A point source at -69.3°,-24°, depth=30 km (WGS84 spheroid) generates earthquakes of magnitude M=7 and rupture area RA=0 km^2 at a rate of NM_{min}=2 events per year. Use the 2023 Ergodic and Non-Ergodic GMM for Chile (interface) to compute the seismic hazard curve for Sa(T=0.02) at a site with V_{S30}=700 m/s located at coordinates (-69.4725°, -23.2120°). The relevant distance metrics for this case are Rrup=93.749 km and Ztor=30 km,

Evaluating Ergodic model for at T=0.02s for M=7, Rrup=93.749, and Ztor=30, leads to

$$\ln Sa(0.02) = -3.0624$$

$$\sigma_{erg} = 0.85527$$

Likewise, the Non-Ergodic model for at T=0.02s leads to

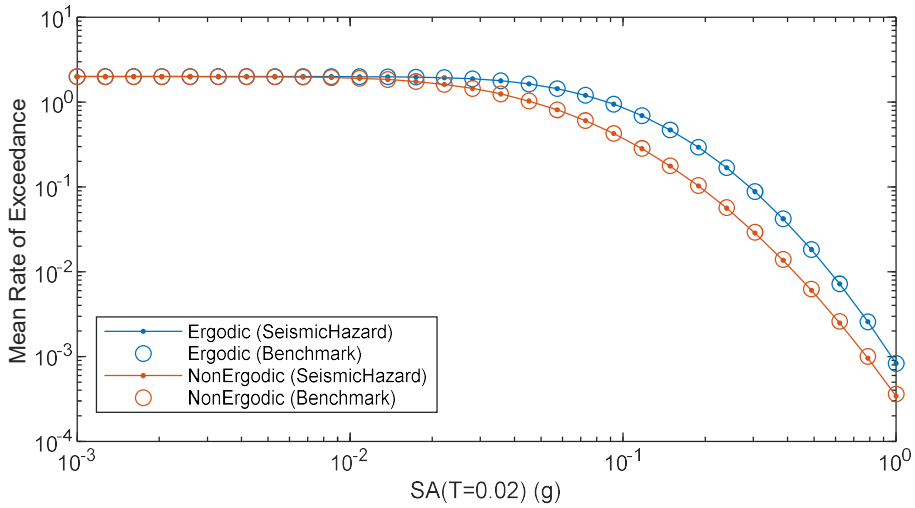
$$\ln Sa(0.02) = -3.0624 + 0.6135 = -2.4307$$

$$\sigma = 0.72722$$

The corresponding hazard curves are

$$\lambda_{erg} = NM_{min}P(Sa > y|m = 7, r_{rup}, z_{tor}) = NM_{min}\left(1 - \Phi\left(\frac{\log(y) - [-3.0624]}{0.85527}\right)\right)$$

$$\lambda_{nerg} = NM_{min}P(Sa > y|m = 7, r_{rup}, z_{tor}) = NM_{min}\left(1 - \Phi\left(\frac{\log(y) - [-2.4307]}{0.72722}\right)\right)$$



Independent calculation in MATLAB:

```
z       = logsp(0.001,1,30);
lambda_erg = zeros(1,30);
lambda_nerg = zeros(1,30);

for i=1:length(z)
   lambda_erg(i)  = 2*(1-normcdf((log(z(i))+3.0624)/0.85526));
   lambda_nerg(i) = 2*(1-normcdf((log(z(i))+2.4307)/0.72722));
end
```