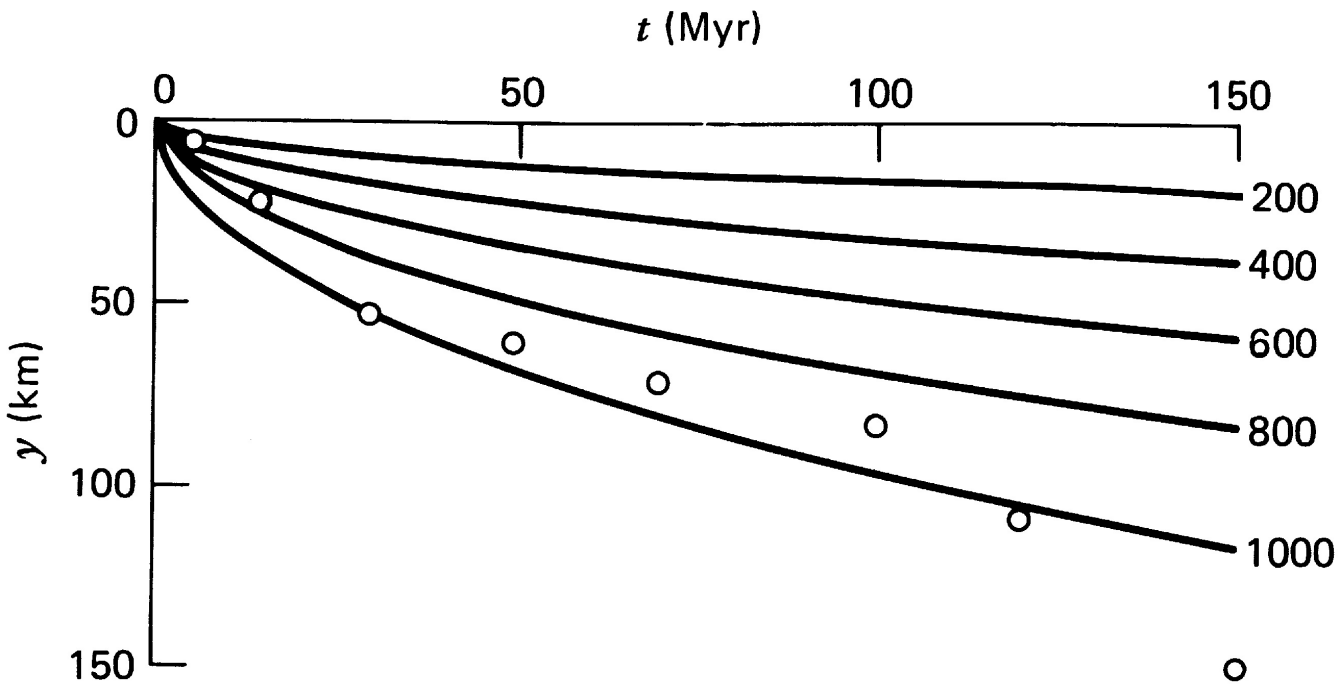
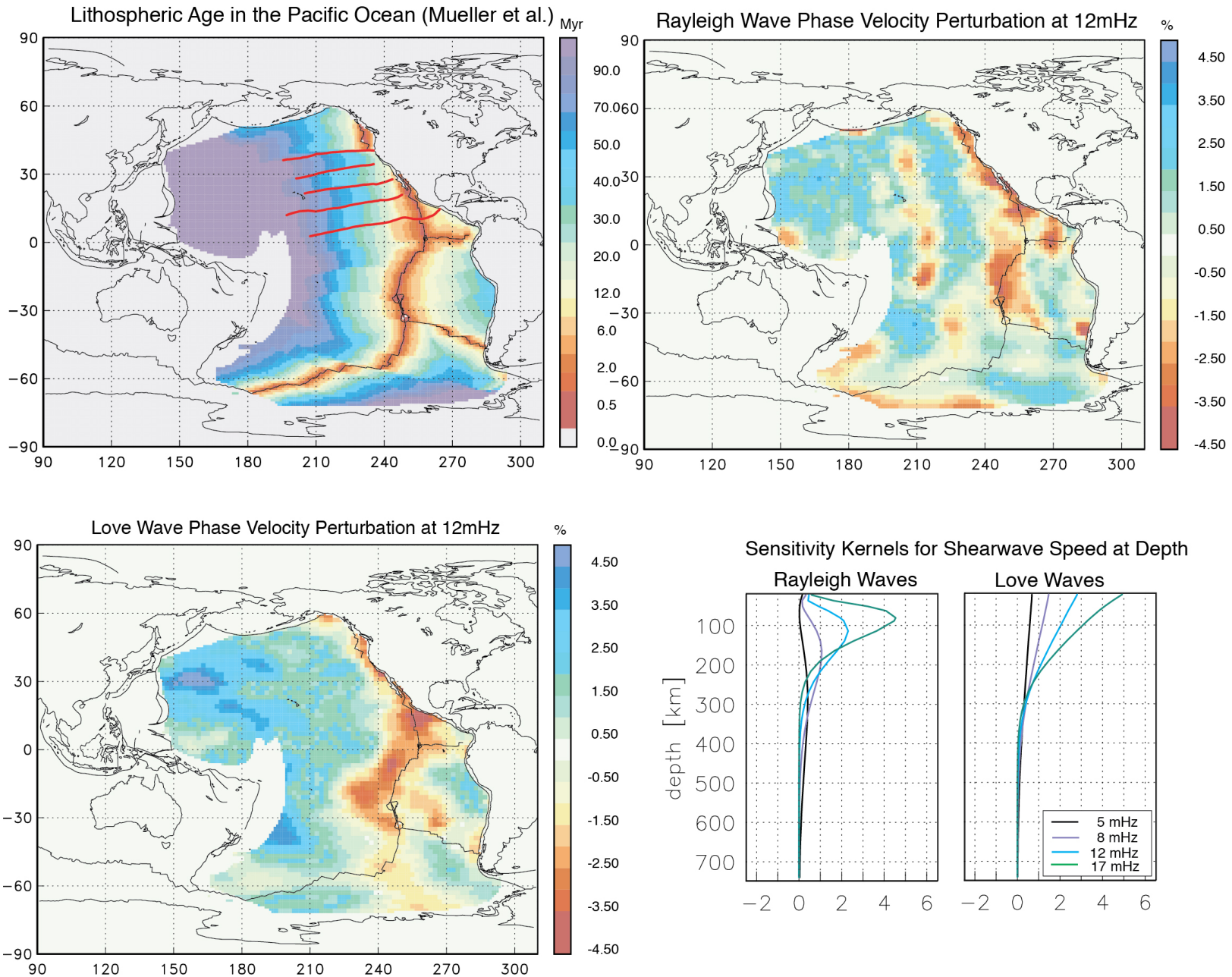
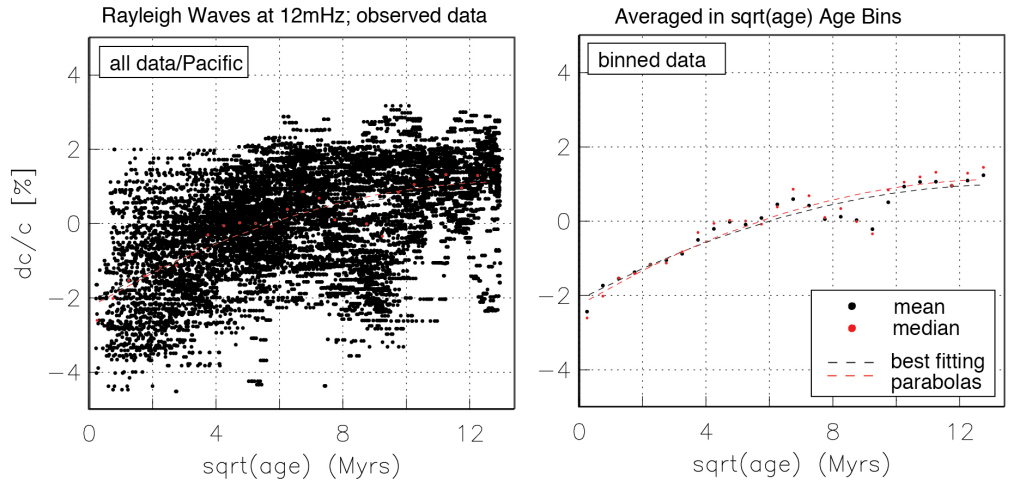


Figure 4-24 The solid lines are isotherms, $T - T_s$ (°K), in the oceanic lithosphere from Equation (4-125). The data points are the thicknesses of the oceanic lithosphere in the Pacific determined from studies of Rayleigh wave dispersion data. (From A. R. Leeds, L. Knopoff, and E. G. Kausel, Variations of upper mantle structure under the Pacific Ocean, *Science*, **186**, 141–143, 1974.)

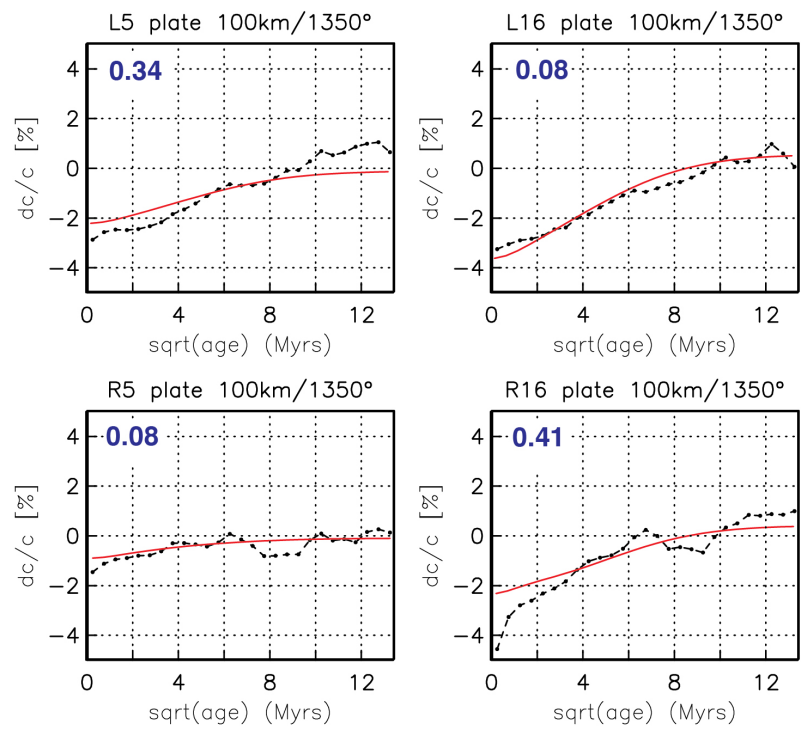


Hogg, C. and G. Laske, The cooling oceanic lithosphere as constrained by surface wave dispersion data, SOS Trans. AGU, Fall AGU Meeting, December, 2003.

Observed Data (raw and binned)



Fit of a cooling plate (100km thick, basal T=1350ºC)



Love

Rayleigh

5 mHz **15 mHz**

(0.34: misfit)

Hogg, C. and G. Laske, The cooling oceanic lithosphere as constrained by surface wave dispersion data, SOS Trans. AGU, Fall AGU Meeting, December, 2003.

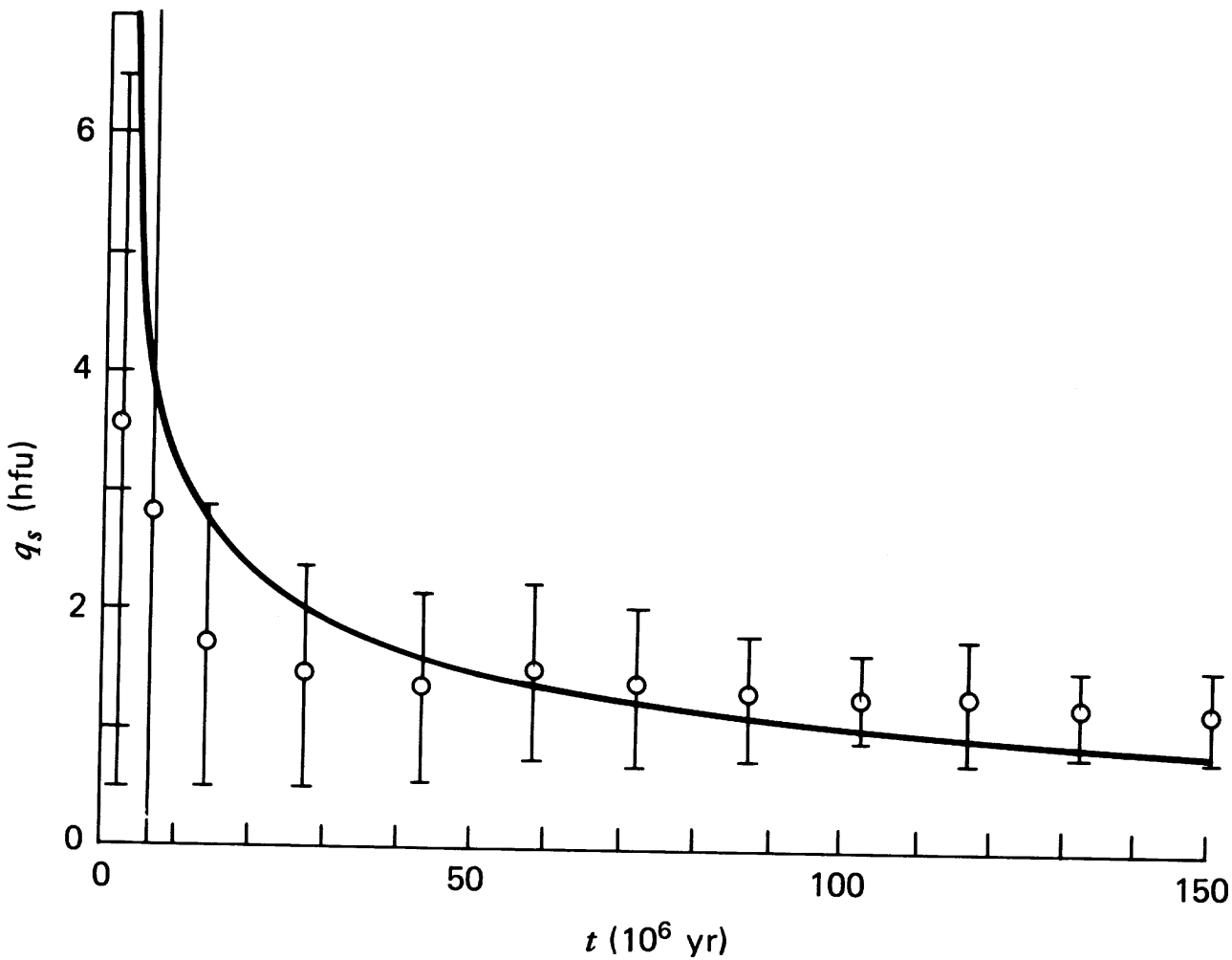
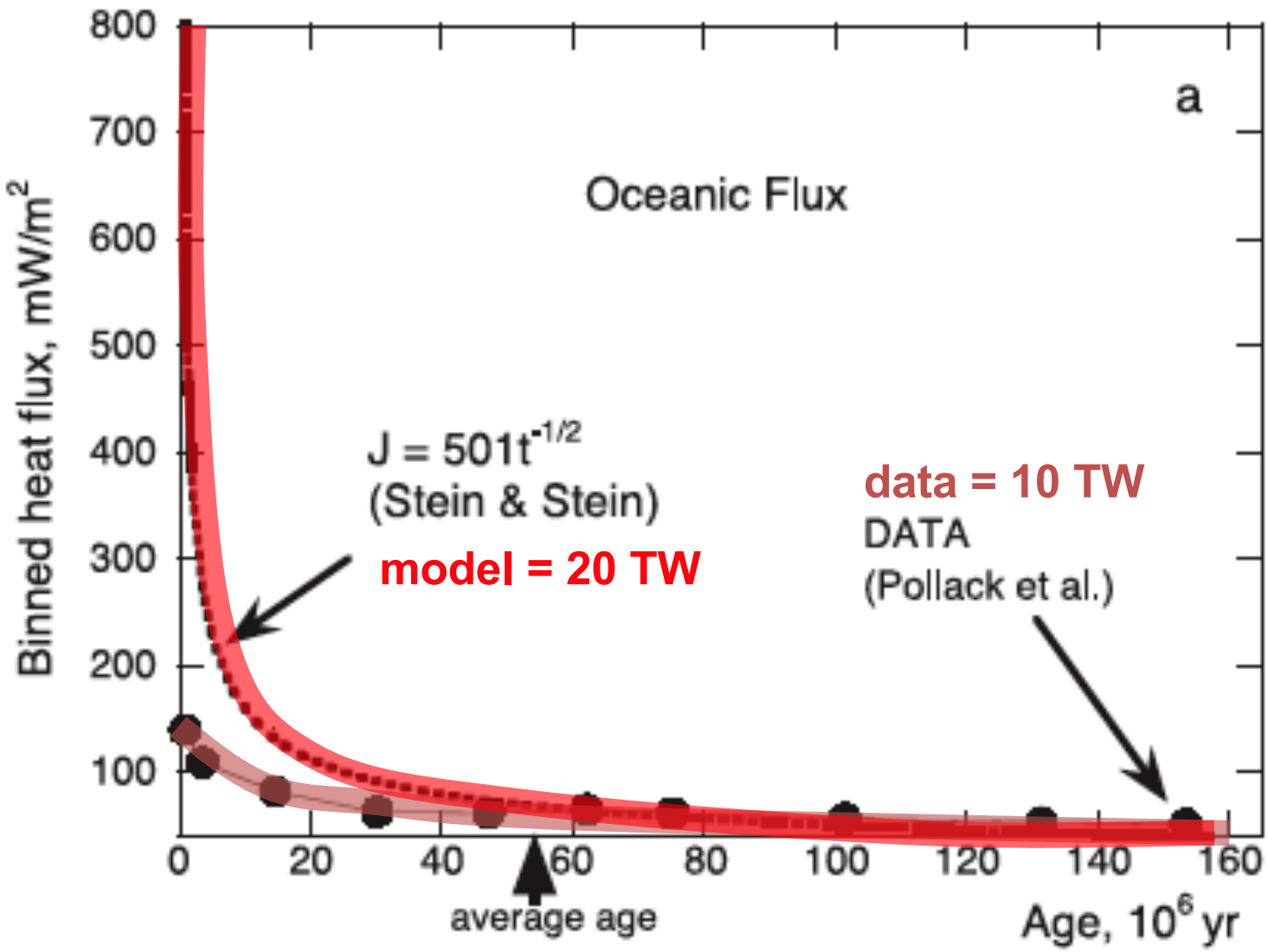
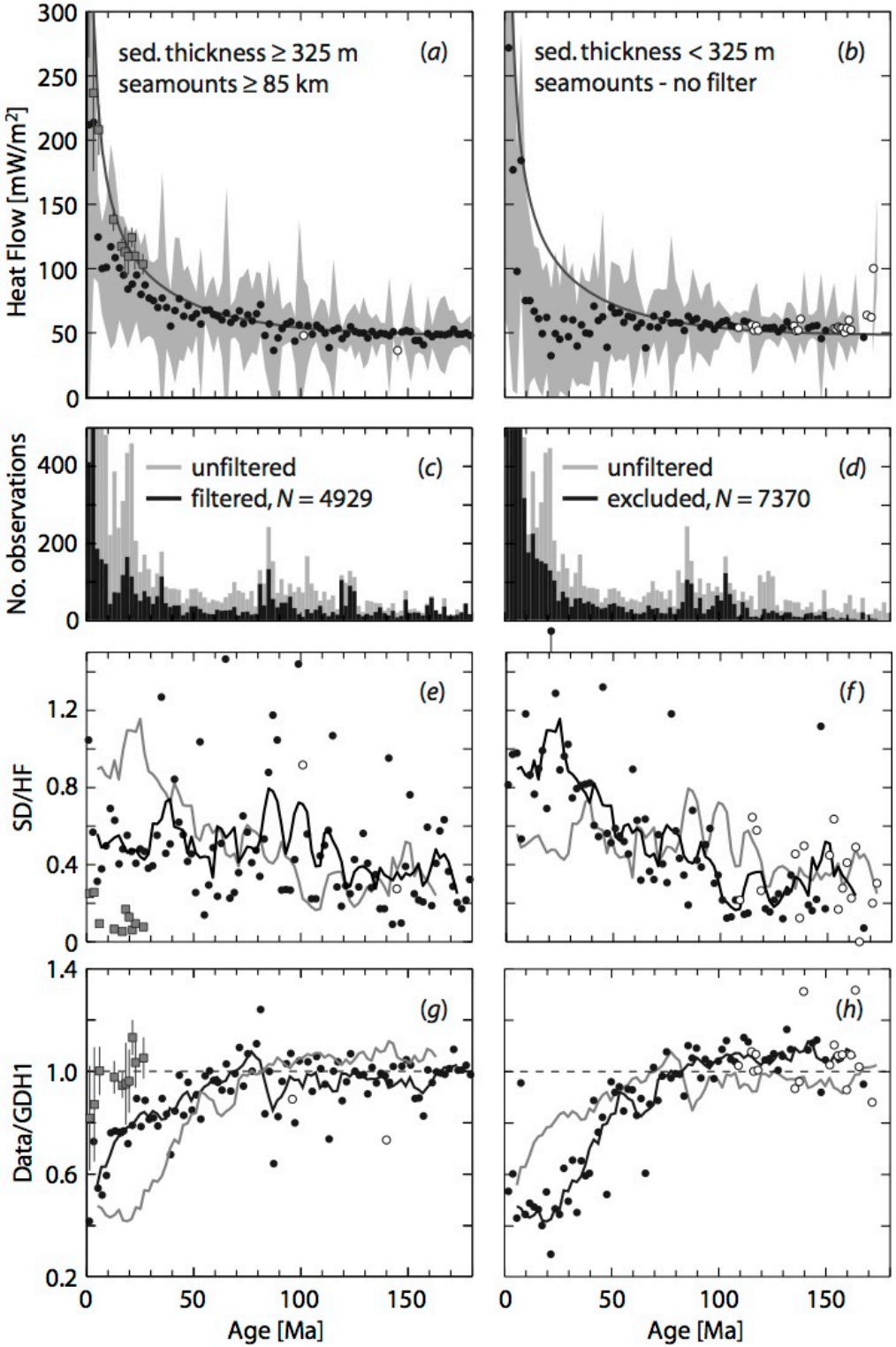


Figure 4-25 Mean values and standard deviations of ocean floor heat flow measurements as functions of age compared with Equation (4-127). Data from J. G. Sclater, C. Jaupart, and D. Galson, The heat flow through oceanic and continental crust and the heat loss of the Earth, *Reviews of Geophys. and Space Physics*, **18**, 269–311, 1980.

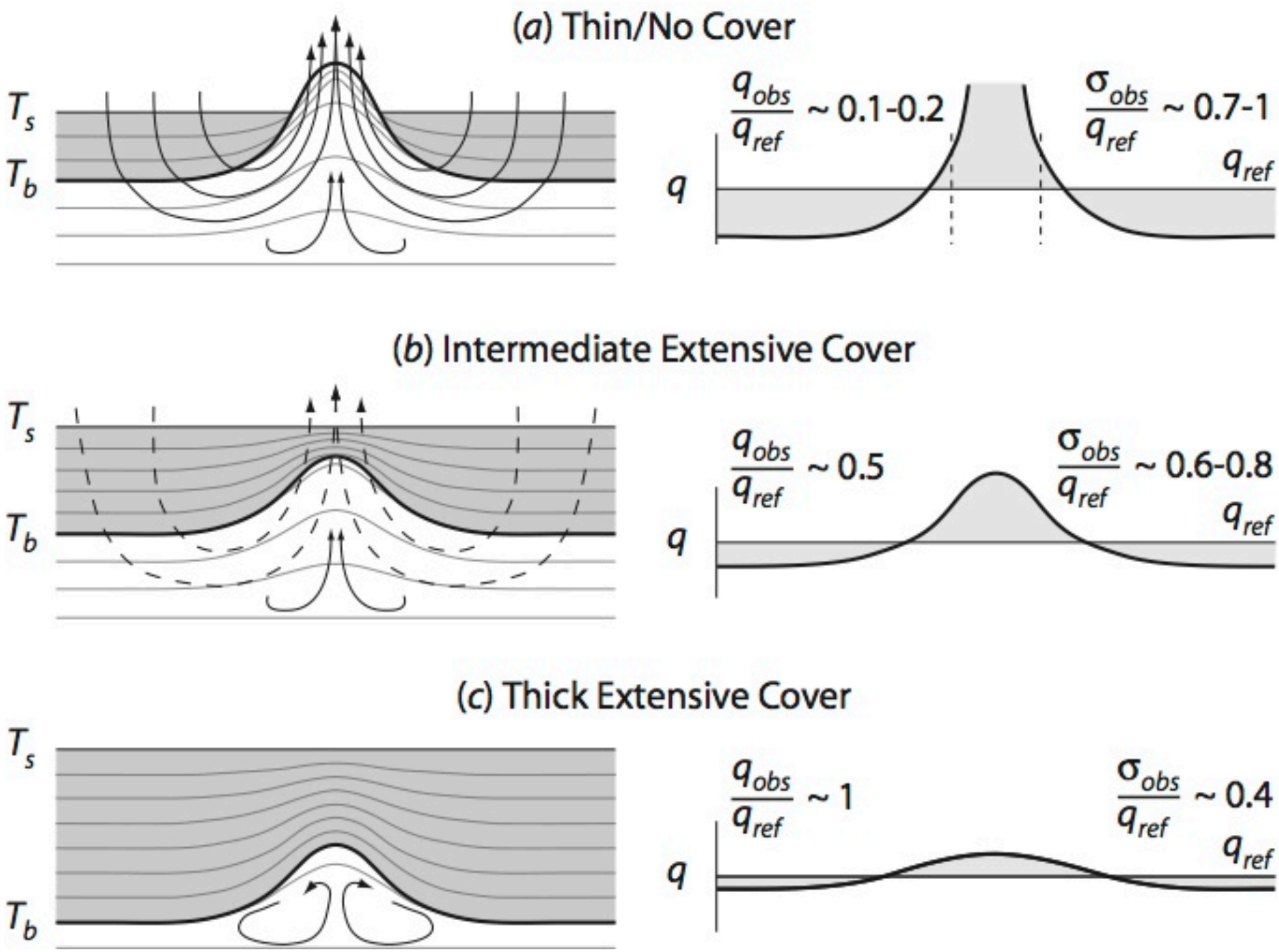
heat flow vs age ➡ $q(t) = k\dfrac{\partial T}{\partial z}$ ➡ $q(t) \cong 480t^{-1/2}$

A.M. Hofmeister, R.E. Criss / Tectonophysics 395 (2005) 159–177





[Hasterok, 2013]



[Hasterok, 2013]

depth vs age $\Rightarrow$ $d(t) = \dfrac{-\alpha\rho_m}{\rho_m - \rho_w}\int_0^L T\,dz$ $\Rightarrow$ $d(t) \cong 2500 + 350t^{1/2}$

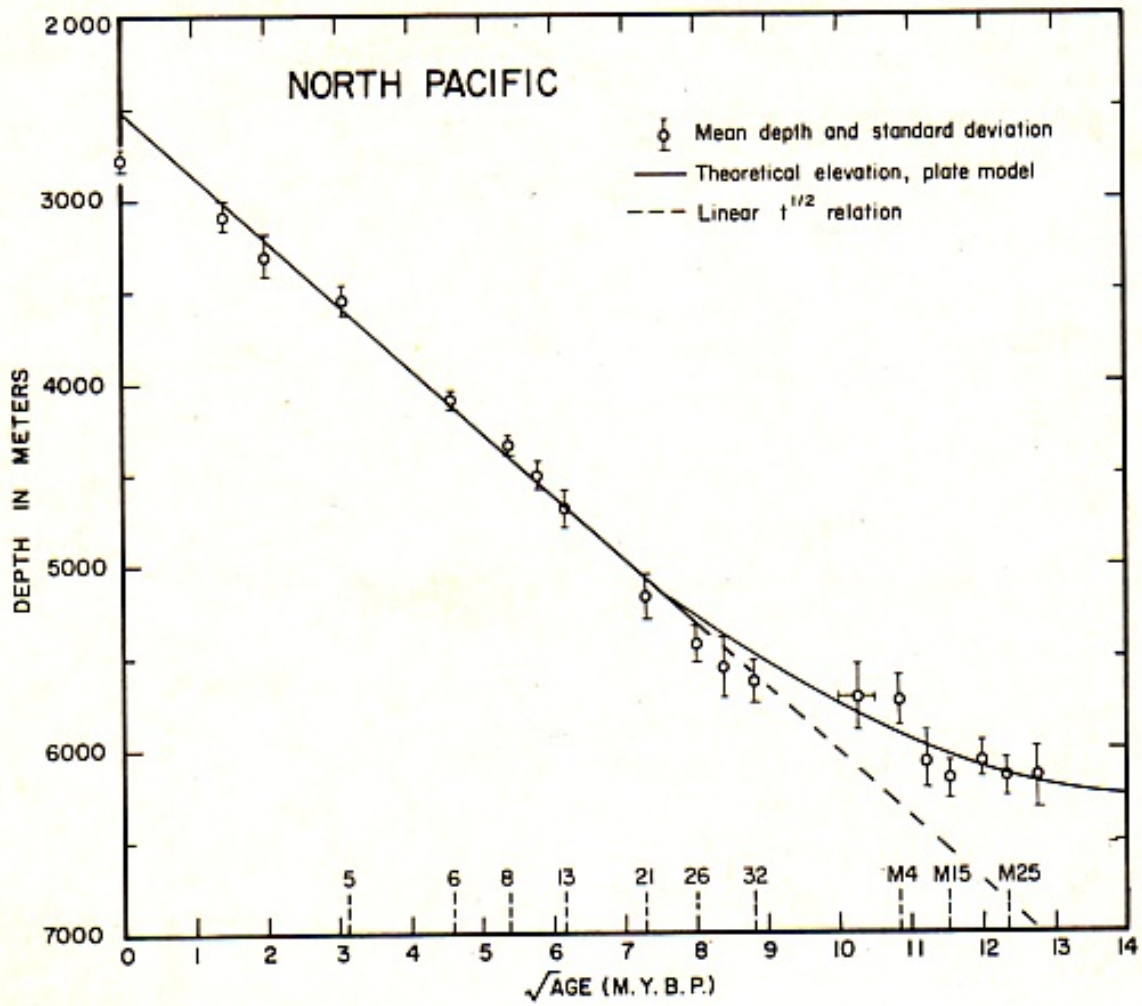


Fig. 1. Plot of mean depth in the North Pacific versus the square root of age. Numbers at the bottom of the figure denote selected Cenozoic and Mesozoic magnetic anomalies [from *Parsons and Sclater*, 1977].