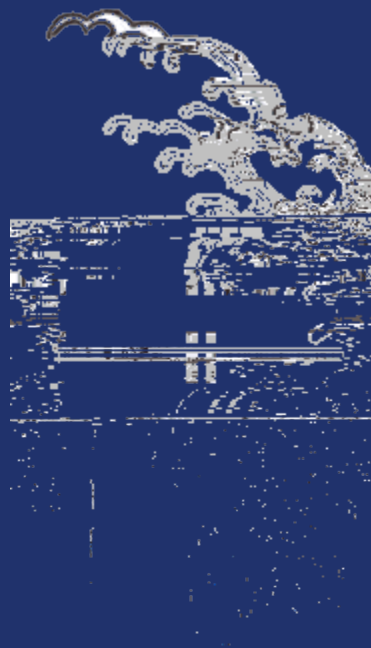
# Ocean Perturbations Are Longwinded

*Forecast Ramifications of Uncertainties in Idealised Transient Scenarios*

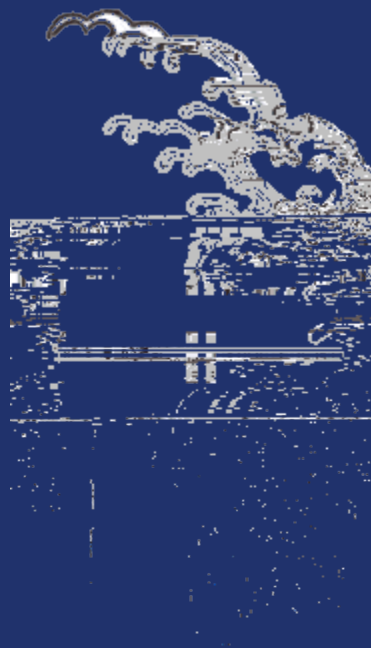
OPAL

FRUITS



Chris Brierley – 2u07

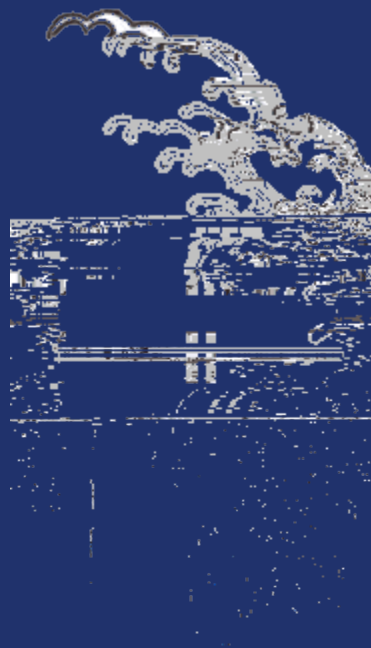
# Tough on Uncertainty - Tough on the causes of Uncertainty



*There are 2 approaches to deal with model errors/uncertainties.*

- *Attempt to remove them with better models*

# Trinity of Uncertainty



*Initial Condition :*

*Atmosphere => Weather errors*

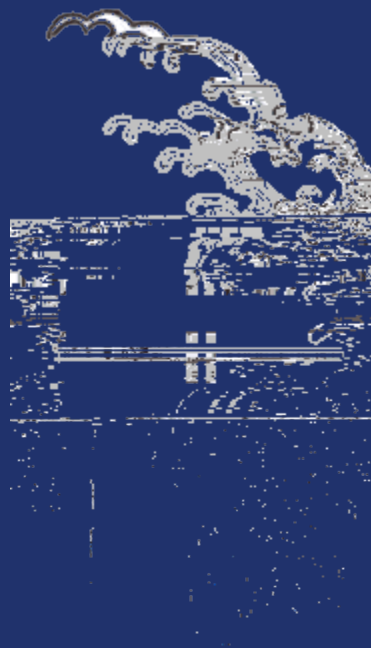
*Ocean => Seasonal and Annual errors*

*Scenario – Humanities/Economics*

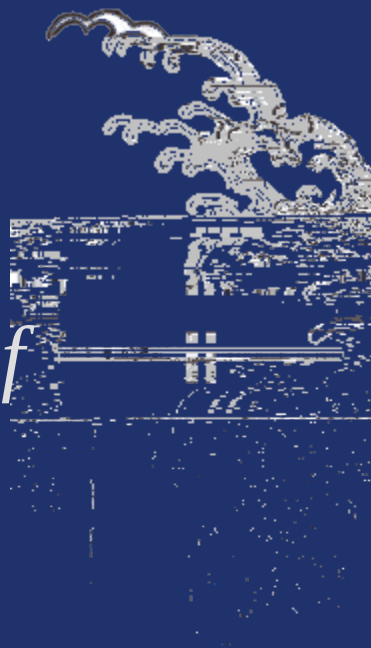
*Model:*

*Multi-model ensembles*

*Parameter perturbations*



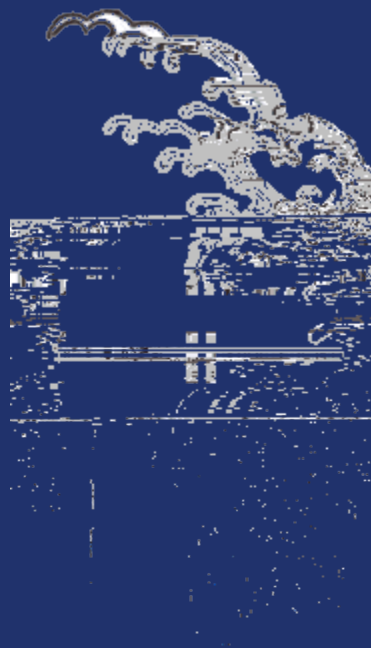
# Step 2. Stir them up.

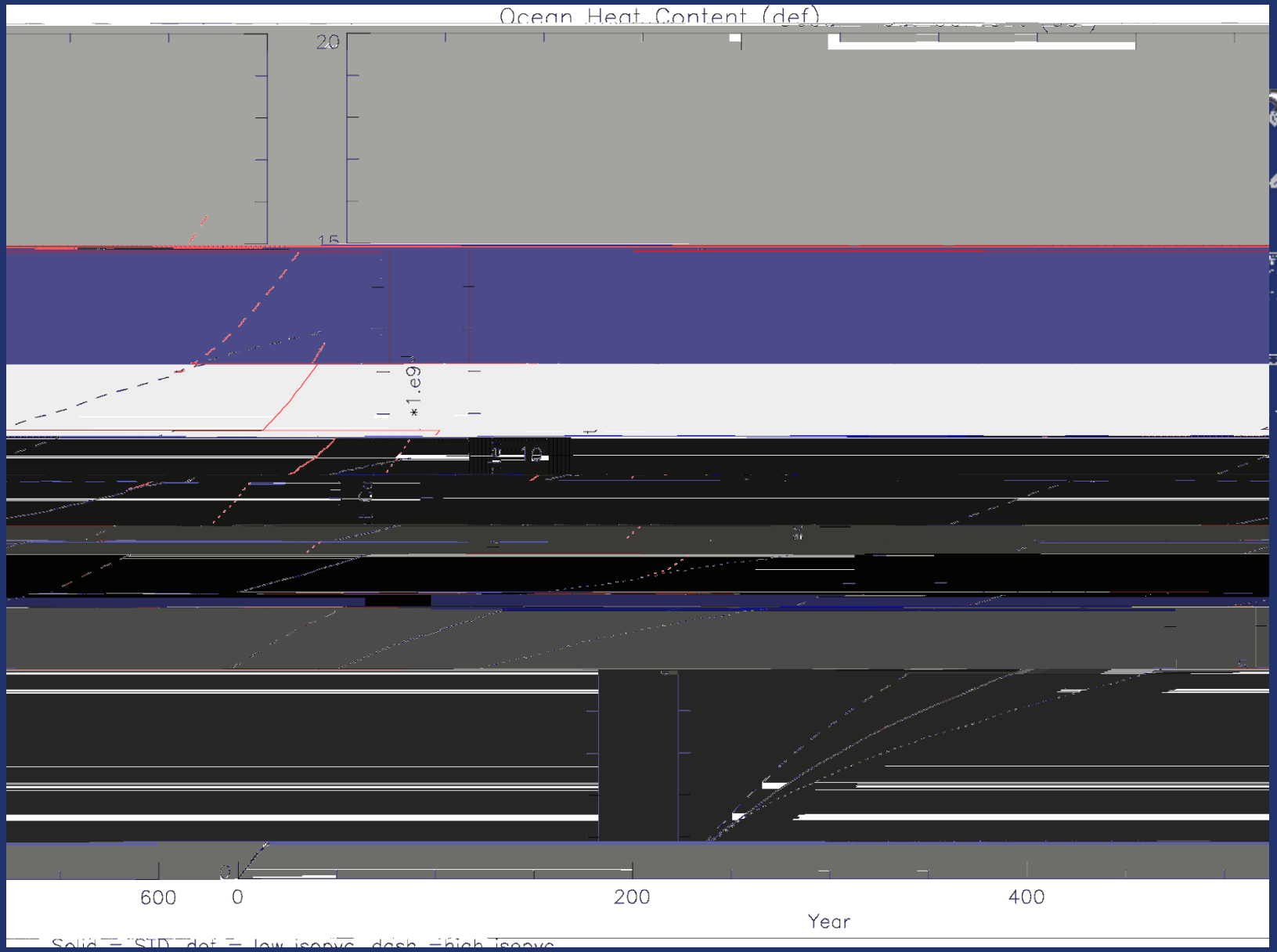


*Combine the perturbations in manner of your pleasing.*

1. *All together – allow for non-linearities.*
2. *Latin Hypercube (posh and complicated)*
3. *Do each one singularly to really under the physical processes.*

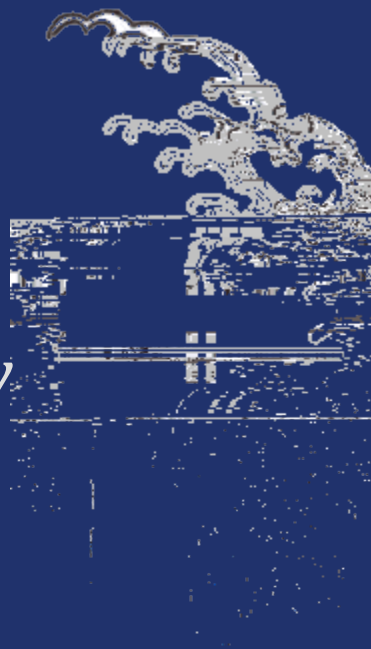
# Step 3. Bake for ages.





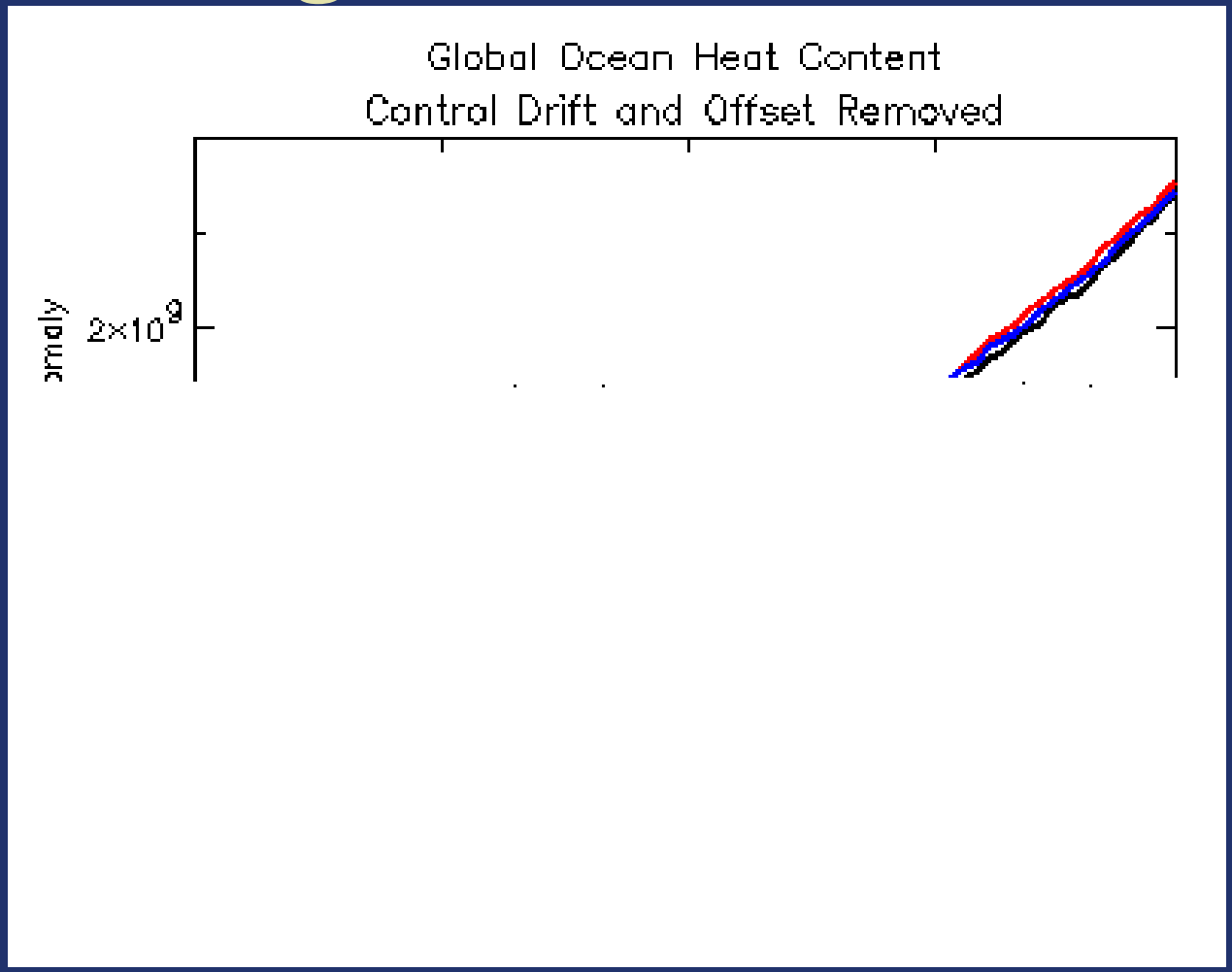

Initial drift is of similar magnitude to global warming !!

# How do Signal differences arise?



*Are they due to differences in climatology*

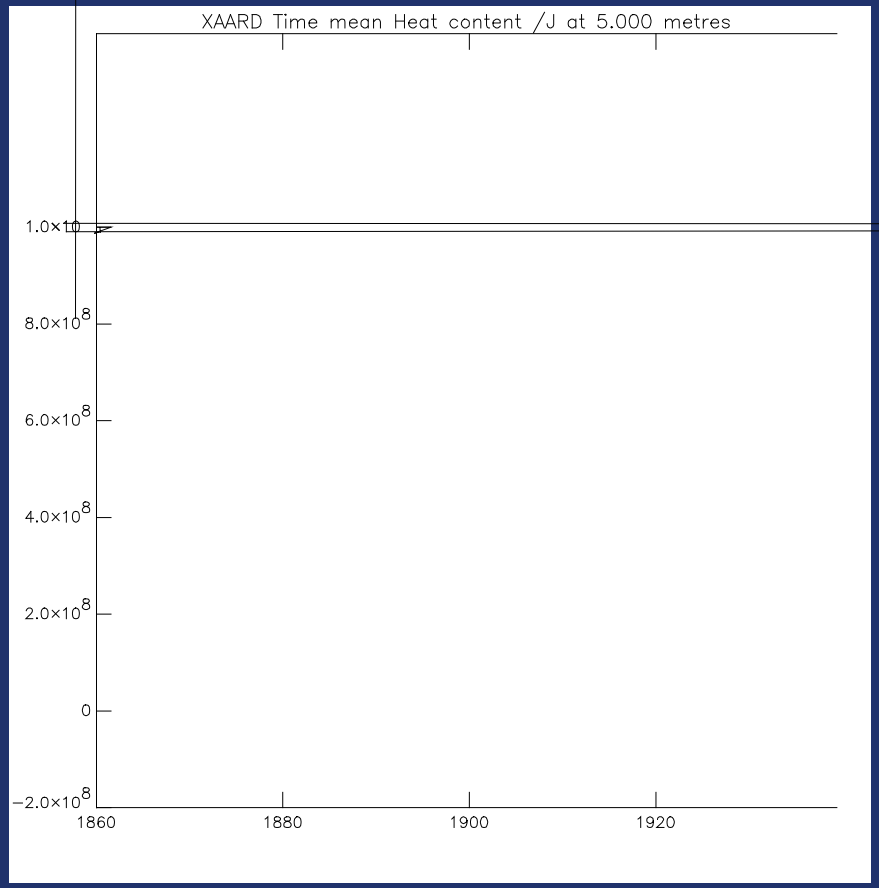
# Change in Heat Content




Red = High, Black = Medium, Blue = Low

- This considers whole ocean and could be hiding important depth structure

# Top 250m


XAARD Time mean Heat content /J at 5.000 metres
1.0×10
8.0×10^8
6.0×10^8
4.0×10^8
2.0×10^8
0
−2.0×10^8
1860
1880
1900
1920