Physical model for air quality prediction

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ITT10

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- distinguishes between vehicle emissions and city imissions
- allows vehicle management in real time and helps to direct local policy decisions

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- Advection - Diffusion Equations

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$$\frac{\partial}{\partial x}(hu) + \frac{\partial}{\partial y}(hv) = 0$$

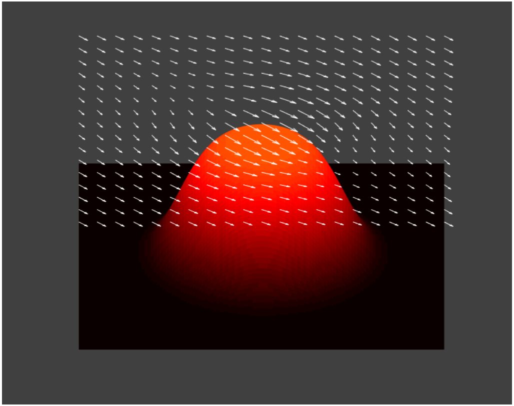
$$\Downarrow$$

$$\frac{\partial}{\partial x}(h\varphi_x) + \frac{\partial}{\partial y}(h\varphi_y) = 0$$

Fluid model - Case 1

Topography:

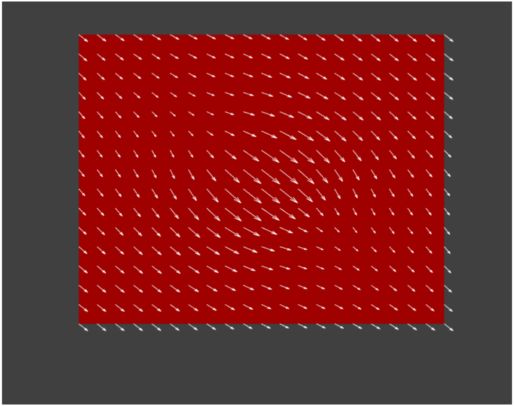
$$h = c \cdot e^{-(x^2+y^2)^2}$$



- 61×81 grid
- Finite difference method
- Boundary condition: fixed $\mathbf{u} = (u, v)^T$

Advection - Diffusion

$$\frac{\partial C}{\partial t} + \mathbf{u} \cdot \nabla C = D \nabla^2 C + f$$



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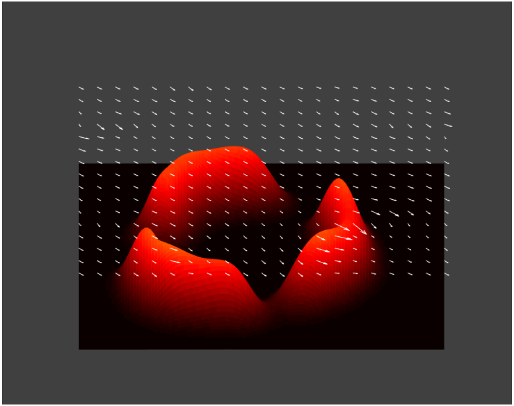
Fluid model - Case 2

Invented some topography



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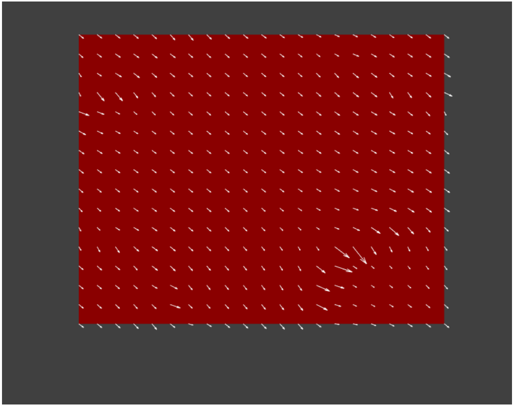

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Using data from sensors

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- Inform us of the best places to introduce sensors