Supplement

Derivation of Equation (6)

$$N_{CCN}(AOP) = \left(a_{SS}BSF + b_{ss}\right)\sigma_{sp} = \left(\left(a_1 \ln(SS\%) + a_0\right)BSF + b_1 \ln(SS\%) + b_0\right)\sigma_{sp}$$

$$R_{CCN/\sigma} = \frac{N_{CCN}(AOP)}{\sigma_{sp}} = a_{SS}BSF + b_{ss} = \left(a_1 \ln(SS\%) + a_0\right)BSF + b_1 \ln(SS\%) + b_0$$

Linear regressions of the coefficients in Table 2 yield

$a_0 \approx (2.38 \pm 0.06)a_1, b_0 \approx (2.33 \pm 0.03)b_1, b_1 \approx -(0.097 \pm 0.013)a_1 + (6.4 \pm 5.9)$

$\Rightarrow$

$a_1 \ln(SS\%) + a_0 \approx a_1 \ln(SS\%) + (2.38 \pm 0.06)a_1 \approx a_1(\ln(SS\%) + (2.38 \pm 0.06))$

$b_1 \ln(SS\%) + b_0 \approx b_1 \ln(SS\%) + (2.33 \pm 0.03)b_1 = b_1(\ln(SS\%) + (2.33 \pm 0.03))$

$\approx \left(-(0.097 \pm 0.013)a_1 + (6.4 \pm 5.9)\right)(\ln(SS\%) + (2.33 \pm 0.04))$

$\Rightarrow$

$R_{CCN/\sigma} = \left(a_1 \ln(SS\%) + a_0\right)BSF + b_1 \ln(SS\%) + b_0$

$\approx a_1(\ln(SS\%) + (2.38 \pm 0.06))BSF + \left(-(0.097 \pm 0.013)a_1 + (6.4 \pm 5.9)\right)(\ln(SS\%) + (2.33 \pm 0.03))$

Approximation, since (2.33±0.03) ≈ (2.38±0.06)

$\Rightarrow$

$$R_{CCN/\sigma} \approx a_1\left(\ln(SS\%) + (2.38 \pm 0.06)\right)BSF - (0.097 \pm 0.013)a_1\left(\ln(SS\%) + (2.38 \pm 0.07)\right) + (6.4 \pm 5.09)\left(\ln(SS\%) + (2.38 \pm 0.06)\right)$$

$$\approx a_1\left(\ln(SS\%) + (2.38 \pm 0.06)\right)(BSF - (0.097 \pm 0.013)) + (6.4 \pm 5.9)\left(\ln(SS\%) + (2.38 \pm 0.06)\right)$$

$$\approx \left(\ln(SS\%) + (2.38 \pm 0.06)\right)\left(a_1(BSF - (0.097 \pm 0.013)) + (6.4 \pm 5.9)\right)$$

$$\approx \left(\ln(SS\%) - \ln(0.093 \pm 0.006)\right)\left(a_1(BSF - (0.097 \pm 0.013)) + (6.4 \pm 5.9)\right)$$

$$\approx \ln\left(\frac{SS\%}{0.093 \pm 0.006}\right)\left(a_1(BSF - (0.097 \pm 0.013)) + (6.4 \pm 5.9)\right)$$

Derivation of Equation (7)

$$N_{CCN}(AOP) \approx \ln\left(\frac{SS\%}{0.093 \pm 0.006}\right)\left(a_1(BSF - BSF_{\min}) + \mathrm{C}\right)\sigma_{sp},$$

where C is an unknown constant.

If $BSF = BSF_{\min}$

$\Rightarrow a_1(BSF - BSF_{\min}) = 0$

$$\Rightarrow N_{CCN}(AOP, BSF_{\min}) \approx \ln\left(\frac{SS\%}{0.093 \pm 0.006}\right)\mathrm{C} \cdot \sigma_{sp}$$

$$\Leftrightarrow \mathrm{C} \approx \frac{1}{\ln\left(\frac{SS\%}{0.093 \pm 0.006}\right)} \frac{N_{CCN}(AOP, BSF_{\min})}{\sigma_{sp}} \approx \frac{1}{\ln\left(\frac{SS\%}{0.093 \pm 0.006}\right)} R_{\min}$$

$\Rightarrow$

$$N_{CCN}(AOP) \approx \ln\left(\frac{SS\%}{0.093 \pm 0.006}\right)\left(a_1(BSF - BSF_{\min}) + \frac{1}{\ln\left(\frac{SS\%}{0.093 \pm 0.006}\right)} R_{\min}\right)\sigma_{sp}$$

$$\approx \left(\ln\left(\frac{SS\%}{0.093 \pm 0.006}\right)a_1(BSF - BSF_{\min}) + R_{\min}\right)\sigma_{sp}$$