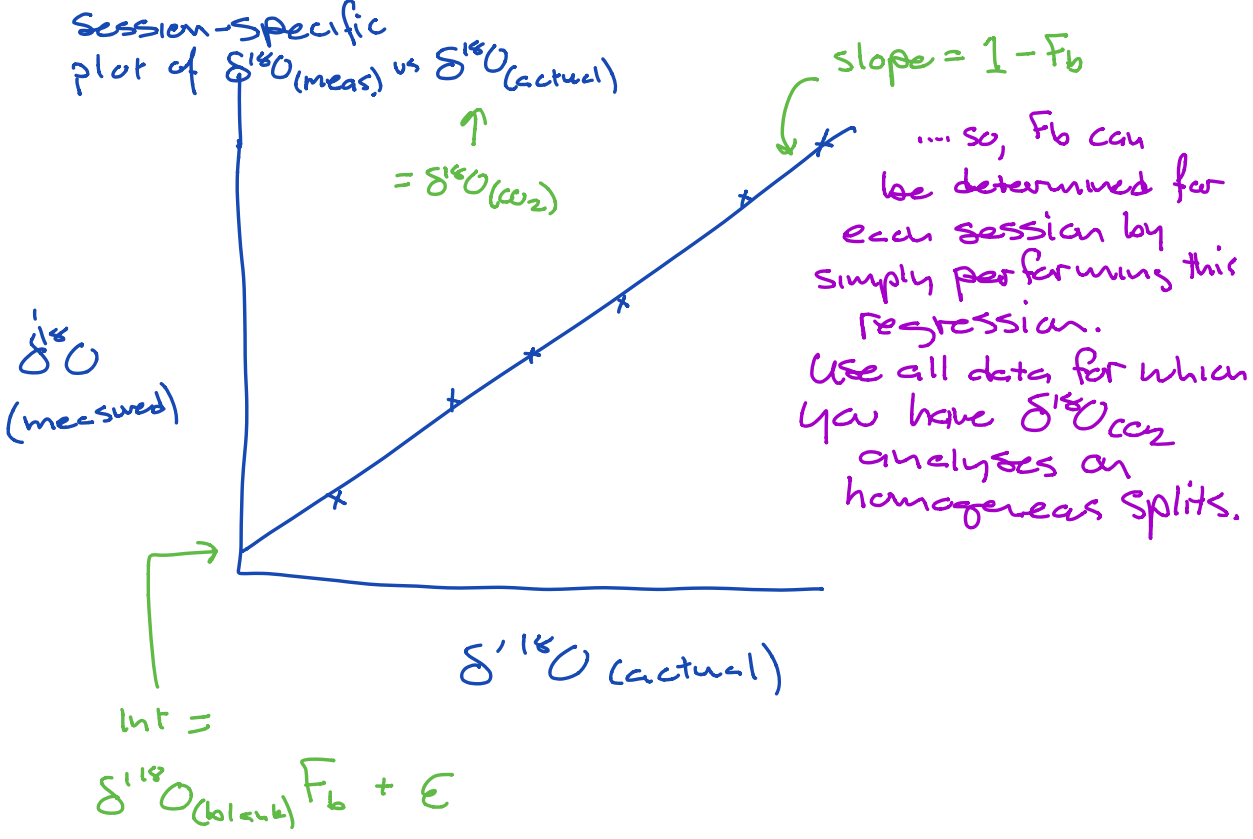
Eq. A2:

$$\delta'^{18}O_{(measured)} = \delta'^{18}O_{(actual)}(1 - F_b) + \delta'^{18}O_{(blank)} F_b + \varepsilon$$

F_b = fraction of O_2 coming from the blank

ε = sum of fraction effects in addition to, but separate from, the blank effect.



.... so, F_b can be determined for each session by simply performing this regression. Use all data for which you have $\delta^{18}O_{CO_2}$ analyses on homogeneous splits.

The intercept contains 2 unknowns. We can use data from 3 or more sessions to solve for these.

The appropriate linear system is of the form $A \cdot m = d$

$$\underset{A:\ (\text{knowns})}{\begin{bmatrix} F_{b,1} & 1 \\ F_{b,2} & 1 \\ F_{b,3} & 1 \\ \vdots & \vdots \\ F_{b,n} & 1 \end{bmatrix}} \quad \underset{\substack{m: \\ (\text{unknowns})}}{\begin{bmatrix} \delta^{18}O_{(\text{blank})} \\ \varepsilon \end{bmatrix}} = \underset{\substack{d: \\ (\text{knowns})}}{\begin{bmatrix} \text{Int. } 1 \\ \text{Int. } 2 \\ \text{Int. } 3 \\ \vdots \\ \text{Int. } n \end{bmatrix}}$$

where the subscripts 1, 2, 3 ... n refer to the 1st, 2nd, ... nth session considered.

(i.e. $F_{b,1}$ + Int. 1 are the fraction blank and regression intercept for session 1),

use least-squares to solve for m.