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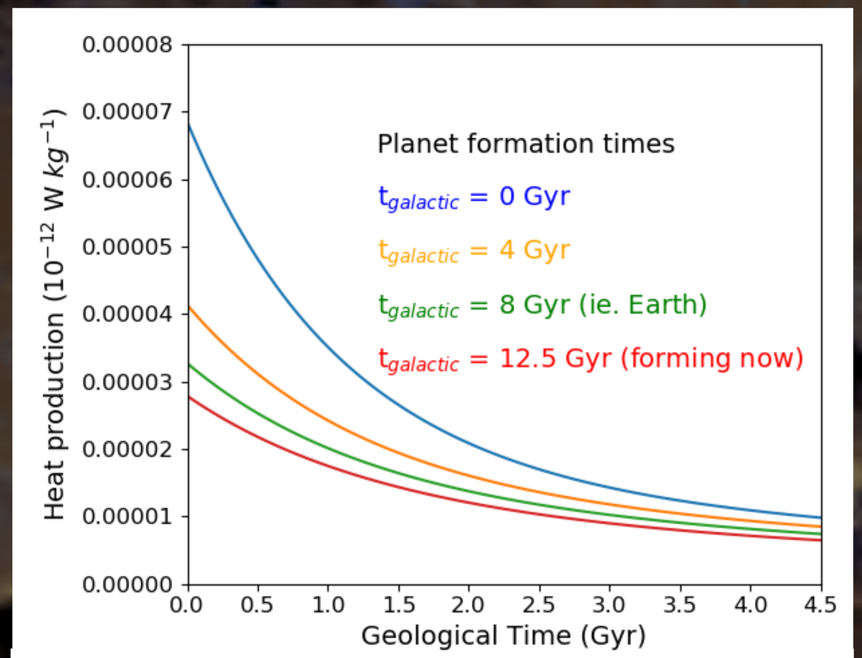
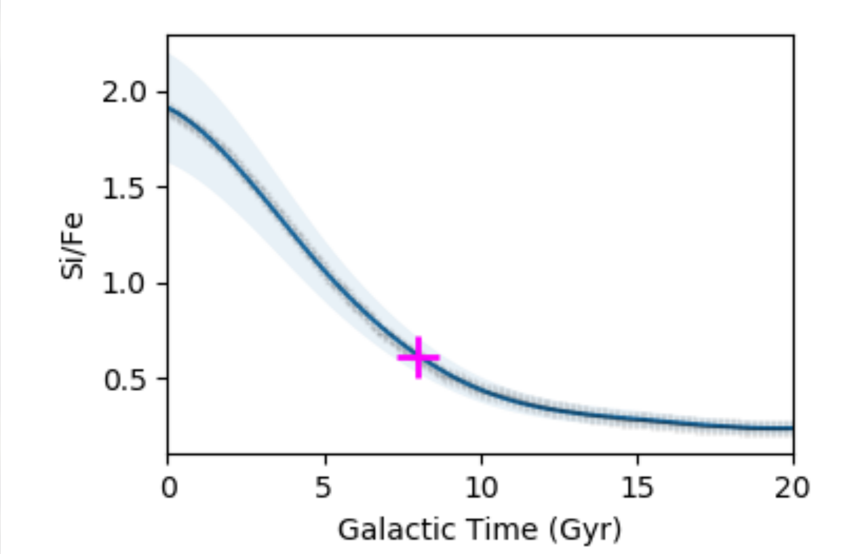
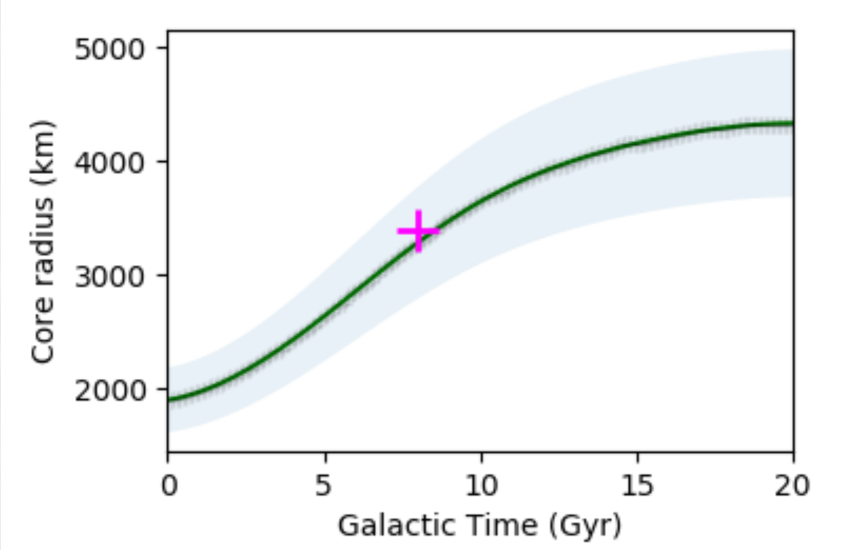
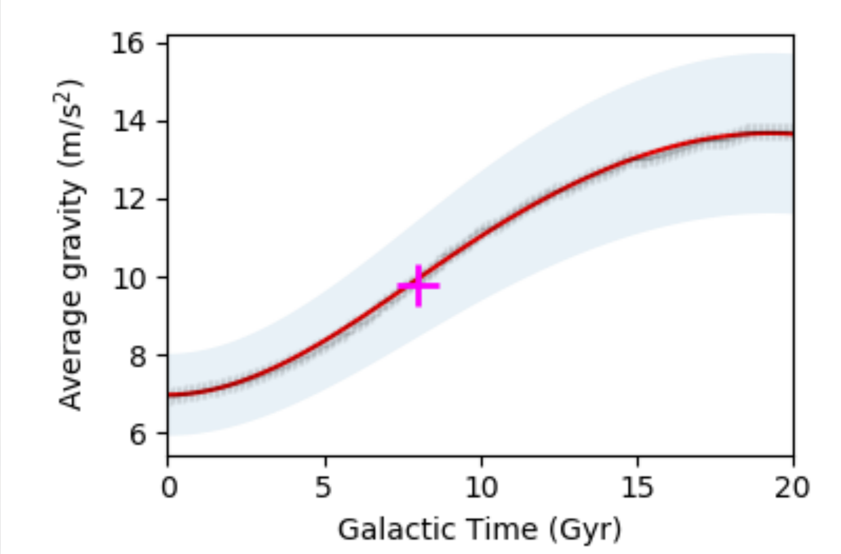
GEODYNAMIC EVOLUTION OF MERCURY-TYPE PLANETS

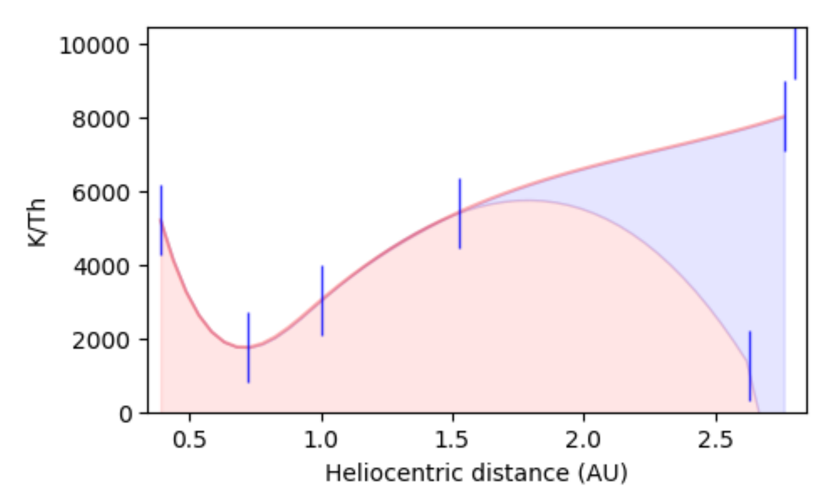
MERCURY IN A GALACTIC CONTEXT





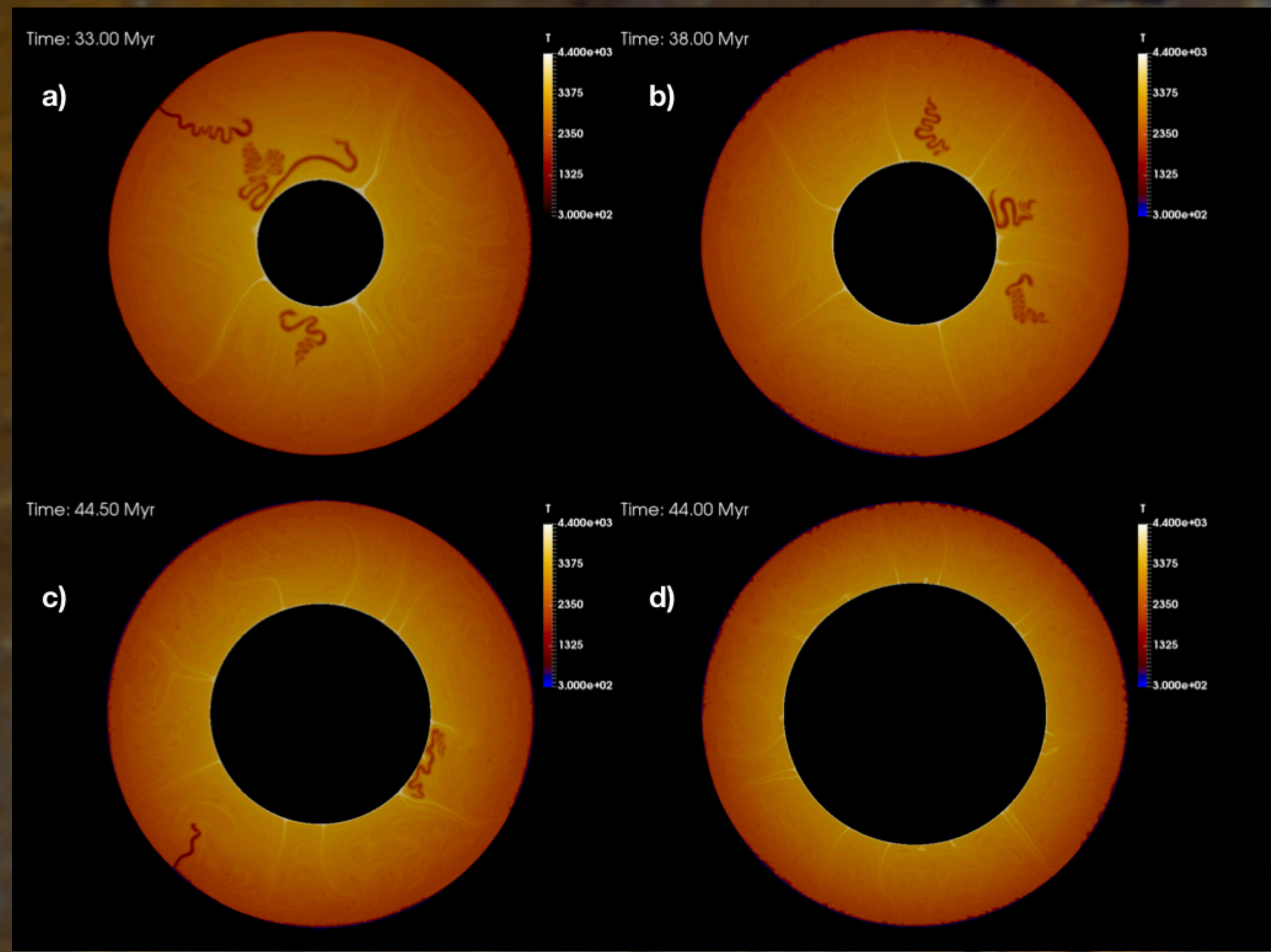


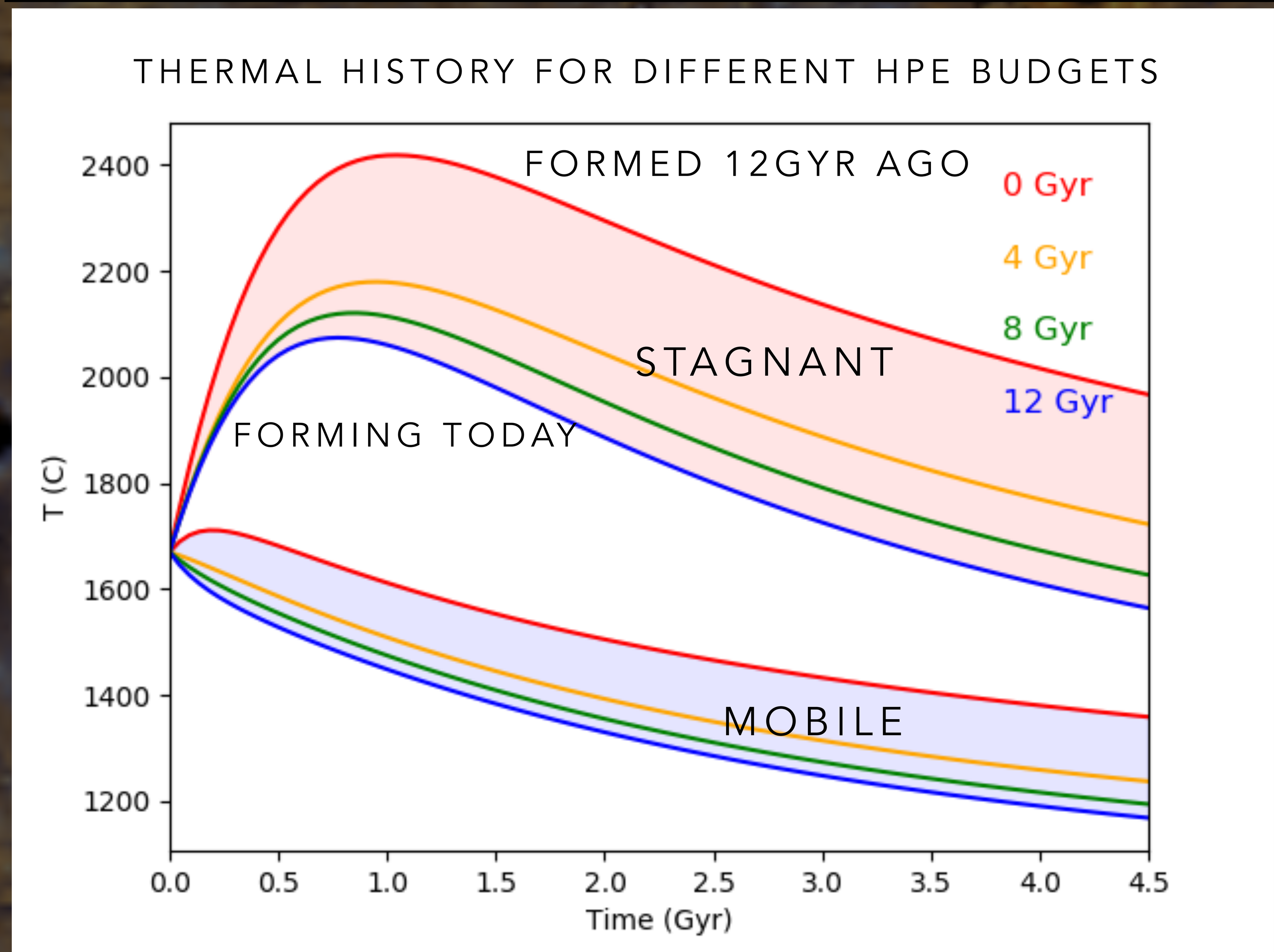




- GALACTIC CHEMICAL EVOLUTION TRENDS SUGGEST MOST RECENTLY FORMED PLANETS ARE MORE MERCURY-LIKE
- LOWER TOTAL CONCENTRATIONS OF HPES (TOP)
- LOWER SI/FE RATIOS - INCREASED TYPE II SUPERNOVA
- LARGER CORES AND GRAVITY (MIDDLE, CALCULATED USING MINERAL PHYSICS SOLVER BURNMAN; EARTH PARAMETERS SHOWN AS MAGENTA CROSS)
- MERCURY BUCKS THE TRENDS IN SOLAR SYSTEM HPES
- VESTA REPRESENTED FROM HED METEORITES, C-TYPE FOR CERES.
- GENERAL VOLATILITY TREND IN K/U, EXCEPT FOR MERCURY - UNCLEAR WHY

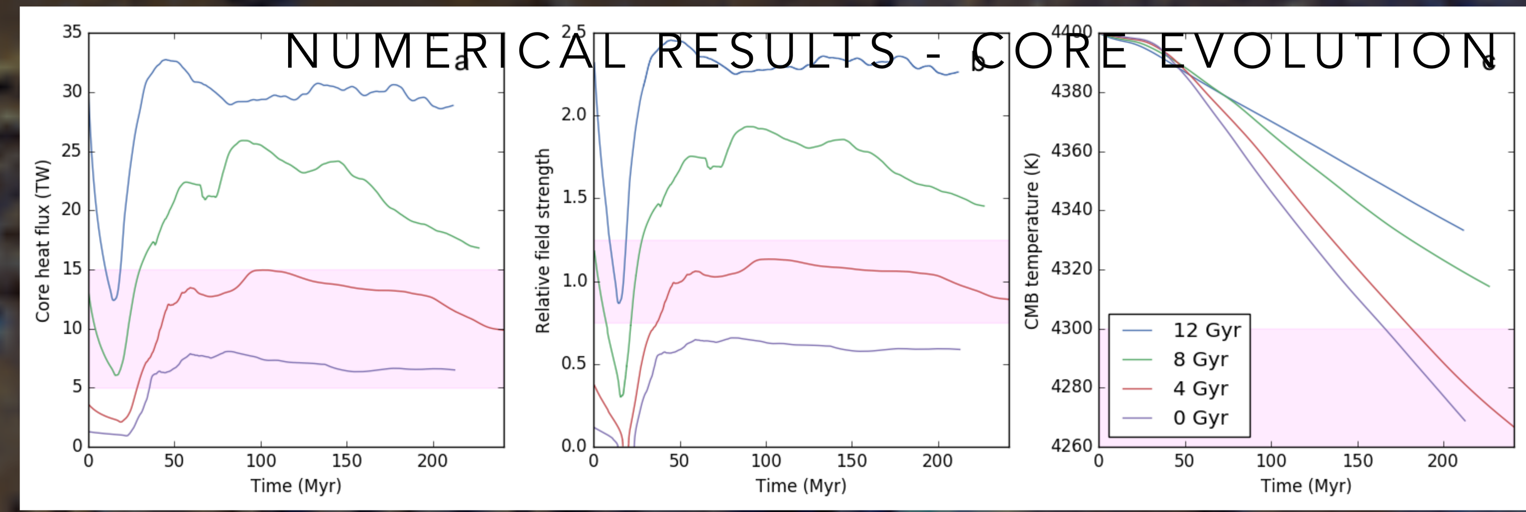
THERMAL EVOLUTION OF MERCURY-TYPE PLANETS



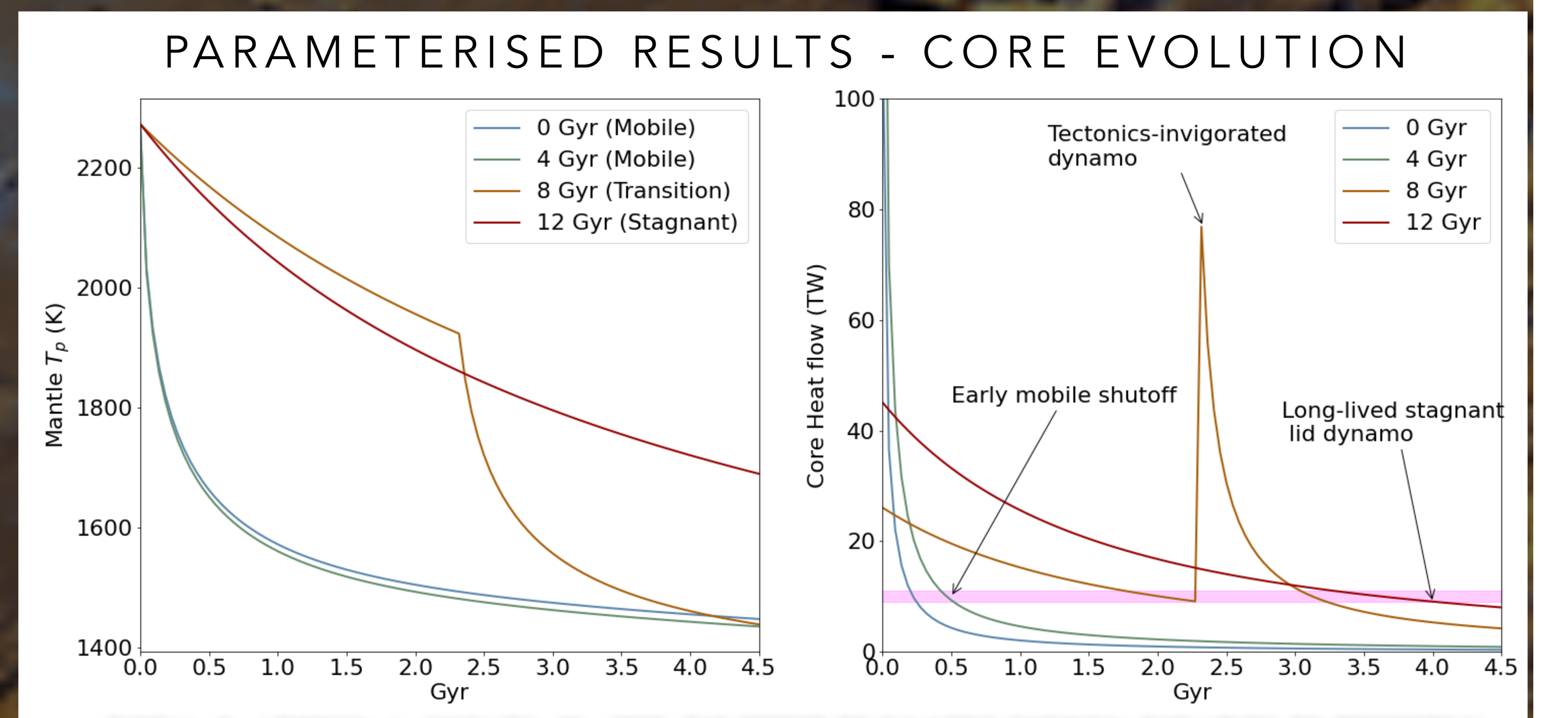


- LARGER CORE PLANETS TEND TO HAVE HOTTER INTERNAL TEMPERATURES
- THIS IMPEDES THEIR ABILITY TO GENERATE TECTONICS

EVOLUTION OF MERCURIAN CORES



- LARGER CORE PLANETS HAVE HOTTER CORES (IN GENERAL) AND - INITIALLY - STRONG MAGNETIC FIELD GENERATION
- WITH TECTONICS, THOUGH, THEY CANNOT MAINTAIN CMB HEAT FLUX, AND MAGNETIC FIELDS CEASE
- THERE IS AN OPTIMAL CORE:PLANET SIZE THAT PERMITS LONG-LIVED HOT GEODYNAMO ACTION, AND TECTONICS TO FACILITATE CMB HEAT FLOW, AND STRONG CONVECTION.
- BIG UNKNOWNS ARE COMPOSITION - S IN CORE (+ OTHER LIGHT ELEMENTS) AND K IN MANTLE.



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