Electronic Supplementary Material 1

Equation 1 was used to calculate the planar area of an ellipse (EPA).

$$EPA = \frac{\pi xy}{4} \qquad \textbf{(1)}$$

where, x is the largest diameter and y is the perpendicular diameter to x, at the widest point of the colony. Calculating the surface area of an elliptic cylinder involves the computation of the circumference of the perimeter (EP). For this we used the Ramanujan first approximation formula, given in Eq. (2). This approximation has the least degradation across different x / y ratios in comparison with other formulations.

$$EP = \pi\left(3(a+b) - \left[(a+3b)(3a+b)\right]^{1/2}\right) \qquad \textbf{(2)}$$

Here, a is the radius of the ellipse measured at the maximum diameter, and b is the radius measured at the perpendicular diameter. Equation 3 was used to calculate the surface area of each coral colony (CSA).

$$CSA = (EP \times z) + EPA \qquad \textbf{(3)}$$

Here, EP is calculated in Eq. (6), EPA in Eq. (1), and z is the height of the coral colony.

The surface area for each quadrat (QSA) was calculated using the surface area of each colony and the planar area of each quadrat as shown in Eq. (4).

(4)

$$QSA = \left[QPA - \sum\left(EPA_i\right)\right] + \sum\left(CSA_i\right)$$

Here, QPA is the quadrat's planar area (40,000 cm^2), EPA_i and CSA_i are the ellipse planar area and the surface area of colony i, respectively.

The structural complexity index (SC) was calculated for each quadrat as a ratio between QSA and QPA as in Eq. (5).

$$SC = QSA/QPA \quad \textbf{(5)}$$

Here, QPA is 40,000 cm^2 for our example. A value of 1 represents a totally flat quadrat; the more complex the quadrat, the greater the value of SC. A similar approach was used to calculate volume. Equation 6 shows the formula used to calculate the volume of a quadrat (QV).

$$QV = \sum(EPA \times z)_i \quad \textbf{(6)}$$

Here, EPA is calculated as in Eq. (1), *z* is the maximum height, and *i* is a coral colony in Q. Structural complexity based on the volume (SCvol) was calculated by dividing the total volume of the quadrat by QV as shown in Eq. (7).

(7)

$$SCvol = QPA \times z\max / QV$$

Here, QPA is 40,000 cm^2 and z max is the height of the tallest coral in the entire surveyed area. Thus, a large value of SCvol represents a highly complex quadrat, while a small value represents a less complex quadrat. This is the same formula as equation 4 in the manuscript.