ΤΥΠΟΛΟΓΙΟ

Ατμοσφαιρική Διάχυση & Διασπορά

$$\overline{A} = \frac{1}{N}\sum_{i=1}^{N} A_i$$

$$\sigma_A^2 = \frac{1}{N-1}\sum_{i=1}^{N}(A_i - \overline{A})^2 = \overline{a'^2}$$

$$\sigma_A = \sqrt{\sigma_A^2} = \left(\overline{a'^2}\right)^{1/2}$$

$$\mathrm{covar}(A,B) = \frac{1}{N}\sum_{i=0}^{N-1}\left(A_i - \overline{A}\right)\cdot\left(B_i - \overline{B}\right) = \overline{a'\cdot b'}$$

$$\frac{\partial\chi}{\partial t} = -\left[\frac{\partial(u\chi)}{\partial x} + \frac{\partial(v\chi)}{\partial y} + \frac{\partial(w\chi)}{\partial z} + R + S\right]$$

$$\frac{\partial\overline{\chi}}{\partial t} + \overline{u}\frac{\partial\overline{\chi}}{\partial x} + \overline{v}\frac{\partial\overline{\chi}}{\partial y} + \overline{w}\frac{\partial\overline{\chi}}{\partial z} = -\left[\frac{\partial\left(\overline{u'\chi'}\right)}{\partial x} + \frac{\partial\left(\overline{v'\chi'}\right)}{\partial y} + \frac{\partial\left(\overline{w'\chi'}\right)}{\partial z}\right] + \overline{R} + \overline{S}$$

$$\overline{u'\chi'} = -K_x\frac{\partial\overline{\chi}}{\partial x}, \quad \overline{v'\chi'} = -K_y\frac{\partial\overline{\chi}}{\partial y}, \quad \overline{w'\chi'} = -K_z\frac{\partial\overline{\chi}}{\partial z}$$

$$\frac{\partial\overline{\chi}}{\partial t} + \overline{u}\frac{\partial\overline{\chi}}{\partial x} + \overline{v}\frac{\partial\overline{\chi}}{\partial y} + \overline{w}\frac{\partial\overline{\chi}}{\partial z} = \left[\frac{\partial}{\partial x}\left(K_x\frac{\partial\overline{\chi}}{\partial x}\right) + \frac{\partial}{\partial y}\left(K_y\frac{\partial\overline{\chi}}{\partial y}\right) + \frac{\partial}{\partial z}\left(K_z\frac{\partial\overline{\chi}}{\partial z}\right)\right] + \overline{R} + \overline{S}$$

$$\overline{u}\frac{\partial\overline{\chi}}{\partial x} = \frac{\partial}{\partial z}\left(K_z\frac{\partial\overline{\chi}}{\partial z}\right)$$

$$\overline{\chi(x,z)} = \frac{Q\cdot r}{z_1\cdot\overline{u_1}\Gamma(s)}\left[\frac{z_1^{\,2}\cdot\overline{u_1}}{r^2\cdot K_1\cdot x}\right]^s \exp\left[-\frac{z_1^{\,2-r}\cdot\overline{u_1}\cdot z^r}{r^2\cdot K_1\cdot x}\right]$$

$$K_z = \frac{k u_* z}{\varphi_h(z/L)}$$

$\varphi_h(z/L) = (1 - 16\frac{z}{L})^{-1/2}$ *z/L<0, αστάθεια*

$\varphi_h(z/L) = 1 + 5\frac{z}{L}$ *z/L>0, ευστάθεια*

$$L = -\frac{u_*^3}{(g/\theta)k\overline{w'\theta'}}$$

$$\chi(x,y,z)=\frac{Q}{2\pi u\sigma_y\sigma_z}\exp\left[-\frac{y^2}{2\sigma_y{}^2}\right]\exp\left[-\frac{(H-z)^2}{2\sigma_z{}^2}\right]$$

$$\chi(x,y,z)=\frac{Q}{2\pi u\sigma_y\sigma_z}\exp\left[-\frac{y^2}{2\sigma_y{}^2}\right]\left\{\exp\left[-\frac{(H-z)^2}{2\sigma_z{}^2}\right]+\exp\left[-\frac{(H+z)^2}{2\sigma_z{}^2}\right]\right\}$$

$$\chi(x,y,z)=\frac{Q}{2\pi u\sigma_y\sigma_z}\exp\left[-\frac{y^2}{2\sigma_y{}^2}\right]\left\{\exp\left[-\frac{(H-z)^2}{2\sigma_z{}^2}\right]+\exp\left[-\frac{(H+z)^2}{2\sigma_z{}^2}\right]\right.$$
$$\left.+\sum_{N=1}^{j}\left(\exp\left[-\frac{(z-H-2Nz_i)^2}{2\sigma_z{}^2}\right]+\exp\left[-\frac{(z+H-2Nz_i)^2}{2\sigma_z{}^2}\right]+\exp\left[-\frac{(z-H+2Nz_i)^2}{2\sigma_z{}^2}\right]+\exp\left[-\frac{(z+H+2Nz_i)^2}{2\sigma_z{}^2}\right]\right)\right\}$$

$$H_c=\frac{\sum_{n=1}^{N}\chi_n z_n}{\sum_{n=1}^{N}\chi_n}$$

$$\sigma_z^2=\frac{\sum_{n=1}^{N}\chi_n(z_n-H_c)^2}{\sum_{n=1}^{N}\chi_n}$$

$$\sigma_y=x\sigma_\varphi f_y \qquad \sigma_z=x\sigma_e f_z$$

$$f_y=\frac{1}{1+0.9\left(\frac{x}{1000u}\right)^{0.5}}$$

$$f_z=\frac{1}{1+0.9\left(\frac{x}{500u}\right)^{0.5}}$$ *Συνθήκες Αστάθειας*

$$f_z=\frac{1}{1+0.9\left(\frac{x}{50u}\right)^{0.5}}$$ *Συνθήκες Ευστάθειας*

$$\chi(x,y,0)=\frac{Q}{(2\pi)^{1/2}u\sigma_y z_i}$$

$$\chi(x,y,0)=\frac{2q}{(2\pi)^{1/2}\sigma_z u}\exp\left[-\frac{H^2}{2\sigma_z{}^2}\right]$$

$$h'=h \quad \alpha\nu\ v_s\geq 1.5u, \qquad h'=h+2d\left(\frac{v_s}{u}-1.5\right) \quad \alpha\nu\ v_s<1.5u$$

$$F=gv_s d^2\frac{T_s-T}{4T_s}$$

$$s=\frac{g}{T}\frac{\partial\theta}{\partial z} \qquad \frac{\partial\theta}{\partial z}=\frac{\partial T}{\partial z}+\Gamma$$

$$\Delta T_c = 0.0297\, T_s / (v_s/d^2)^{1/3} \quad \text{αν } F<55\ m^4 s^{-3}$$

$$\Delta T_c = 0.00575\, T_s / (v_s^2/d)^{1/3} \quad \text{αν } F\geq 55\ m^4 s^{-3})$$

$$\Delta T_c = 0.019582\, T_s v_s s^{1/2}$$

$$H = h' + 21.425\frac{F^{3/4}}{u}, \quad x_f = 0.049F^{5/8} \quad \text{αν } F<55$$

$$x_f \rightarrow km$$

$$H = h' + 38.710\frac{F^{3/5}}{u}, \quad x_f = 0.119F^{2/5} \quad \text{αν } F\geq 55$$

$$H = h' + 2.6\left(\frac{F}{us}\right)^{1/3}, \quad x_f = 0.00207us^{-1/2}$$

$$x_f \rightarrow km$$

$$H = h' + 4F^{1/4}s^{-3/8}$$

$$H = h' + 3d\frac{v_s}{u}$$

$$H = h' + 1.5\left(\frac{v_s^2 d^2 T}{4T_s u}\right)^{1/3} s^{-1/6}$$

$$H = h' + 1.6F^{1/3}x^{2/3}u^{-1} \quad x \rightarrow m$$

$$u_s = u_{ref}\left(\frac{h_s}{z_{ref}}\right)^p$$

$$\frac{\alpha(z)}{\alpha(h)} = d_1\left[1-\exp\left(-d_2 z/h\right)\right]$$

$$D = \exp\left(-\psi\frac{x}{u_S}\right) \quad \psi>0 \quad , \quad \psi = \frac{\ln 2}{T_{1/2}} \cong \frac{0.693}{T_{1/2}}$$

$$D=1 \quad \psi=0$$

$$v_g = \frac{(\rho_{PAR} - \rho_{AIR})g\, d_{PAR}^2\, c_2}{18\mu}S_{CF}$$

$$S_{CF} = 1 + \frac{2x_2\left(a_1 + a_2 e^{-\frac{a_3 d_{PAR}}{x_2}}\right)}{10^{-4}d_{PAR}}$$

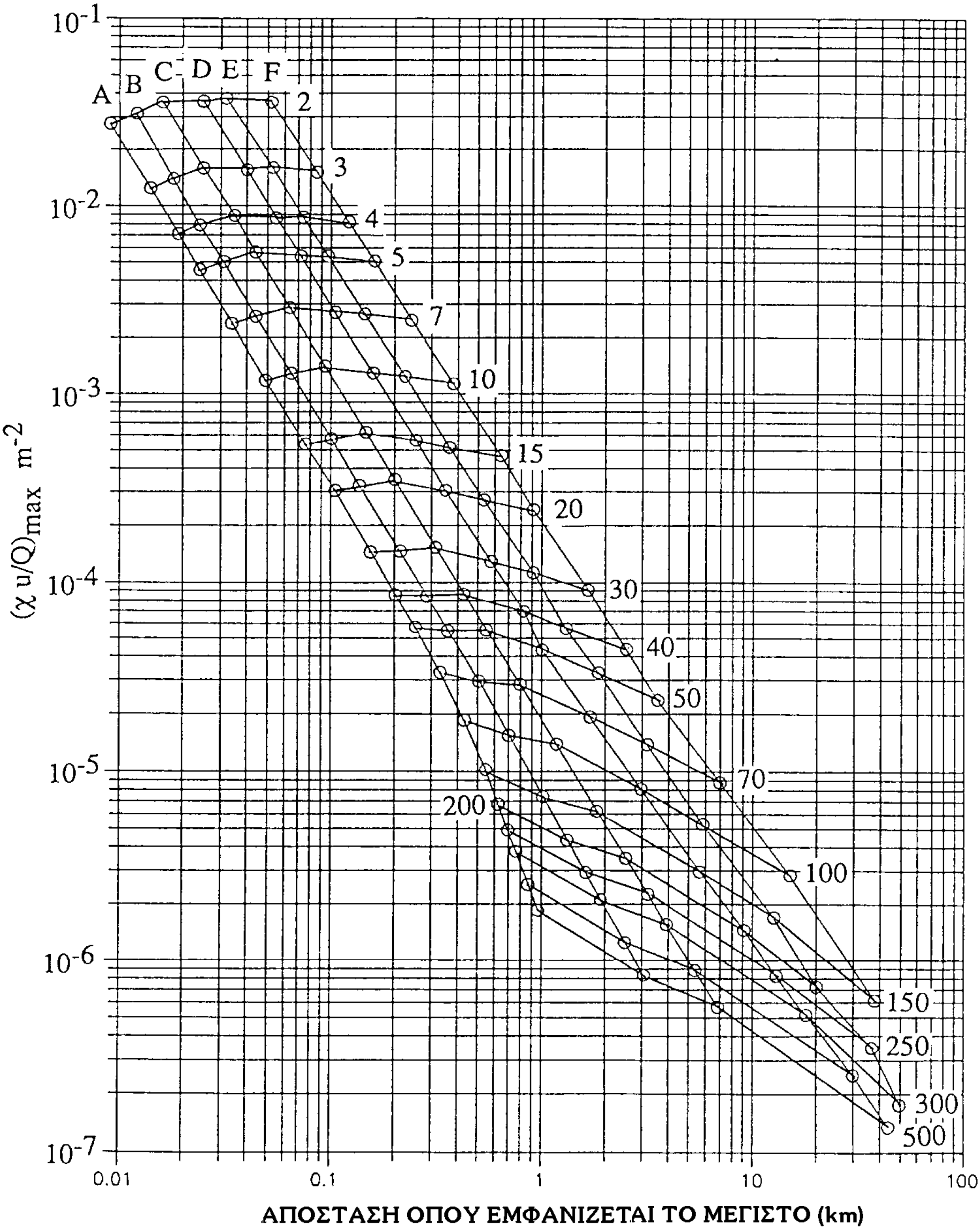
$x_2 = 6.5 \times 10^{-6}$
$a_1 = 1.257$
$a_2 = 0.4$
$a_3 = 0.55 \times 10^{-4}$

$$F_d = \chi_d \cdot v_d \quad v_d = \frac{1}{r_a + r_s + r_t} \quad v_d = \frac{1}{r_a + r_s + r_a r_s v_g} + v_g$$

$$Q(x) = Q_o e^{-\Lambda x/u} = Q_o e^{-\Lambda t} \quad \Lambda = a\lambda^b$$

$$\frac{\Delta\chi}{\chi} = \frac{\Delta Q}{Q} - \frac{\Delta\bar{u}}{\bar{u}} - \frac{\Delta\sigma_y}{\sigma_y} - \frac{\Delta\sigma_z}{\sigma_z} - \Delta\left(\frac{H^2}{2\sigma_z^2}\right)$$

$$C_i^m = C_i^v \frac{100\cdot P\cdot MB_i}{8.314\cdot T}$$



10-1
10-2
10-3
10-4
10-5
10-6
10-7
(χ u/Q)max m-2
A
B
C
D
E
F
2
3
4
5
7
10
15
20
30
40
50
70
100
150
200
250
300
500
0.01
0.1
1
10
100
ΑΠΟΣΤΑΣΗ ΟΠΟΥ ΕΜΦΑΝΙΖΕΤΑΙ ΤΟ ΜΕΓΙΣΤΟ (km)