

Fit round 1

$$\left\{ \begin{array}{c} Set_1 \\ \vdots \\ Set_n \end{array} \right\} \text{ loose fit } \left\{ \begin{array}{c} \text{Start values} \\ {}^1Group_1 \\ \vdots \\ {}^1Group_m \end{array} \right\} \Rightarrow \left\{ \begin{array}{c} \text{Fitted values} \\ {}^2Group_1 \\ \vdots \\ {}^2Group_p \end{array} \right\}$$

Fit round 2

$$\left\{ \begin{array}{c} Set_1 \\ \vdots \\ Set_n \end{array} \right\} \text{ stiff fit } \left\{ \begin{array}{c} \text{Start values} \\ {}^2Group_1 \\ \vdots \\ {}^2Group_p \end{array} \right\} \Rightarrow \left\{ \begin{array}{c} \text{Fitted values} \\ {}^3Group_1 \\ \vdots \\ {}^3Group_{n \times p} \end{array} \right\} \rightarrow \left\{ \begin{array}{c} \text{Fitted values} \\ Collection_1 \\ \vdots \\ Collection_p \end{array} \right\}$$

$$\text{where } Collection_x \in \bigcup_{i=1}^n {}^3Group_{x,Set_i}$$

Supplementary Figure 5. Fitting procedure to explore the entire parameter space. In fitting round #1) all sets are fitted with a variety of starting values for the parameters (¹Groups, ~20 groups). The fit procedure is set such that the parameters can make large swings during the fitting (loose fit). These first fits give groups of parameters (²Groups) that each can describe one or more sets. Groups with very similar values for every parameter are made into a single group by averaging the individual parameters. In fitting round #2) every set is fitted with the ²Groups as starting values. The fit procedure is set such that the parameters can make only small deviations during the fitting, forcing the model to find a solution with most (if not all) of the parameters close to their initial values (stiff fit). This results in a collection of groups for each set of fits in which the parameters can be determined with a certain distribution. If a collection had one or more parameters with a wide distribution (multiple orders of magnitude), the results were assumed to stem from a local minimum in error space with invalid parameter values.