Source rate retrieval by the IME method

Plume mask and enhancements $\Delta \Omega(x,y)$

Compute IME and plume size $L$

Local measurements of 10m wind speed $U_{10}$ available?

No

Yes

10m wind speed $U_{10}$ from meteorological database

Effective wind speed $U_{\text{eff}} = f(U_{\text{eff}})$

$$\tau = \frac{L}{U_{\text{eff}}}$$

$\tau = \tau_{i+1}$

Source rate $Q = \frac{\text{IME}}{\tau}$

Input

Output

Local measurements of 10m wind speed $U_{10}$

First guess $\tau_i = \tau_0$ for plume lifetime ($i = 0$)

10-m wind speed $U_{10}$ averaged over $\tau_i$

Effective wind speed $U_{\text{eff}} = f(U_{\text{eff}})$

$$\tau_{i+1} = \frac{L}{U_{\text{eff}}}$$

$\frac{\tau_{i+1} - \tau_i}{\tau_i} \leq 0.01$?

Yes

No

$i = i + 1$