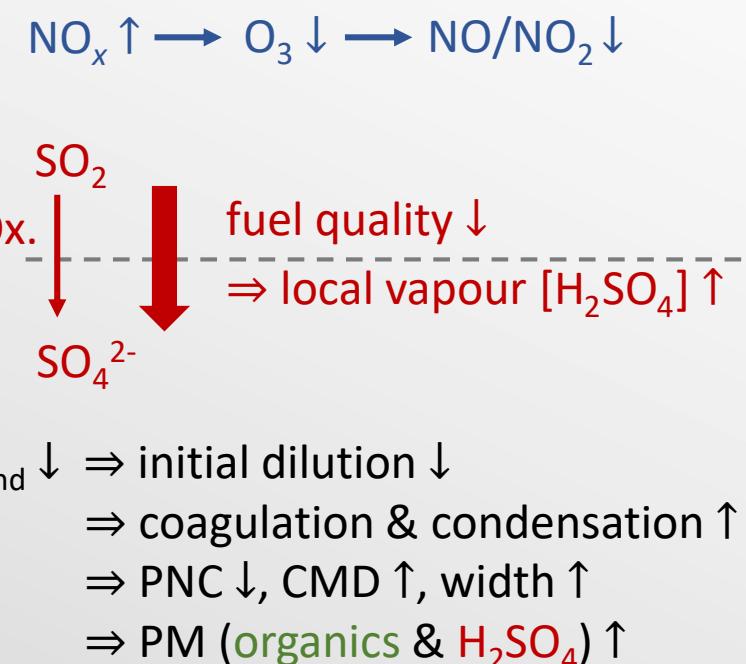


Ambient atmospheric conditions and reactants:

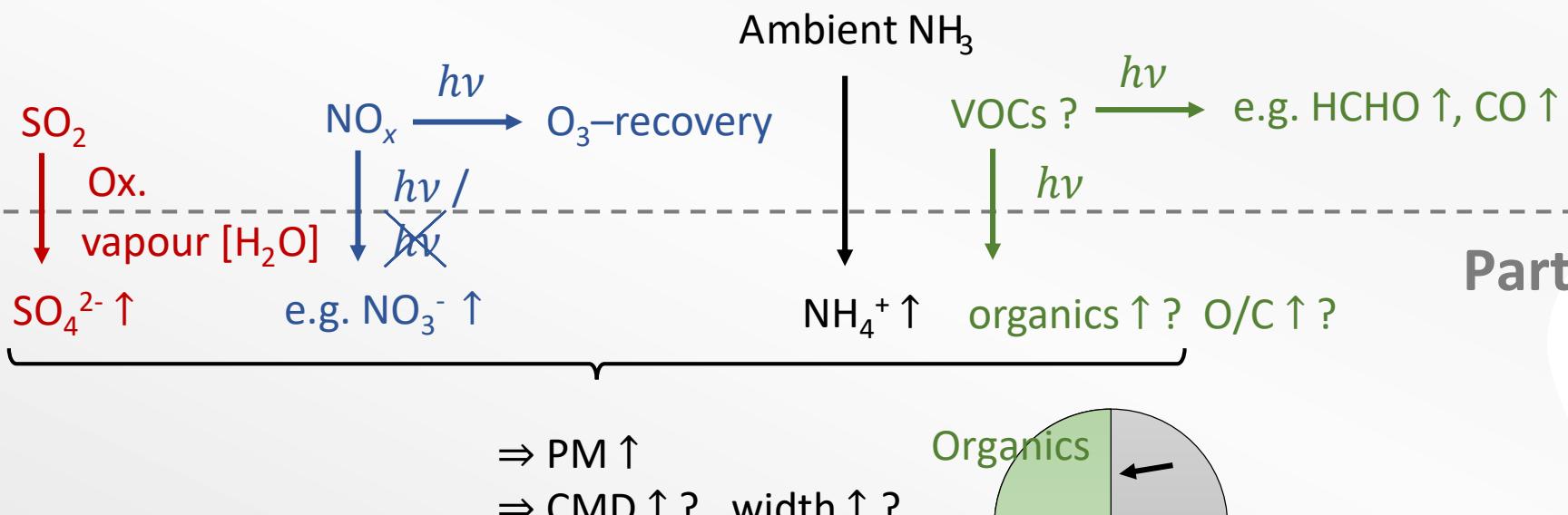
$h\nu$, O₃, OH & HO₂ radicals, NH₃, H₂O (g), (CH₄)

Influences of atmospheric processes

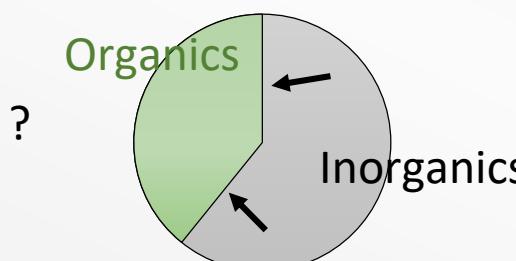
Early stage



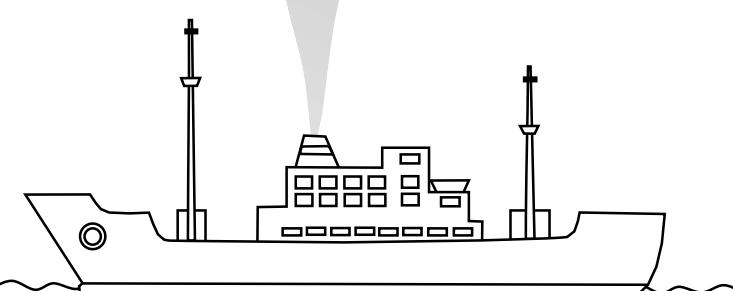
Ageing



Gas phase
Particle phase

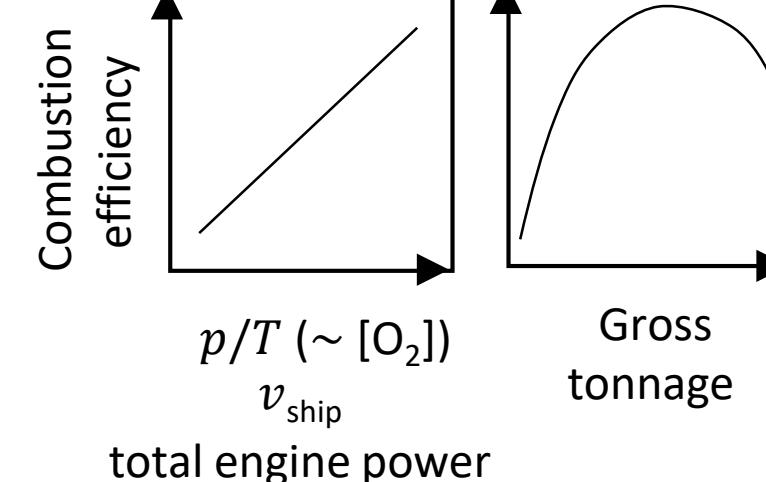


Time

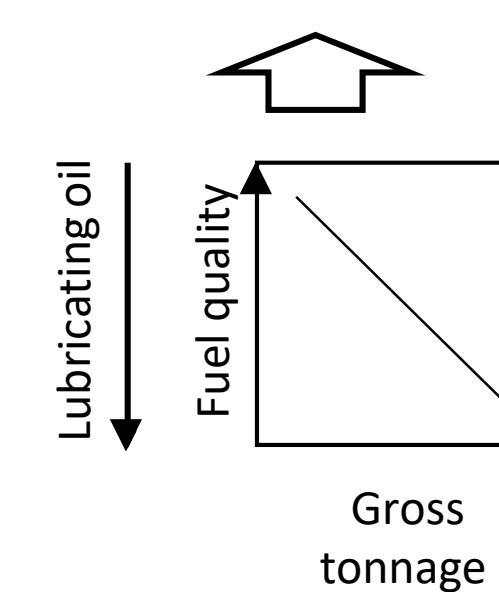


Influences of ship and combustion

Combustion efficiency ↑
 $\Rightarrow \text{BC} \downarrow$
 $\Rightarrow \text{NO}_x \uparrow, \text{NO/NO}_2 \uparrow$
 $\Rightarrow \text{VOCs, CO, HCHO} ?$



Fuel quality ↓(S content ↑)
 $\Rightarrow \text{SO}_2 \uparrow$
 $\Rightarrow \text{organic vapours} \uparrow$
 $\Rightarrow \text{later: PM} \uparrow$



Coagulation in exhaust system ↑

