

# Old, partially-convective stars disagree with standard solar scalings.

Amanda Ash | Lucy Lu | Marc Pinsonneault  
Ohio State University

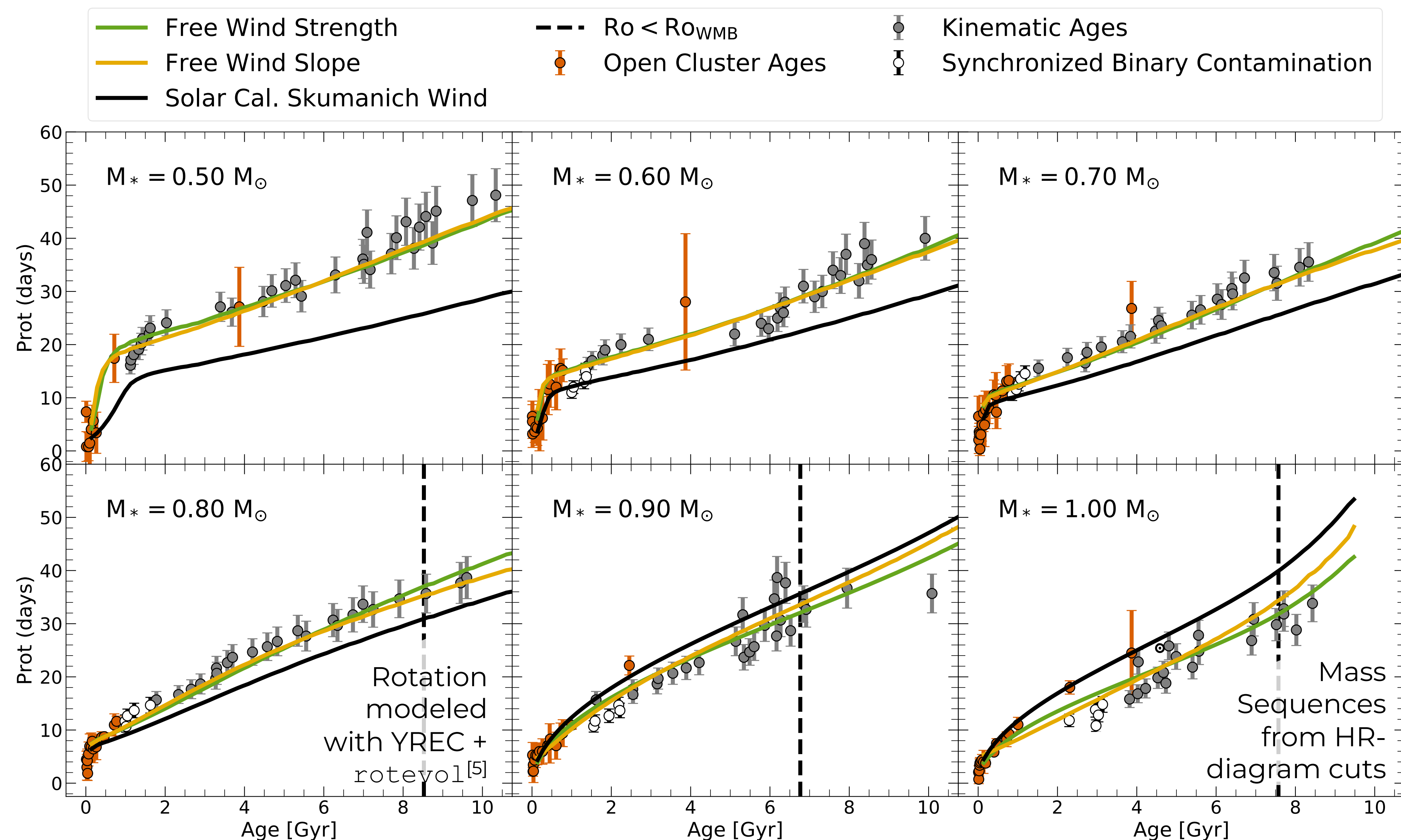
Paper:



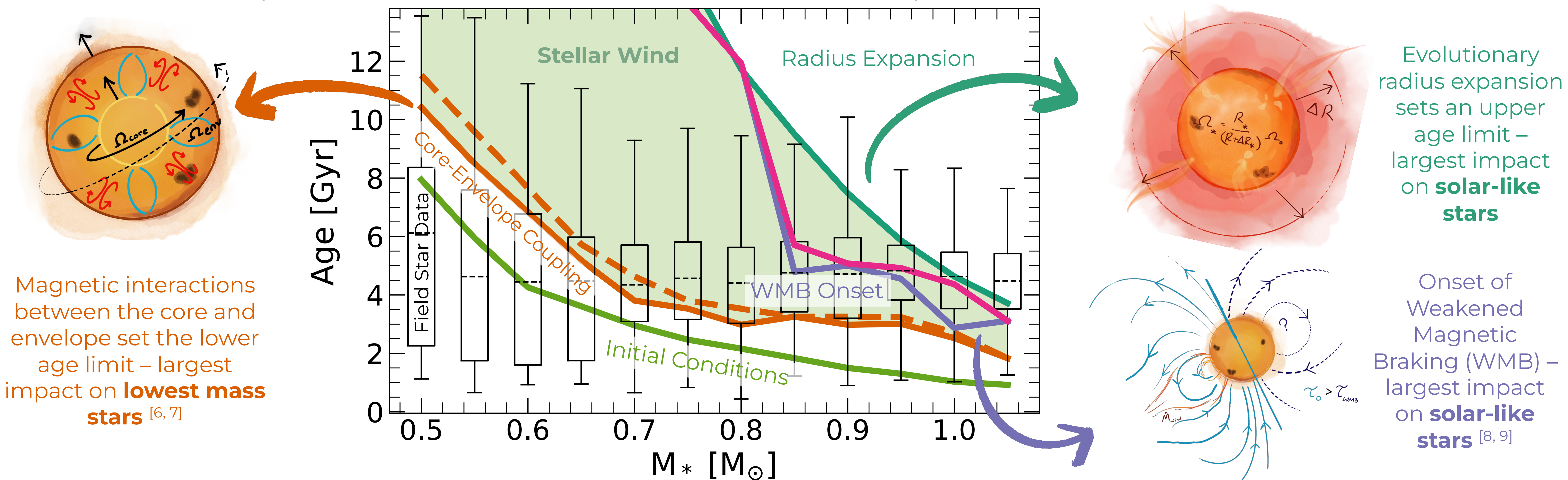
Historically, gyrochronology has been calibrated using young, rapidly rotating stars in open clusters.<sup>[1, 2, 3]</sup>

Kinematic ages extend the range where we can test rotation models.<sup>[4]</sup>

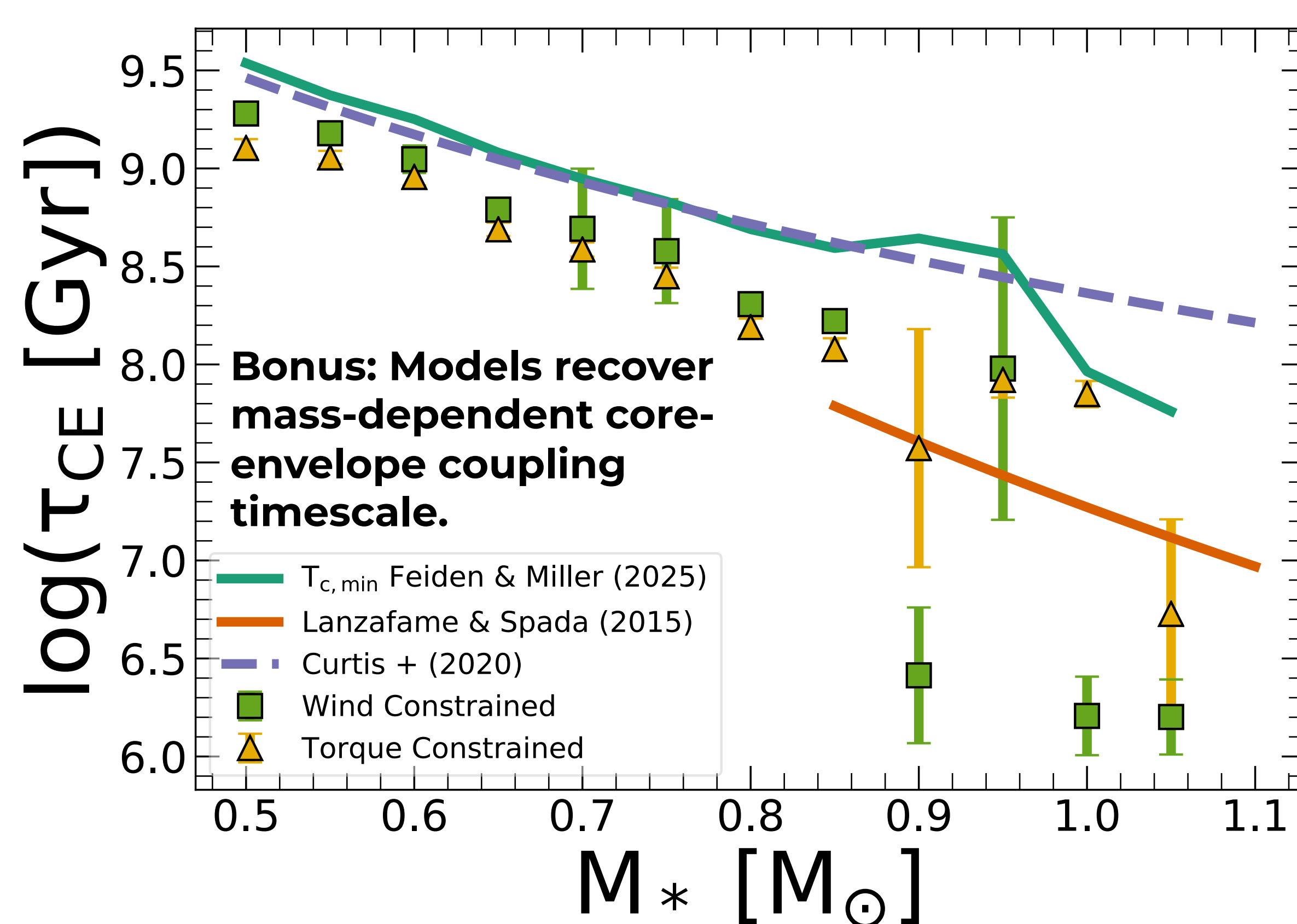
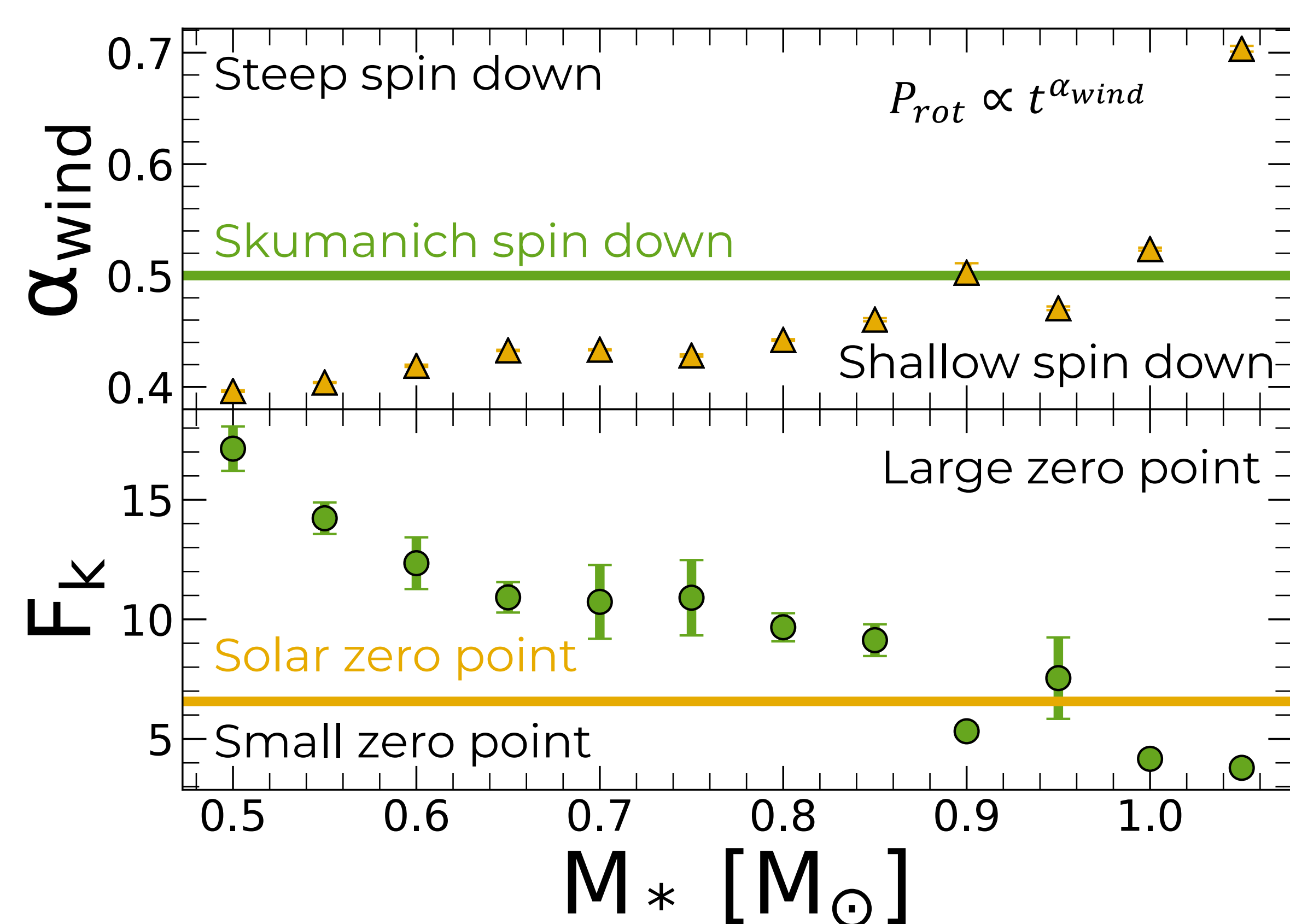
**Old stars are best represented by models with either stronger mass loss rates and Alfvén radii or steeper dependencies between wind strength and angular velocity.**



Full rotation models allow the wind-dominated domain to be isolated from other physical effects. When do different physical effects matter?



These age limits have implications on the interpretation of empirical gyrochronology and highlight the advantages of a full forward modelling approach.



The field data is represented by models that have a **larger scale factor** in the solar Rossby scalings or a change in the **dynamo relationships**

Website  
(on the job  
market)



Like smaller stars? Ask me  
about M dwarf winds!  
**Questions? - ash.172@osu.edu**

Key References:

[1] Skumanich (1972), [2]Curtis et al. 2020, [3] Dungee et al. 2022, [4] Lu et al. (2021), [5] Pinsonneault et al. (2026), [6] MacGregor & Brenner (1991), [7] Denissenkov et al. (2010), [8] van Saders et al. (2016), [9] Metcalfe et al. 2025a

A. Ash is funded by NASA ADP grant.