(a)

Remove background sulfate; generate signal concentration and flux

Identify likely volcanic sulfate peaks using threshold value

Find the maximum sulfate concentration of each peak (h_{data})

Calculate total sulfate flux of each peak (F)

Remove small peaks and peaks impacted by data gaps or dust layers

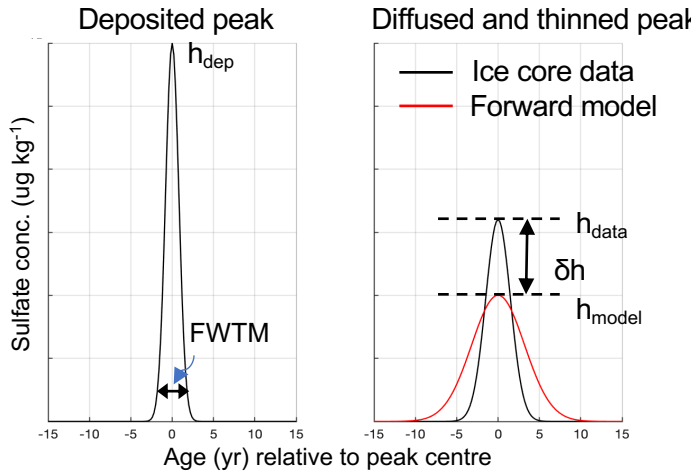
Calculate input peak height (h_{dep}), width (FWTM) assuming 3 yr duration) and σ value

Calculate accumulation rate (*a*) for Nye model that gives correct peak age-depth

Forward model evolution of peak shape from deposition to age of peak, accounting for sulfate diffusion (determined by D_{eff}) and ice thinning

Repeat forward modelling for 50 values of effective diffusion coefficient (D_{eff})

Difference between h_{data} and h_{model} (δh) calculated for every sulfate peak across range of D_{eff}

D_{eff} that produces best-fit between data and forward model (lowest δh) identified for each peak

(b)