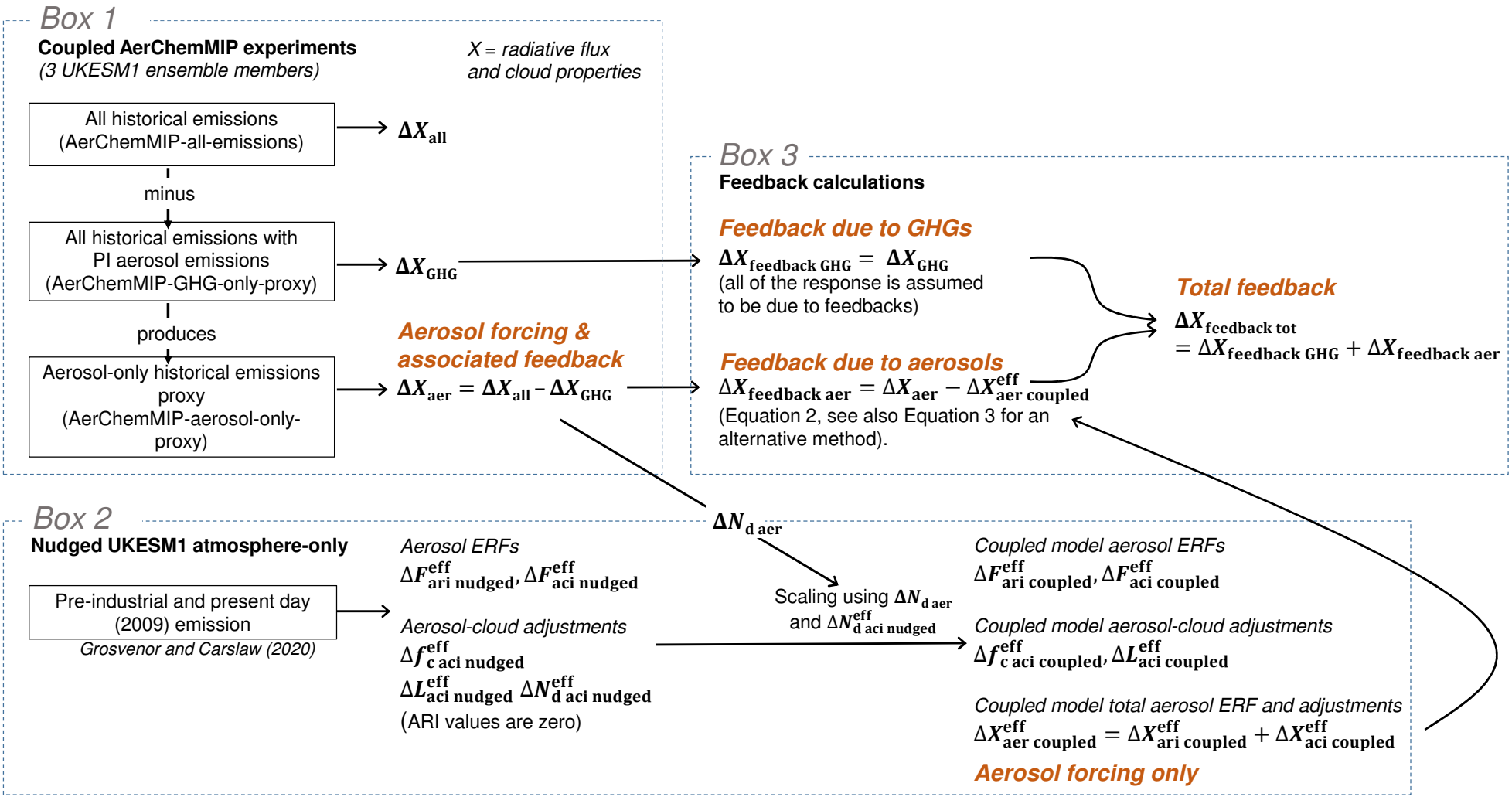
Box 1
Coupled AerChemMIP experiments
(3 UKESM1 ensemble members)
X = radiative flux and cloud properties
All historical emissions (AerChemMIP-all-emissions)
ΔX_all
minus
All historical emissions with PI aerosol emissions (AerChemMIP-GHG-only-proxy)
ΔX_GHG
produces
Aerosol-only historical emissions proxy (AerChemMIP-aerosol-only-proxy)
Aerosol forcing & associated feedback
ΔX_aer = ΔX_all − ΔX_GHG
Box 3
Feedback calculations
Feedback due to GHGs
ΔX_feedback GHG = ΔX_GHG
(all of the response is assumed to be due to feedbacks)
Feedback due to aerosols
ΔX_feedback aer = ΔX_aer − ΔX^eff_aer coupled
(Equation 2, see also Equation 3 for an alternative method).
Total feedback
ΔX_feedback tot = ΔX_feedback GHG + ΔX_feedback aer
Box 2
Nudged UKESM1 atmosphere-only
Pre-industrial and present day (2009) emission
Grosvenor and Carslaw (2020)
Aerosol ERFs
ΔF^eff_ari nudged, ΔF^eff_aci nudged
Aerosol-cloud adjustments
Δf^eff_c aci nudged
ΔL^eff_aci nudged ΔN^eff_d aci nudged
(ARI values are zero)
ΔN_d aer
Scaling using ΔN_d aer and ΔN^eff_d aci nudged
Coupled model aerosol ERFs
ΔF^eff_ari coupled, ΔF^eff_aci coupled
Coupled model aerosol-cloud adjustments
Δf^eff_c aci coupled, ΔL^eff_aci coupled
Coupled model total aerosol ERF and adjustments
ΔX^eff_aer coupled = ΔX^eff_ari coupled + ΔX^eff_aci coupled
Aerosol forcing only