

Supplementary Materials for

Reconciling past changes in Earth's rotation with 20th century global sea-level rise: Resolving Munk's enigma

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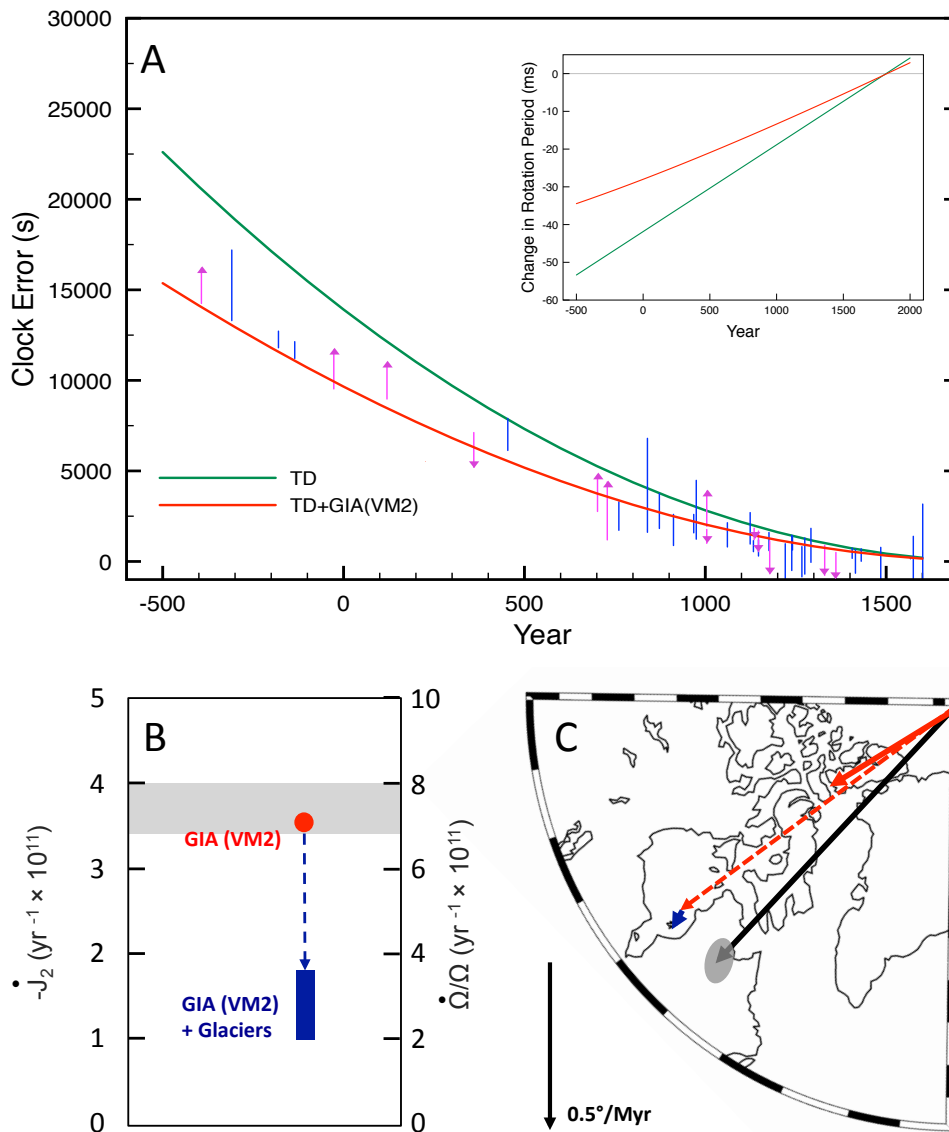
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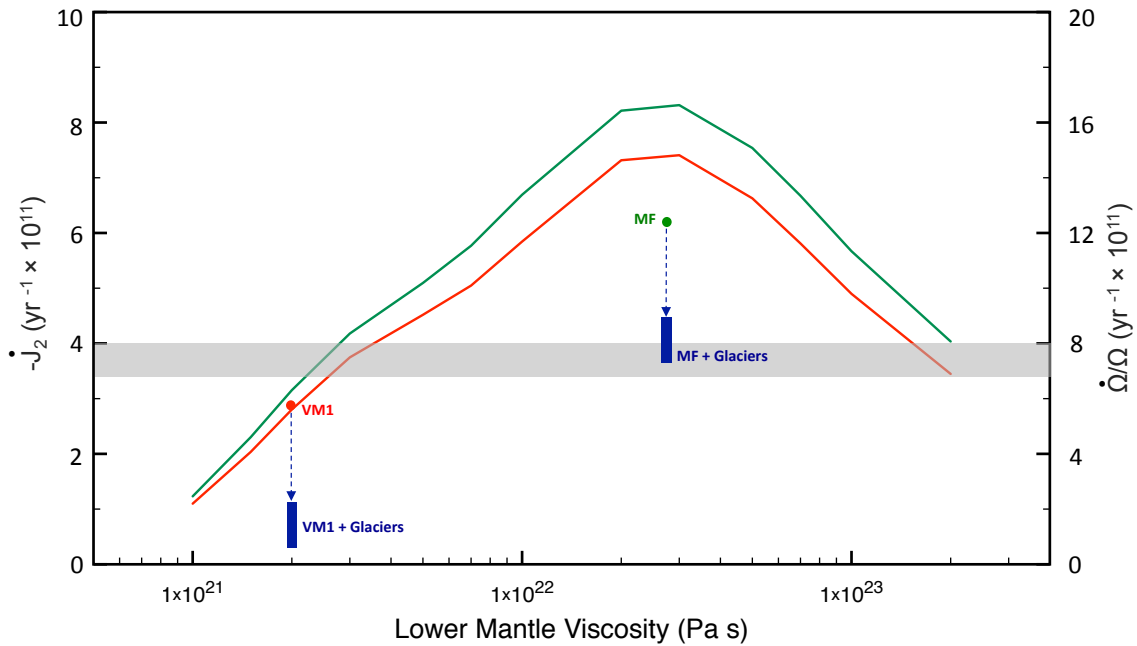
The PDF file includes:

Fig. S1. Munk's enigma of global sea-level rise (*I*): the VM2 model.

Fig. S2. Sensitivity of GIA predictions of the J_2 rate to variations in mantle viscosity.



Supplementary Figure 1: Munk's (I) enigma of global sea level rise – VM2 model. As in Fig. 1, with the exception that the GIA predictions are based on radial mantle viscosity profile VM2 (15), a revision to the model VM1 used in the main text and adopted by Munk (I).



Supplementary Figure 2. Sensitivity of GIA predictions of the J_2 rate to variations in mantle viscosity. Shaded region is satellite-derived (7-9) observational constraint on the secular rate of change of the J_2 harmonic from 1976-1990. The red line is the prediction of the J_2 rate associated with ongoing GIA computed using the ICE5G ice history (15) and a suite of models with an upper mantle viscosity of 5×10^{20} Pa s and a constant lower mantle viscosity given by the abscissa value. Green line is analogous to the red line, except that the global ice history of Ref. 32 is adopted in the GIA calculation. The red dot is the predicted J_2 rate due to GIA computed using the VM1 viscosity model (13,14) and the ICE5G ice history (15). In contrast, the green dot is the GIA calculation based on the MF viscosity model (26) and the global ice history of Ref. 32. The blue dashed line with bar represents the correction to these GIA predictions associated with melting of glaciers, as tabulated in Ref. 18. The vertical range of the blue bar reflects the uncertainty in this melt contribution. The right ordinate scale maps the predicted J_2 rate into an associated acceleration of the Earth's axial rate of rotation (11).