MRV110

$\delta_i = a_i - b_i T$ for species i

$$\bar{\delta}_i = \int (a_i - b_i T(z)) P_i(z)\, dz =$$

$$= a_i - b_i \int T(z) P_i(z)\, dz$$

let $T(z), P(z)$ be piecewise continuous with interval Δz

$$\bar{\delta}_i = a_i - b_i \sum_j T(z_j) P_i(z_j)\, \Delta z \qquad \text{if } T_j = T(z_j) \text{ and } P_{ij} = P_i(z_j)\Delta z$$

$$\bar{\delta}_i = a_i - b_i \sum_j T_j P_{ij}$$

Let $T(z)$ have an orthonormal expansion $T(z) = \sum_j T_j f_j(z)$

and similar expansion for $P_i(z) = \sum_j P_{ij} f_j(z)$

$$\bar{\delta}_i = a_i - b_i \sum_j \sum_k T_j P_{ik} \int f_j(z) f_k(z)\, dz$$

$$= a_i - b_i \sum_j \sum_k T_j P_{ik} \delta_{jk}$$

$$\bar{\delta}_i = a_i - b_i \sum_j T_j P_{ij}$$

$$\bar{q}_i \equiv (a_i - \bar{\delta}_i)/b_i = \sum_j P_{ij} T_j \qquad \underline{q} = \underline{\underline{P}}\,\underline{T}$$

now consider that one have $\bar{q}_i$ at many x's $\bar{Q}_{ik}$

$$\bar{Q}_{ik} = \sum_j P_{ij} T_{ik} \quad \text{or} \quad \bar{\underline{\underline{Q}}} = \underline{\underline{P}}\,\underline{\underline{T}} \qquad \underline{\underline{P}}^{est} = \bar{\underline{\underline{Q}}}^{obs}\,\underline{\underline{T}}^{-g}$$

"Training" locations

$$\underline{T}^{est} = \underline{\underline{P}}^{-g}\,\underline{q}^{obs}$$

target location