Slowing Embedded Migration

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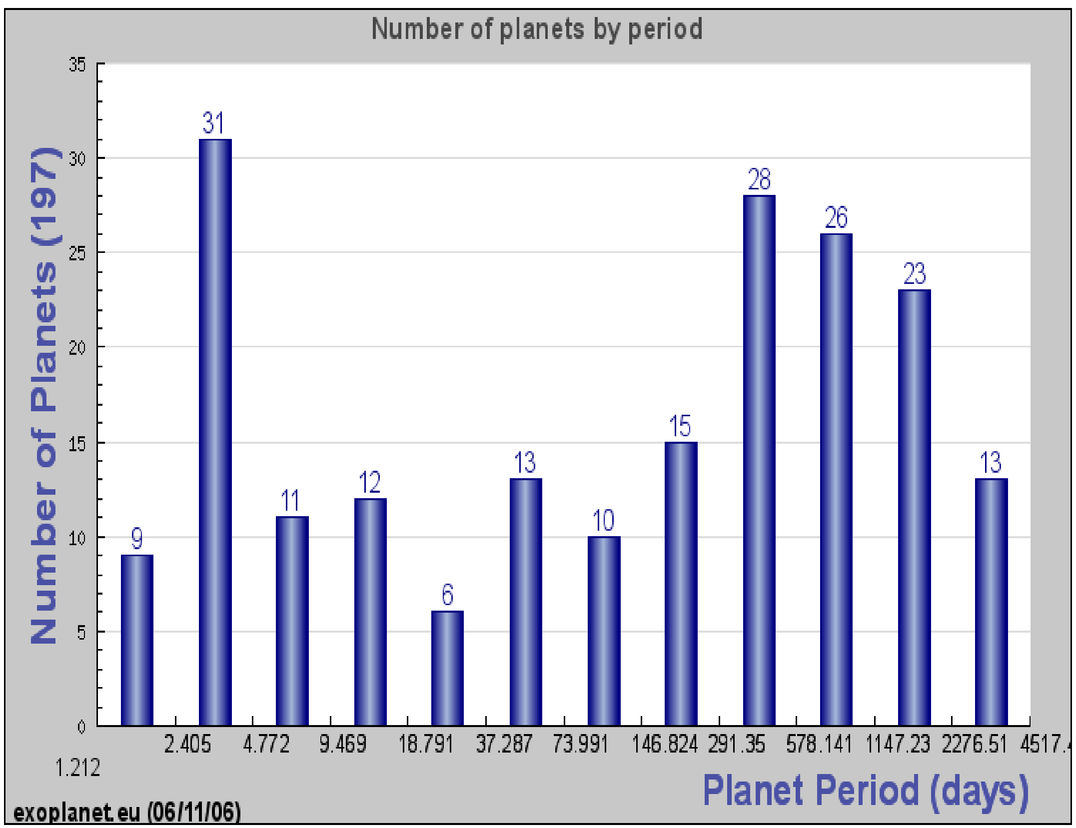
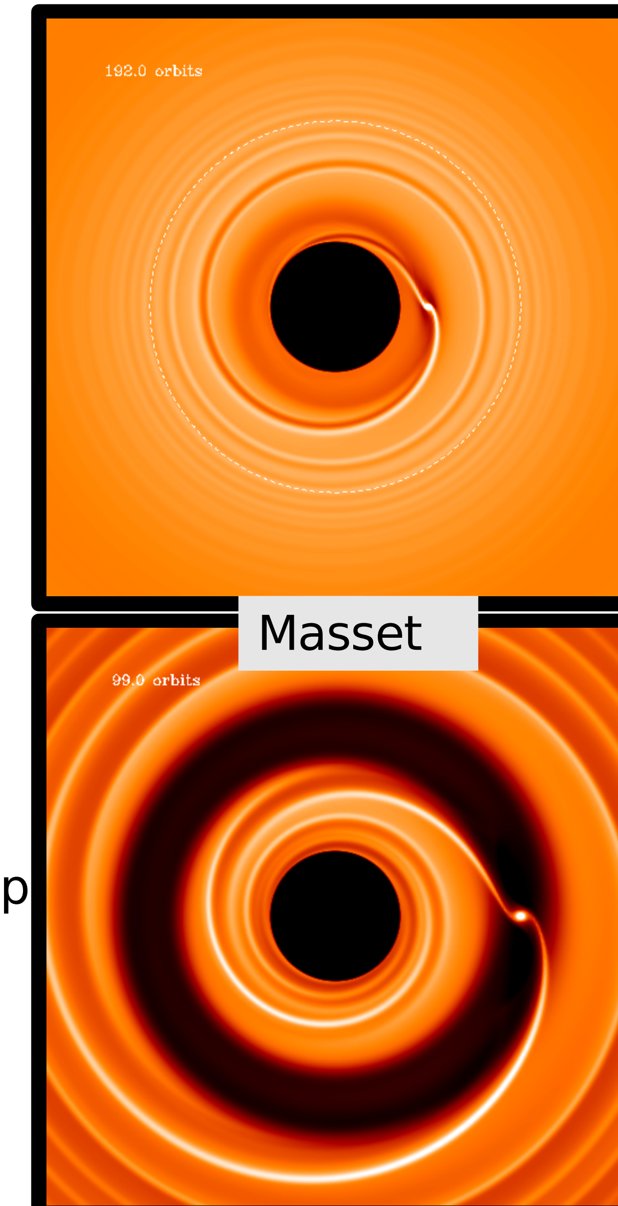
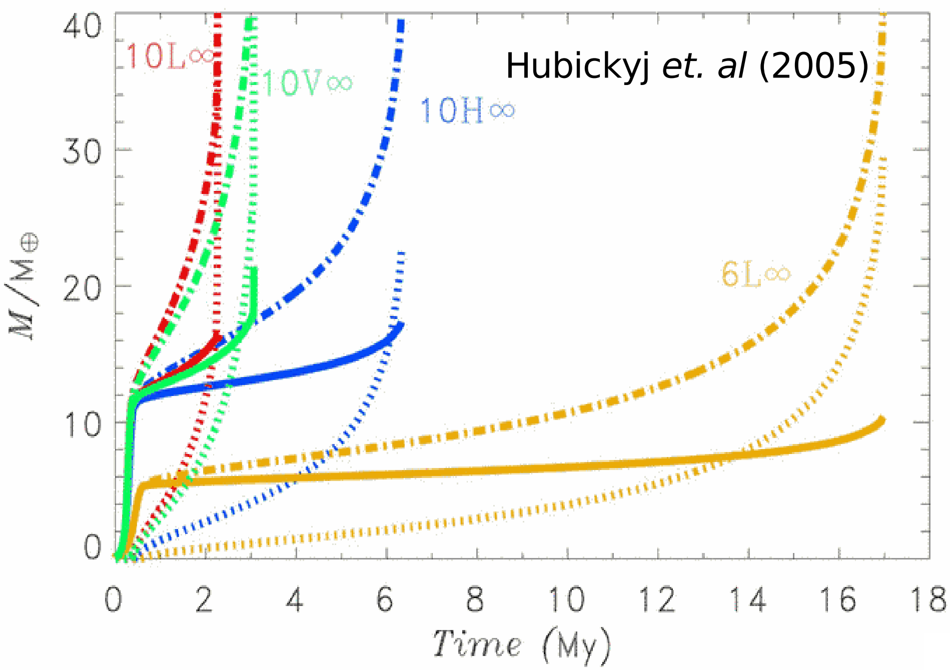
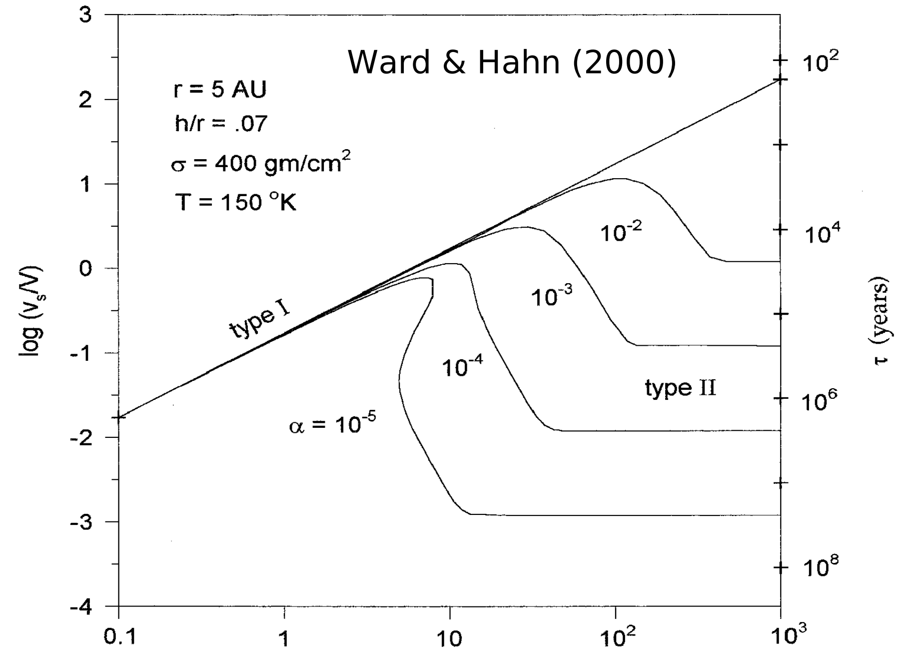


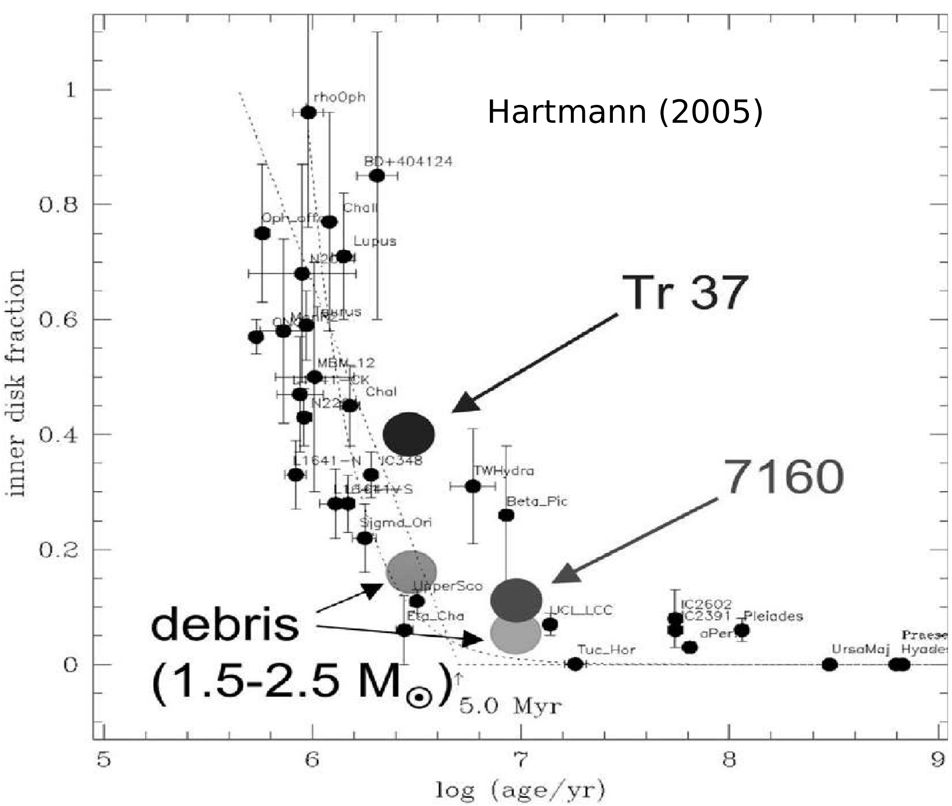
Type I - embedded

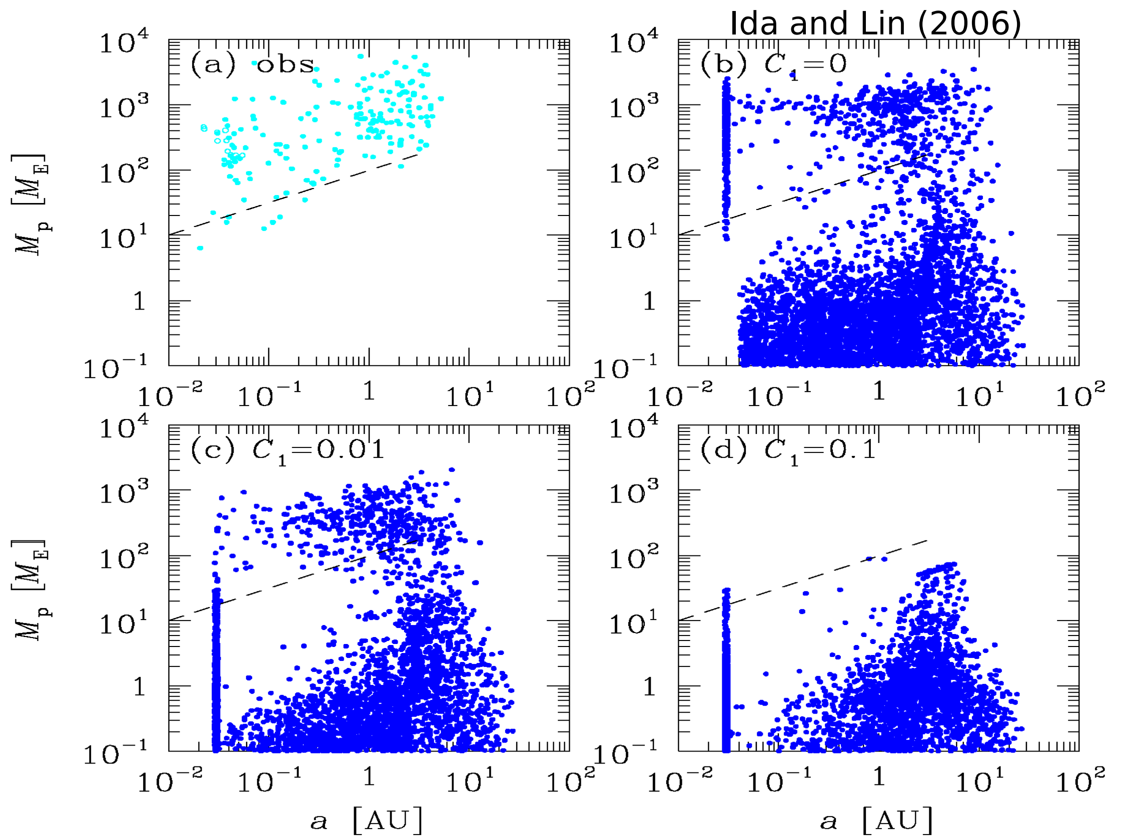
Type II – gap forming











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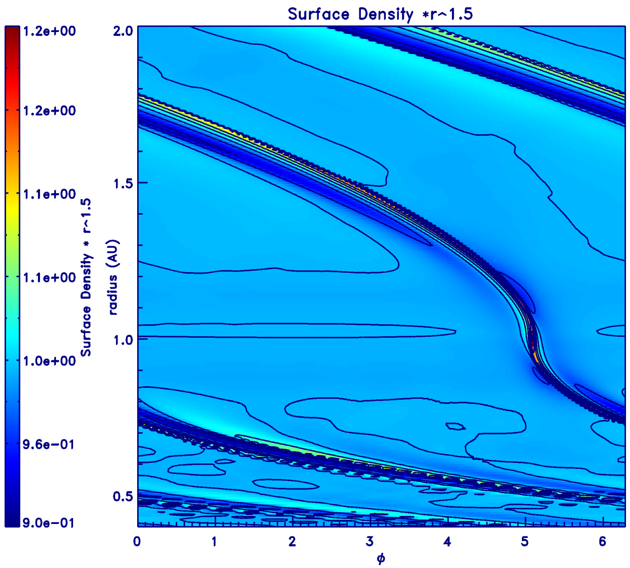
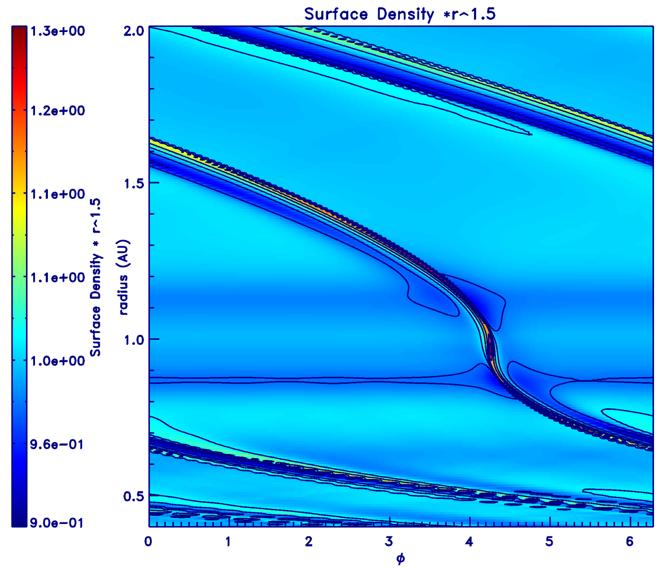
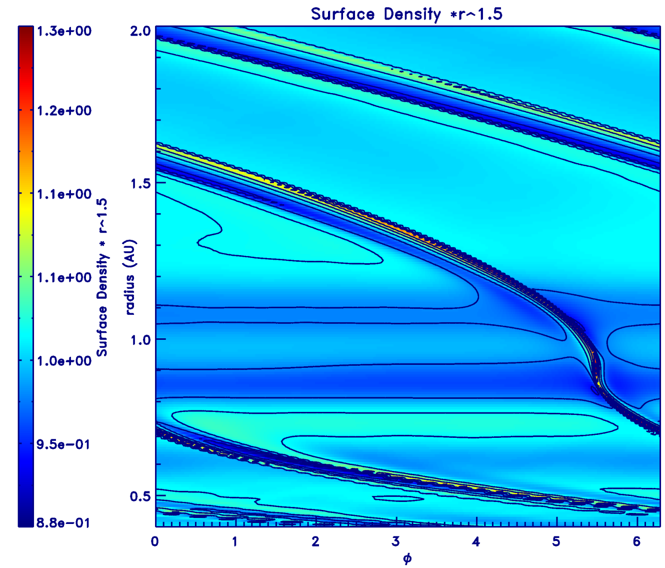
T = 50 orbits

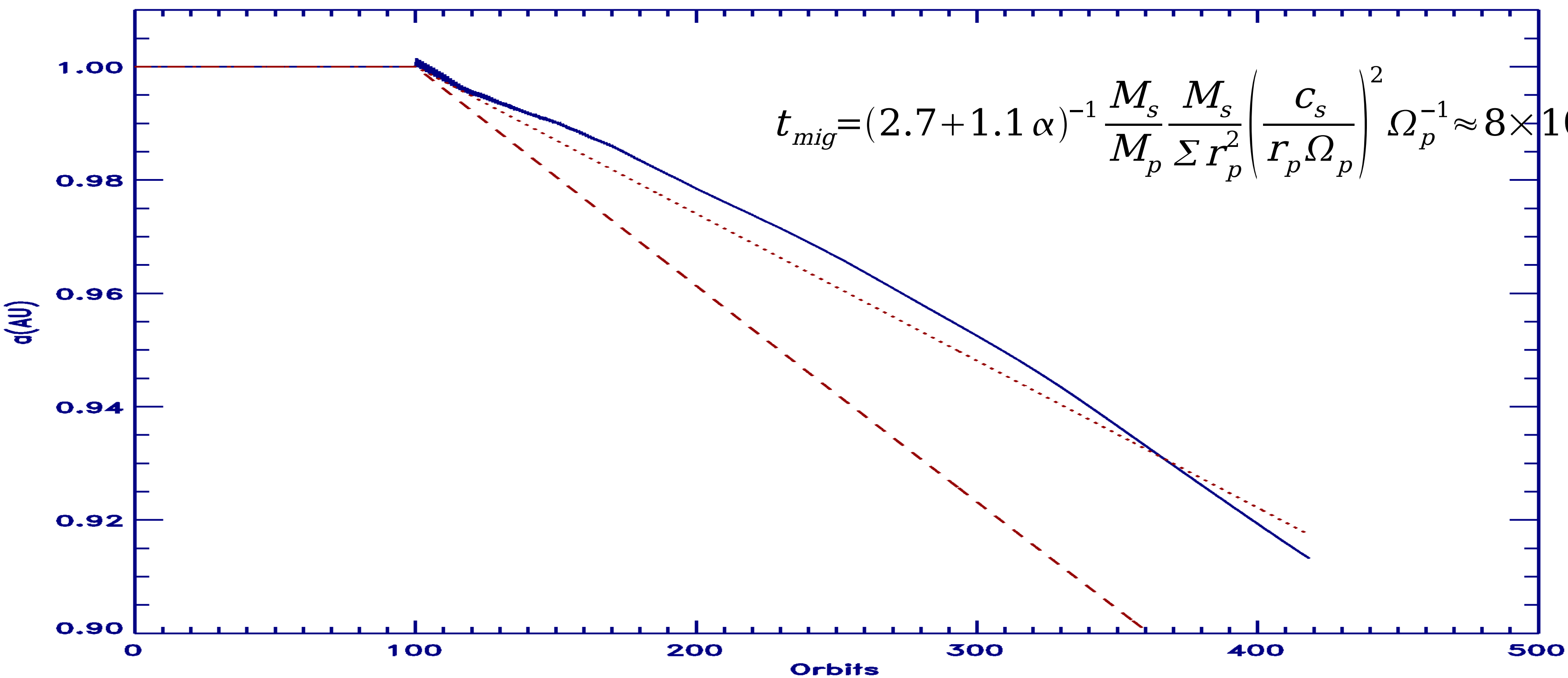


T = 250 orbits



T = 450 orbits





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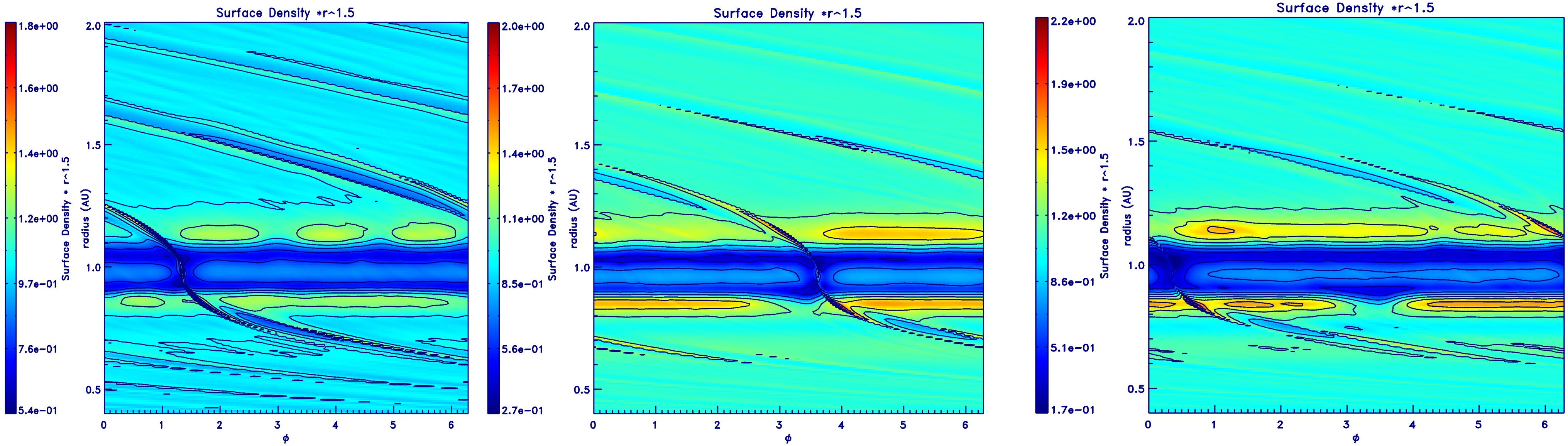
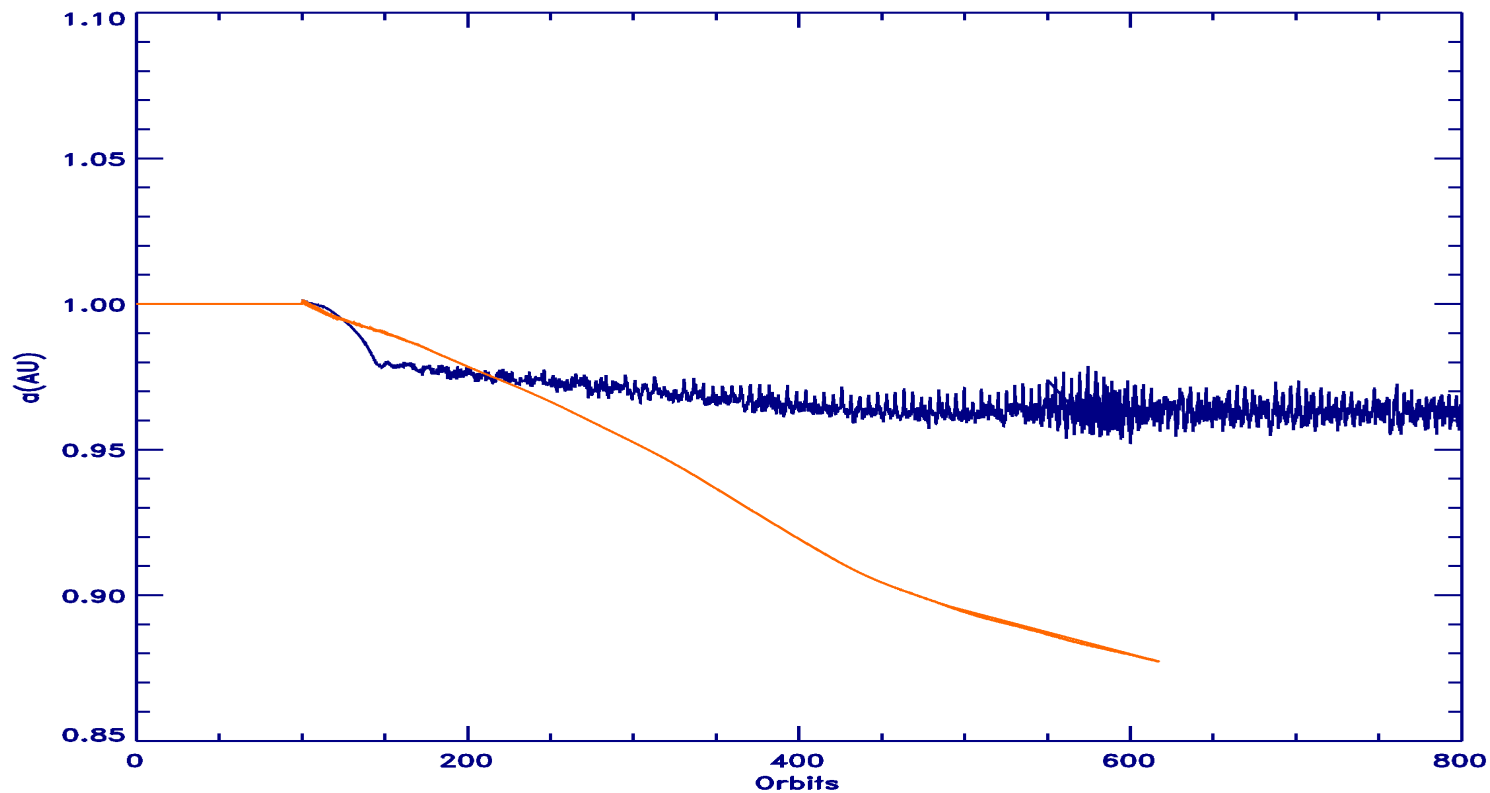
T = 270 orbits T = 530 orbits T = 790 orbits





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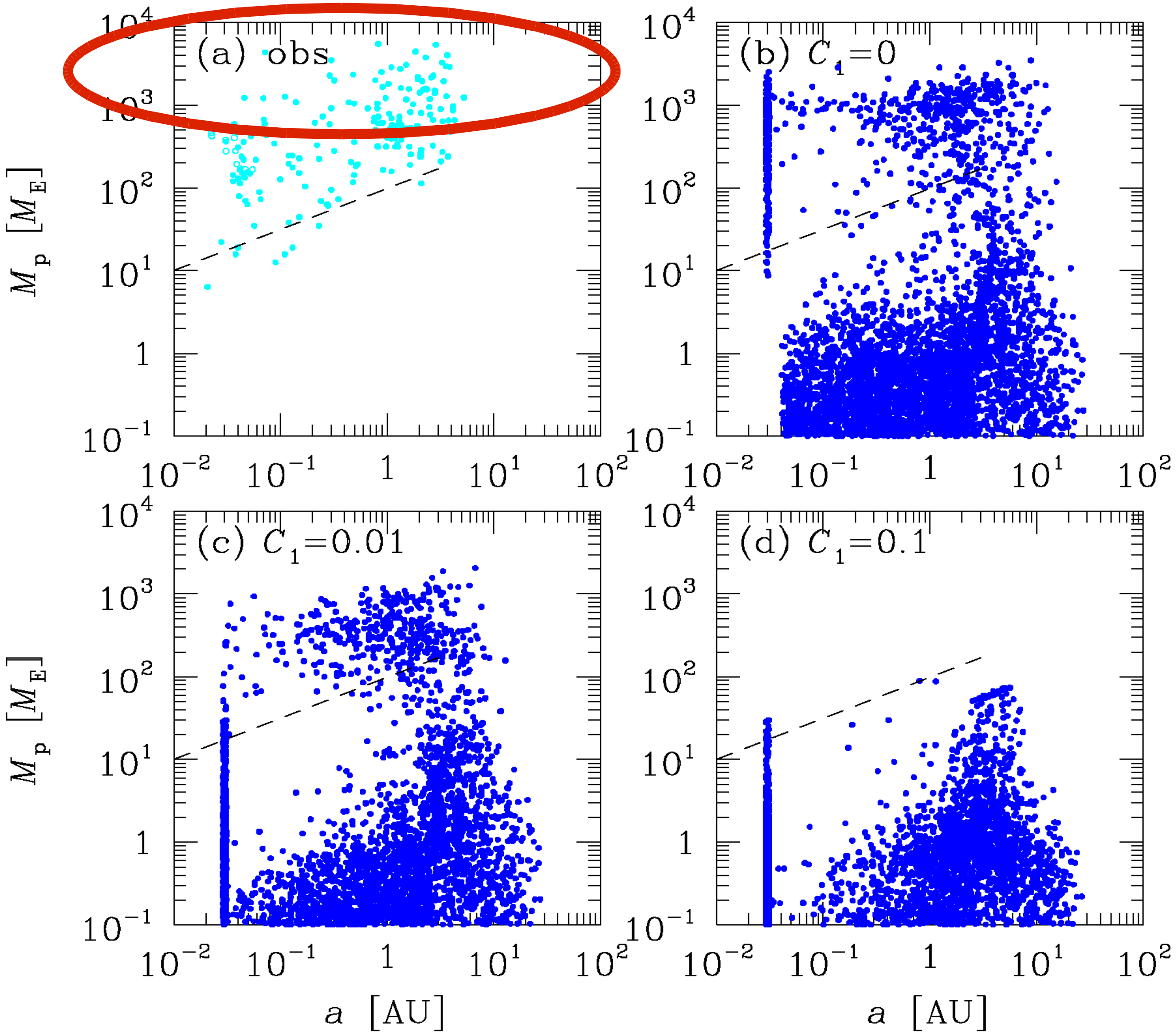

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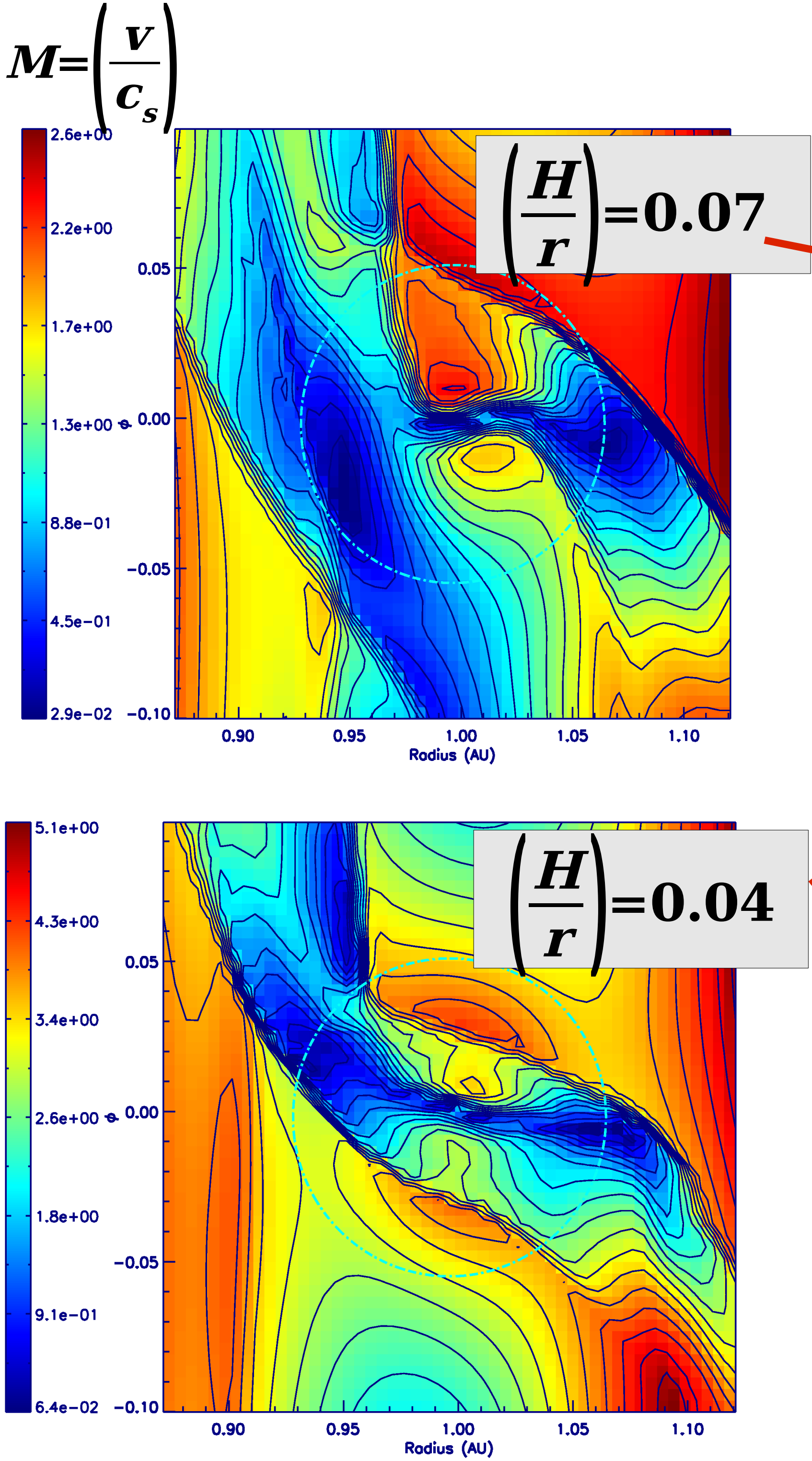

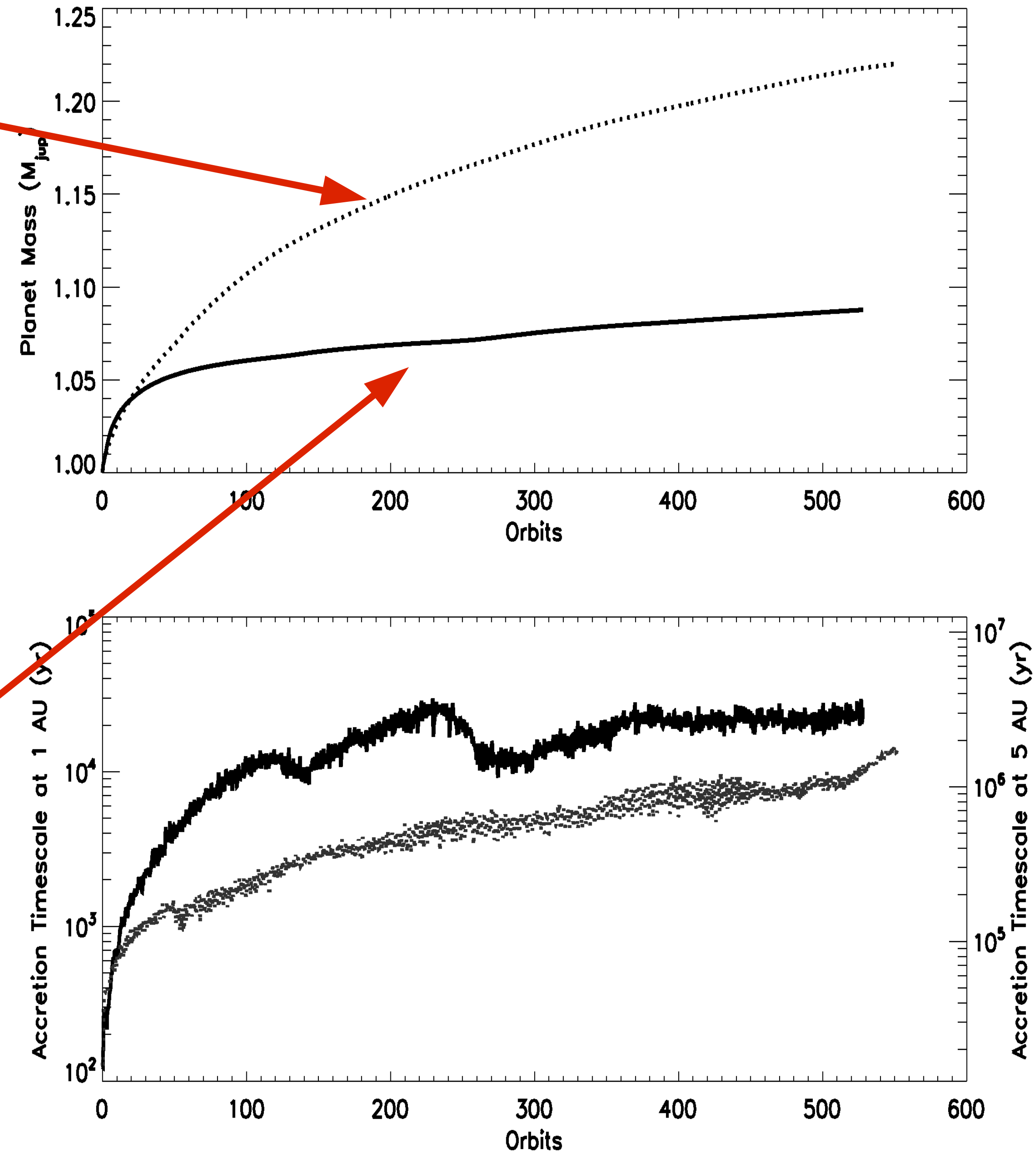

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Summary

- Dissipation at the spiral shocks initiates fluid instabilities. Instability timescales are rapid enough to allow vorticies to form for $10M_\oplus$ planets.
- Vorticies play a dominate role in embedded migration (type-I), rivaling disk Lindblad torques. This slowing is necessary for explaining observed planet locations
- The upper bound to the observed mass distribution can be understood using the planets growing tidal barrier. Planets reach their asymptotic mass when their tidal barrier