

The best sea rise model you will see today!*

By Chris Allum and Lilo Heinrich

* No guarantees



Question

What is the effect of reducing global carbon emission on global sea level rise by the year 2050?

- What will sea levels be in 2050 if we cut carbon dioxide emissions by 100%, 50%, 25% ... ?
- Understanding and being able to predict both how much we need to cut carbon emission now and how much sea levels will rise is vital in planning for the future.



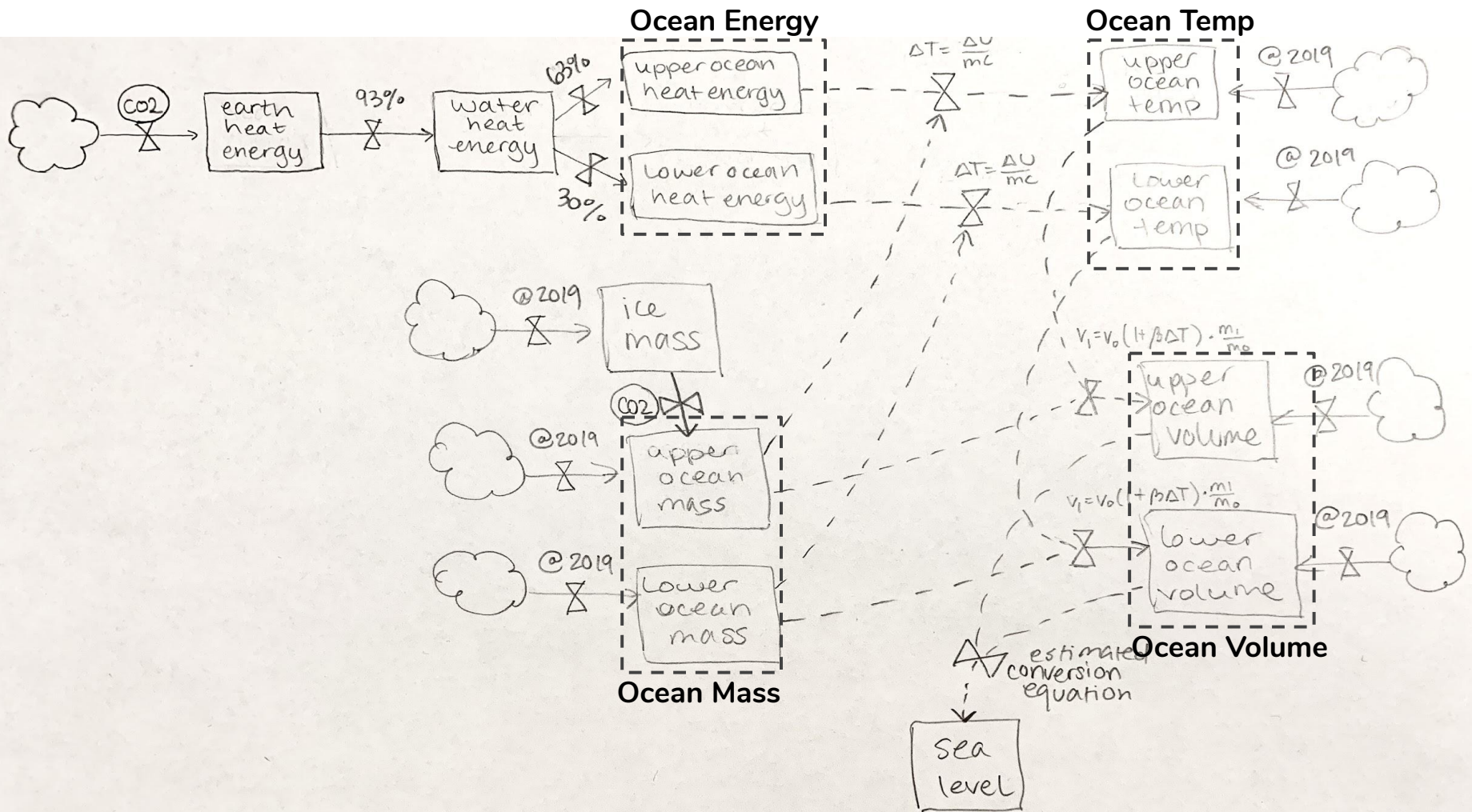
Model

We run a simulation that calculates sea level rise based on the following factors:

- Carbon dioxide in the atmosphere
- Ice sheets melting
- Thermal expansion of water



We run a sweep series over a variable that scales the future predicted emissions





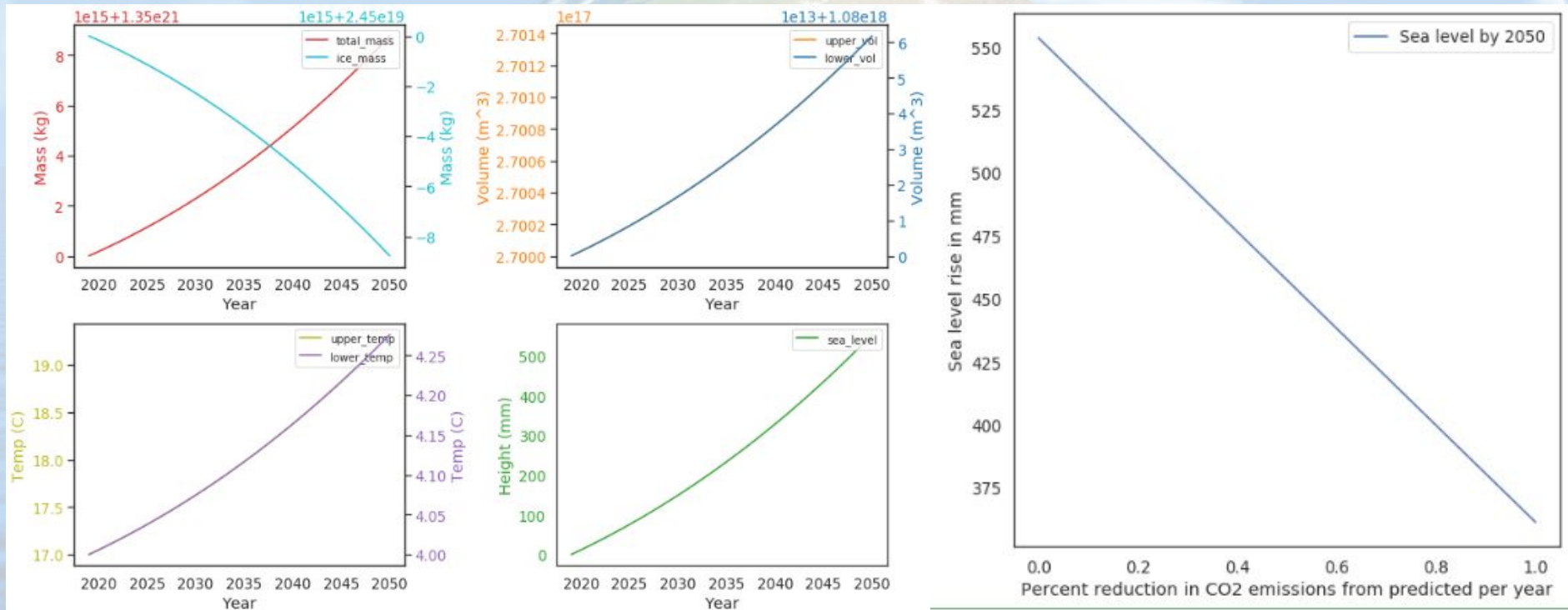
Model Assumptions

- There is a direct relationship between CO2 concentrations and heat retention in earth's atmosphere
- There is a direct relationship between CO2 concentrations and ice sheet melting
- Ice sheets melting and water expansion are the primary causes of sea level rise
- Many other things for simplicity of calculation

Results

→ Sea level rises 550mm without emission reduction

→ Still rises 360mm with 100% emission reduction





Interpretation

- The predicted effect of reducing global carbon emission by 100% on sea level rise by the year 2050 is 0.19m, 35% lower than without any reduction.
- Reducing or eliminating future CO₂ emissions will not reverse the damage to our climate system. Since we cannot take back past actions, sea level will continue to rise in the future no matter our emission rate.
- Missing Aspects
 - Other greenhouse gases
 - CO₂ absorption ability of the ocean as temperature increases
- Model Complexity: complex environmental systems have interdependent and interdisciplinary nature, making modelling difficult