A graph of a number of coral reef degradation

AI-generated content may be incorrect.

**Fig. 1** Plot of the mean percentage of hard coral cover of the Great Barrier Reef from July 1985 to June 2011. Data obtained from the Australian Institute of Marine Science.

A graph of the number of years

AI-generated content may be incorrect.

**Fig. 2** Average annual percent coral cover for two datasets of Moorea (French Polynesia): (a) Moorea 1 and (b) Moorea 2, (c) St John in US Virgin Islands and (d) Florida Reef.

A graph of data with red lines

AI-generated content may be incorrect.

**Fig. 3** Deviations of the raw data from a linear fit (orange curve). The deviations are used to calculate the empirical mean square deviation (MSD) which will be matched with a theoretical MSD.

A graph of a normalized curve

AI-generated content may be incorrect.

**Fig. 4** Log-log plot of Great Barrier Reef percent hard coral cover empirical (Blue) and Theoretical MSD (Green) using Eq. (6).

A graph of different types of data

AI-generated content may be incorrect.

**Fig. 5** Log-log plots of the mean squared deviation (MSD) versus time for (a) Moorea reef 1, (b) Moorea reef 2, (c) St John and (d) Florida Reef. Theoretical model using Eq. (6) in green (squares) while empirical data in blue (circles).

A graph of a function

AI-generated content may be incorrect.

**Figure 6.** Mean square deviation (MSD). Dashed line: Brownian motion (no memory). Curved black line: stochastic process with memory, Eq. (6), describing the GBR.

A graph of a normal distribution

AI-generated content may be incorrect.

**Fig. 7** Plot of the first passage time density, Eq. (16), for | | equal to 4.69 (circles), 5.36 (squares), and 5.43 (triangles). The peaks of the graphs are at 198 weeks (circles), 193 weeks (squares), and 204 weeks (triangles).

A graph with blue dots

AI-generated content may be incorrect.

**Fig. 8** Plot of the percent error that compares the predicted value, which corresponds to the time at the peak of Eq. (16), with the actual empirical data from the GBR**.** Here, we set the initial value at zero, and the threshold value or “cliff point ” ranges from 180 to 250.

A graph of the different types of growth

AI-generated content may be incorrect.

**Fig. 9** Plot of the percent errors comparing the predicted time (the time corresponding to the peak of Eq. (16)) vs. the actual time (from the empirical data) for (a) Moorea 1, (b) Moorea 2, (c) St John and (d) Florida Reef.

A graph of a function

AI-generated content may be incorrect.

**Fig. 10** MSD plots of Eq. (17) for different diffusion regimes at . Subdiffusive (open box, ); memoryless Brownian motion (cross, ); Superdiffusive (dashed line, ); and Hyperballistic diffusion (solid line, ).