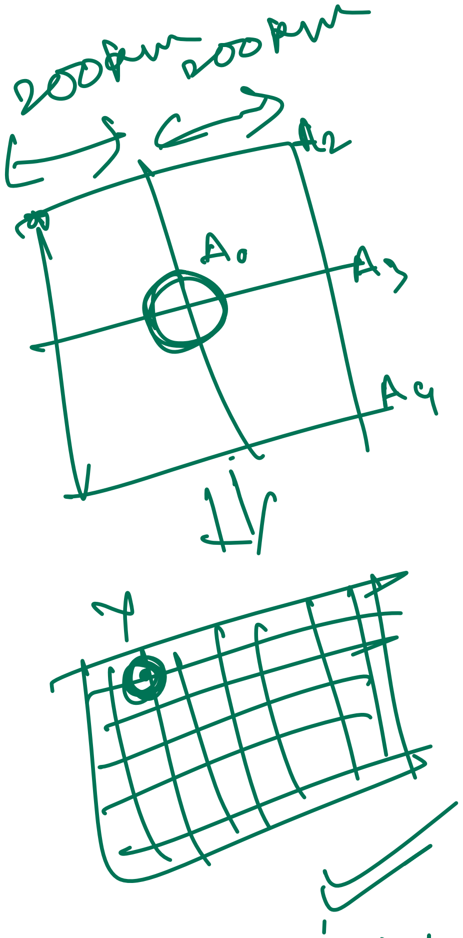
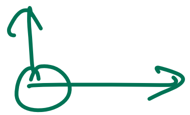
GHG

$precip = f(T, p, u, v, w, \dots)$

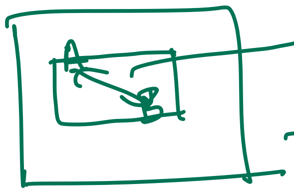
Y





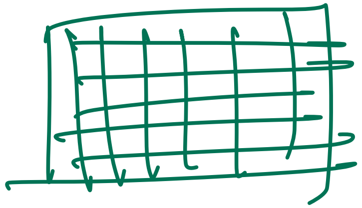
$Y = f(A_0, A_1, A_2 \dots)$ X

Y



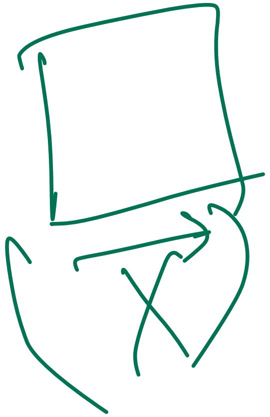
~100 km

100 kms

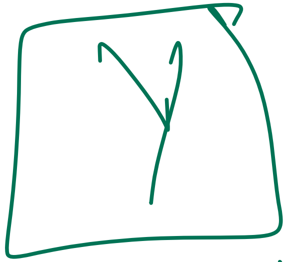


~10 km

100 kms



f(X)



25 km × 25

4 km × 4 km

$$\Longrightarrow \quad f = ?$$

$$y = ax + b$$

$f(x)$: linear

$$\vec{X}$$

$$\downarrow$$

$$X, \vec{X}$$

$$Y$$

$$\underset{\text{target}}{Y} = f(\underset{\text{independant}}{\vec{X}})$$

$$\hat{Y} = f(x)$$

$$\boxed{\hat{Y}}$$

$$\min \left[E\left((Y - \hat{Y})^2 \right) \right]$$

$$\min \left[\epsilon_1^2 + \epsilon_2^2 + \epsilon_3^2 + \ldots \right)$$

Linear regression

predictand

$$T = f(\underbrace{CO_2, CH_4, CFCs}_{\text{predictors}})$$

$$T = \alpha_1 x_1^2 + \alpha_2 x_2^3 + \alpha_3 x_3^3 + \ldots$$

$$T = \alpha_1 CO_2^2 + \alpha_2 CH_4^3 + \alpha_3 CFC + \beta$$

$\alpha_1, \alpha_2, \alpha_3$?

β ?

T = linear combination of parameters

$$T = \alpha_1 CO_2 + \alpha_2 CH_4 e^{\alpha_3 CFC}$$: non-linear regression

GLMs or GNLMs

$$Y = f(CO_2, CH_4, \cancel{CFCs})$$

100%

$\boxed{\text{CIs}}$

" " ∵ limited data

$\alpha_1, \alpha_2, \alpha_3, \ldots, \alpha_n$

(1) work "well" on surprise datasets.

$p(\vec{x} | \vec{\theta})$

MLE $(\theta_1, \theta_2) : \Rightarrow$

$p(\vec{x} | \vec{\theta})$

$\boxed{p(\vec{\theta} | \vec{x})} = \frac{\boxed{p(\vec{x} | \vec{\theta}) \cdot p(\vec{\theta})}}{p(\vec{x})}$