

iii) a "random observation" is determined by random ordering of each column and sampling the resulting row.

$\therefore$   $N$  trials required.

iv) evaluate mean & variance in normal manner.

Reference Iman & Conover Commun. Statist. - Theor. Methods, A9(17) 1749-1842, 1980

### 3. Log normal Distributions

given a variable  $\phi$

$\log \phi$  is a normal dist<sup>n</sup>.

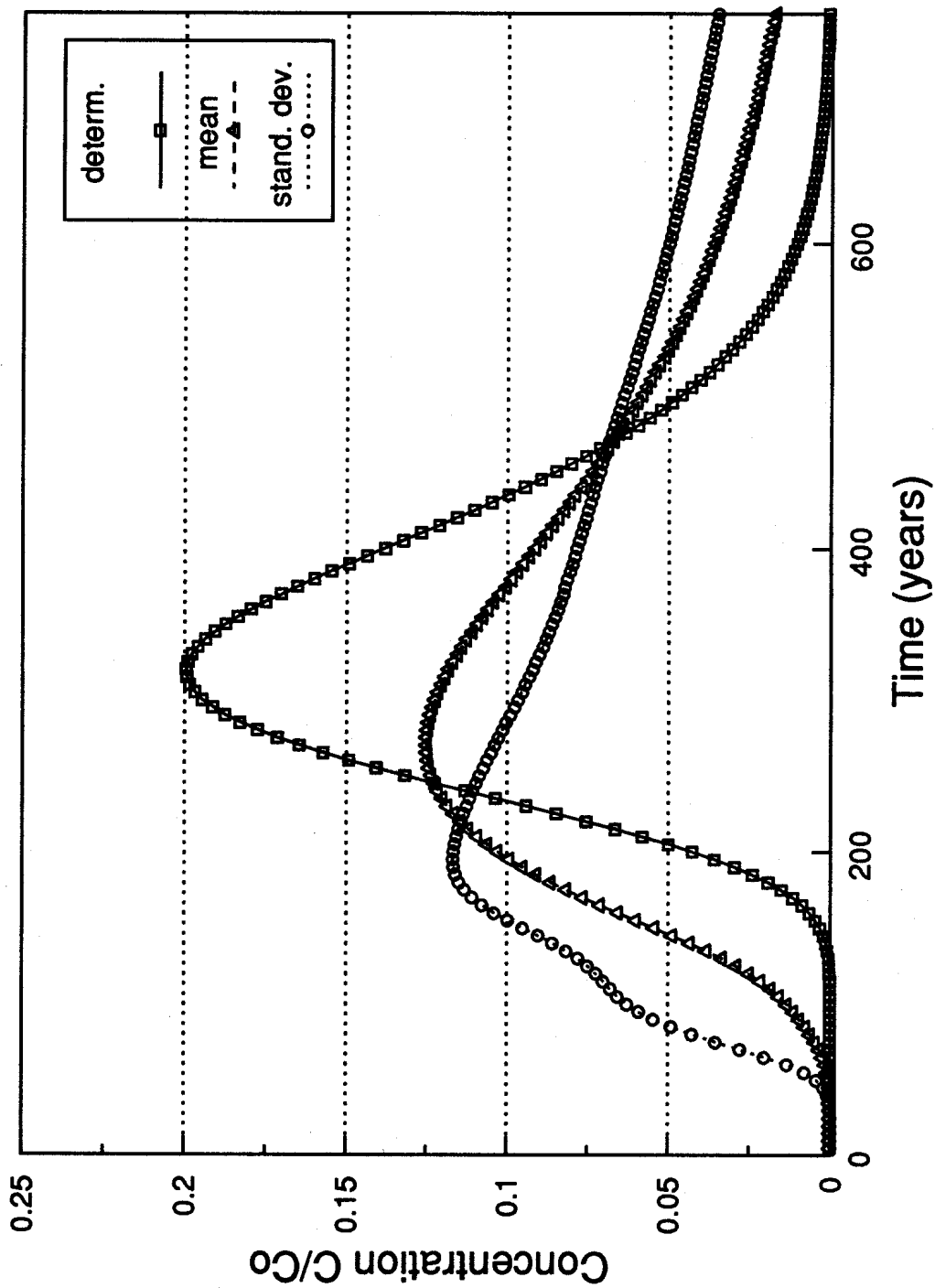
e.g. velocity  $v$  is log normal

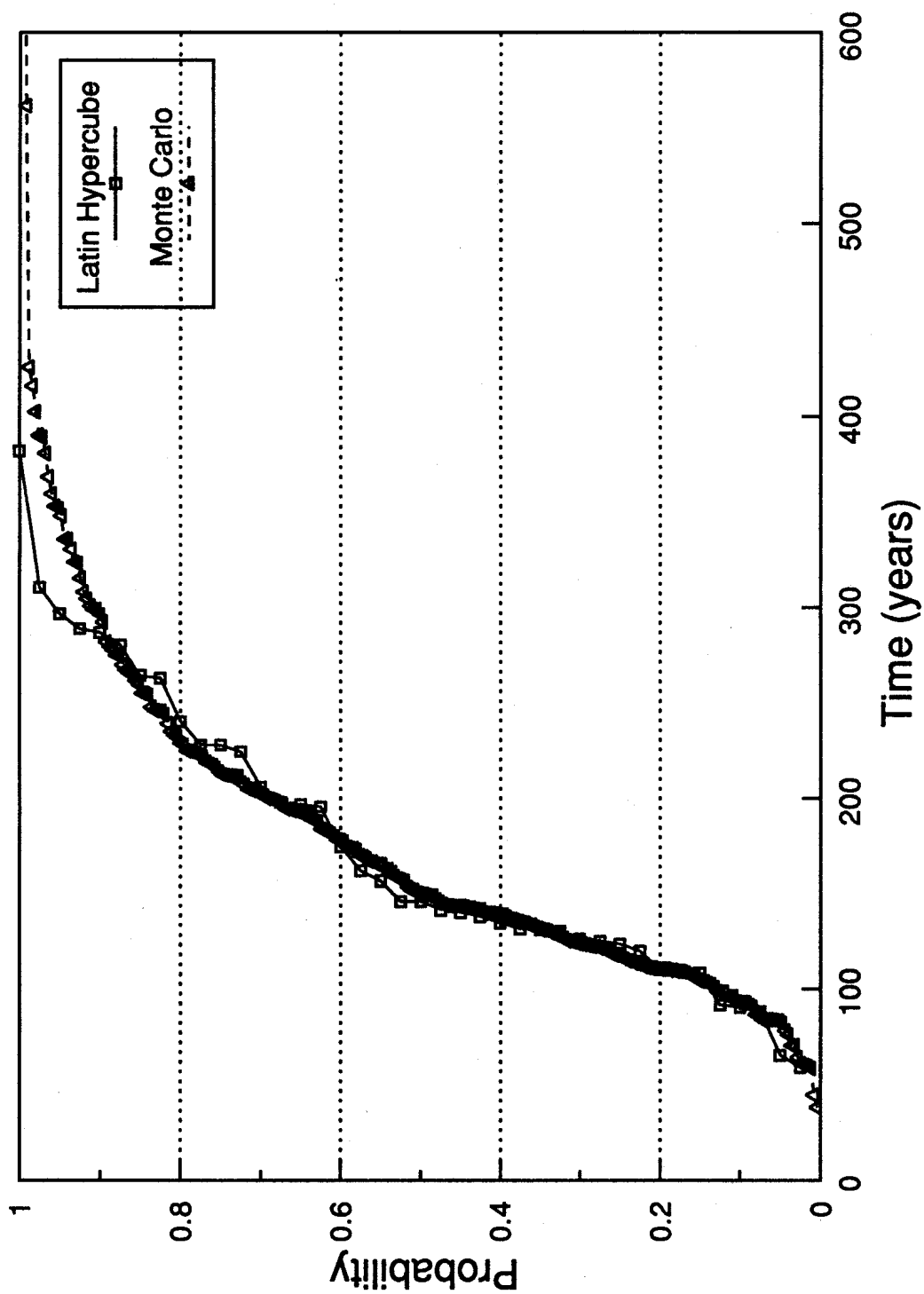
mean  $v = 10^{-3}$  m/d.

log normal mean =  $\log(10^{-3}) = -3$

log normal st. dev = 0.5  $\Rightarrow 10^{-2.5} \rightarrow 10^{-3.5}$

i.e. value is w.r.t. power!!





#### 4 Selecting parameter standard deviation

eg porosity

$$n \text{ minimum} = 0.20 \quad \therefore 0.20 = 10^x \\ x = \log(0.20) = -0.70$$

$$\text{maximum} = 0.50 \quad \therefore 0.50 = 10^x \\ x = \log(0.50) = -0.30$$

$$\therefore \text{range} = 60$$

$$\frac{(-0.3) - (-0.7)}{6} = 0.067$$

eg velocity through cap. (flux)

maximum is  $\frac{1}{3}$  of precip.

$$q = 30 \text{ cm/yr.} \quad \Rightarrow \quad \log(30) = 1.48$$

minimum

$$q = 3 \text{ cm/yr} \quad \Rightarrow \quad \log(3) = 0.48$$

$$\therefore \sigma = \frac{1.48 - 0.48}{6} = 0.167$$