

Algorithm Description for Integrated Site Specific Science Value Geologic Feature Map

Priority Level 3: Science Value Geological Features (L3)

Science value of Geological Features (L3 %) will be calculated from the following equation:

$$L3 = (Q + R + S + T + U / L3_{\text{max.points}}) * 100$$

where Q is the score of plume activity, R is space weathering, S is Particle Size Frequency Distribution, T is the existence of Brittle Deformation, U is the score of Craters. The maximum points of L3 (L3_{max.points}) is 8.

Q represents Plume Activity:

Q = either a or b or c

where a is the detection of active plume. When it is detected then

$$Q = a = 2$$

b is the detection of recent activity (definition TBD). When it is detected then

$$Q = b = 1$$

c is the detection of old plume site (definition TBD). When it is detected then

$$Q = c = 0$$

R represents the degree of space weathering:

R = either d or e

when the space weathering feature is less than global average (definition TBD), therefore the site is fresher than average asteroidal surface, then

$$R = d = 1$$

When the space weathering feature is more than the global average (definition TBD), therefore the site is more weathered than average asteroidal surface, then

$$R = e = 0$$

S represents the particle size frequency distribution (PSFD):

S = either f or g or h

when the PSFD feature show mixture of coarse and fine grains, then

$$S = f = 2$$

When the PSFD feature show either only coarse grains distribution, then

$$S = g = 1$$

When the PSFD feature show either only fine grains distribution, then

$$S = h = 1$$

T represents the existence of Brittle Deformation.

T will be contributed to the L3 only when the feature is recognized in the area, then

$$T = 1$$

U represents Crater features:

U = either i or j

where i is the detection of recent crater (definition TBD). When it is detected then

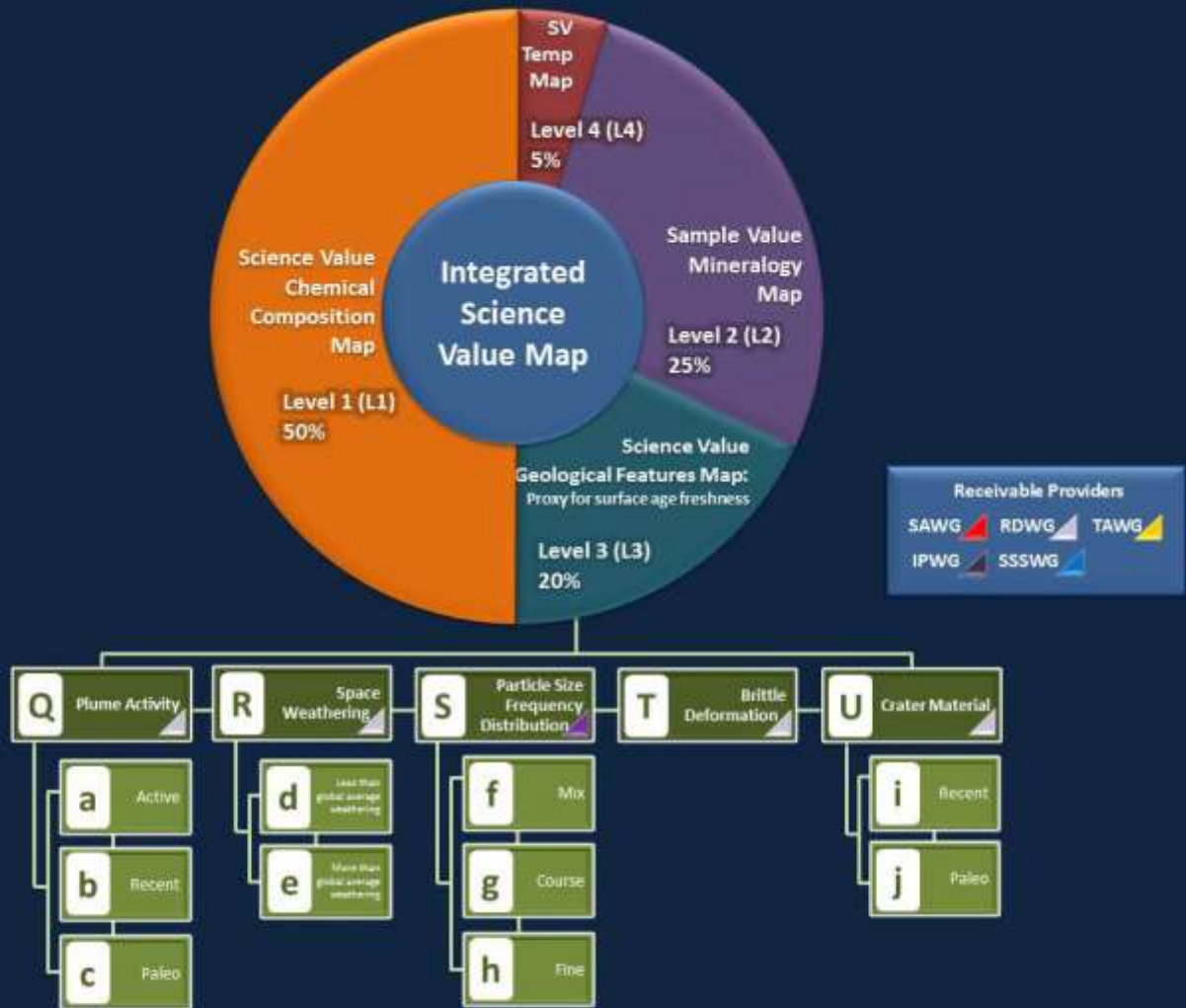
$$U = i = 2$$

j is the detection of old crater (definition TBD). When it is detected then

$$U = j = 1$$

OSIRIS-REx Science Value Map with Calculations

$$\text{Total Science Value Score} = (L1 * 0.50 + L2 * 0.25 + L3 * 0.2 + L4 * 0.05) * 100 \%$$



$$L3 = (Q + R + S + T + U / L3_{\text{max.points}}) * 100 \% \quad L3_{\text{max.points}} = 8$$

Q = a or b or c ($Q_{\text{max.points}} = 2$)

a = 2

b = 1

c = 0

R = d or e ($R_{\text{max.points}} = 1$)

d = 1

e = 0

S = f or g or h ($S_{\text{max.points}} = 2$)

f = 2

g = 1

h = 1

T = 0 or 1 ($T_{\text{max.points}} = 1$)

U = i or j ($U_{\text{max.points}} = 2$)

i = 2

j = 1

