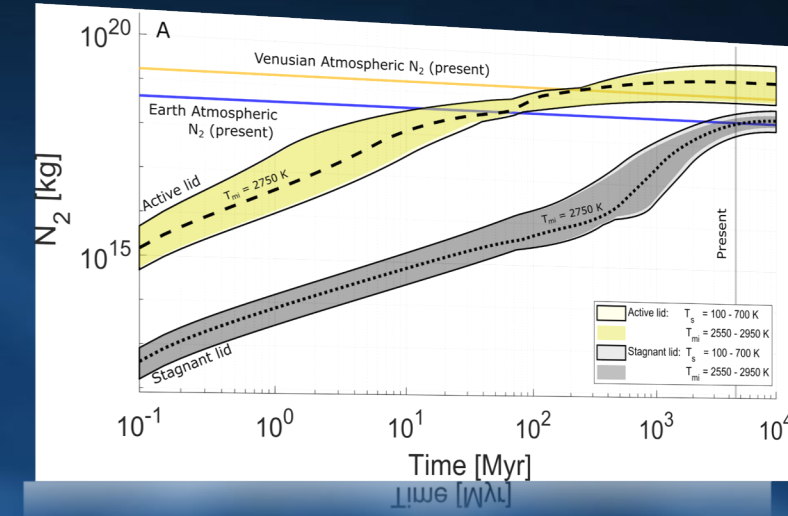


# Venus' Atmospheric Nitrogen Explained by Ancient Plate Tectonics

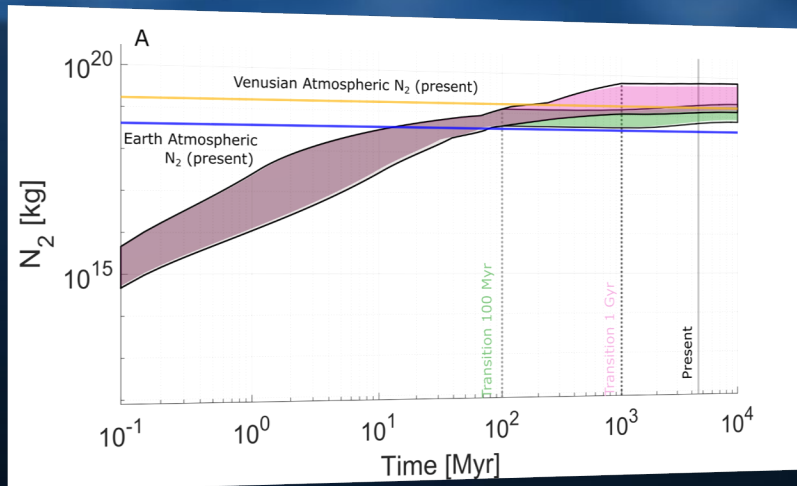
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**(Top Left)** Cumulative atmospheric mass of outgassed  $N_2$  (active and stagnant lids) from numerical experiments. Shaded regions over initial mantle temperatures ( $T_{mi}$ ) results; lighter shades indicate surface temperature ( $T_s$ ) alone.

**(Bottom Left)**  $N_2$  to the Venusian atmosphere over time with a transition from active to stagnant lid states at: 100 Myr (Green) and 1 Gyr (Purple). Transitions past 1 Gyr do not substantially alter results.



- (1) An ancient and continuous stagnant lid does not explain the present-day atmosphere ( $N_2$ )
- (2) The current atmosphere requires outgassing in an early phase of plate-tectonic-like activity
- (3) This activity would have persisted for at least 1 Gyr, and potentially to the recent past

