimal formation.



図：ダストアグリゲイトが割れる場合の面密度分布を中心星からの距離の関数で示した。ダストアグリゲイトの初期の半径を100cm、破片のサイズは0.1cmとした。わずか数十年で100倍に達している。