Table 1. Measures used in recurrence quantification analysis (RQA).

Recurrence rate	%REC Percentage of recurrent points falling within radius, ε, for W, number of points in signal.
Determinism	%DET Percentage of recurrent points forming diagonal line structures; Predictability of the system
DMAX	Length of the longest diagonal line. The shorter the line, the faster the divergence of the phase space trajectory.
Entropy	The Shannon information entropy of probability distribution of the diagonal line lengths. Complexity of deterministic structures.
Trend	A measure of system stationarity.
Laminarity	%LAM Percentage of recurrent points forming vertical line structures; intermittency of system.
VMAX	Length of the longest vertical line.
Trapping time	TT Average length of vertical line structures. Length of time (or space) system remains in a specific state.

Table 2. Significance of patterns in recurrence plots.

Pattern	Significance
Homogeneous	The process is stationary. TREND tends to zero. TREND tends to infinity for an heterogeneous distribution.
Fading pattern to upper right or lower left	Non-stationary data; the process contains a trend or drift
Disruptions (horizontal or vertical)	Non-stationary data; some states are far from the normal; transitions may have occurred. %LAM reflects such intermittency.
Periodic or quasi-periodic patterns	The process is cyclic. The vertical (or horizontal) distance between periodic lines corresponds to the period. Variations in the distance means quasi-periodicity in the process. e.g. simple periodic systems have all diagonal lines of equal length; entropy tends to zero.
Single isolated points	Represent rarity or strong fluctuations in the process. The process may be uncorrelated or anti-correlated. e.g. white noise has almost only single dots; low DET.
Diagonal lines (parallel to the line of identity, LOI)	The evolution of the system is similar over the length of the line. If lines appear next to single isolated points the process may be chaotic. e.g. Sine waves give very long diagonal lines; chaotic signals give many very short diagonal lines.
Diagonal lines (orthogonal to the LOI)	The evolution of states at different times is similar but with reverse timing.
Vertical and horizontal lines or clusters	States do not change with time or change slowly; represented by trapping time.
Lines not parallel to the LOI - sometimes curved.	The evolution of states is similar at different times but the rate of evolution changes with time. The dynamics of the system is changing with time.

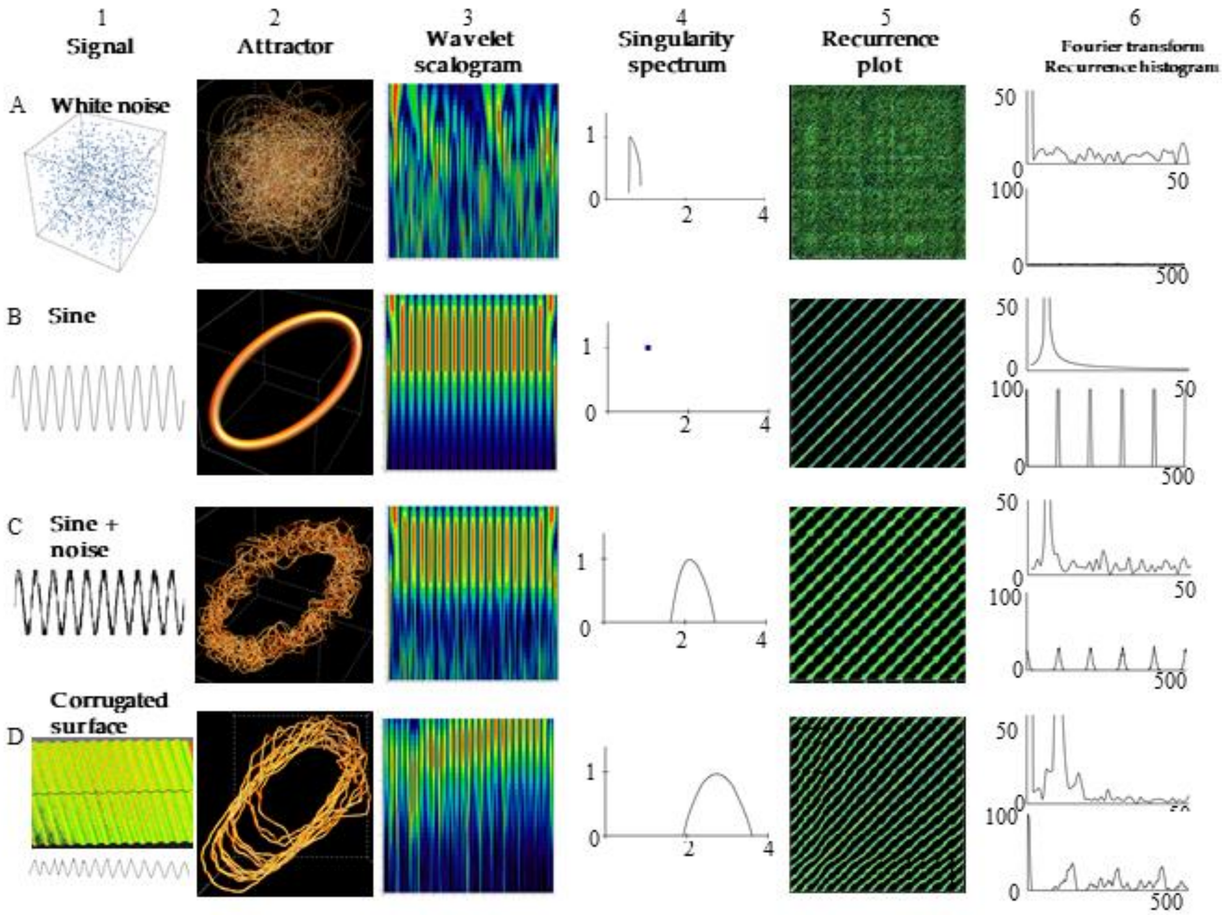

Figure 3. Row A White noise. Row B Sine. Row C Sine plus noise. Row D Corrugated surface. Column 1 Signal. Column 2 Attractor. Column 3 2D wavelet scalogram. Column 4 Singularity spectrum. Column 5 Recurrence plot. Column 6 Upper: Fourier transform. Lower: Recurrence histogram.

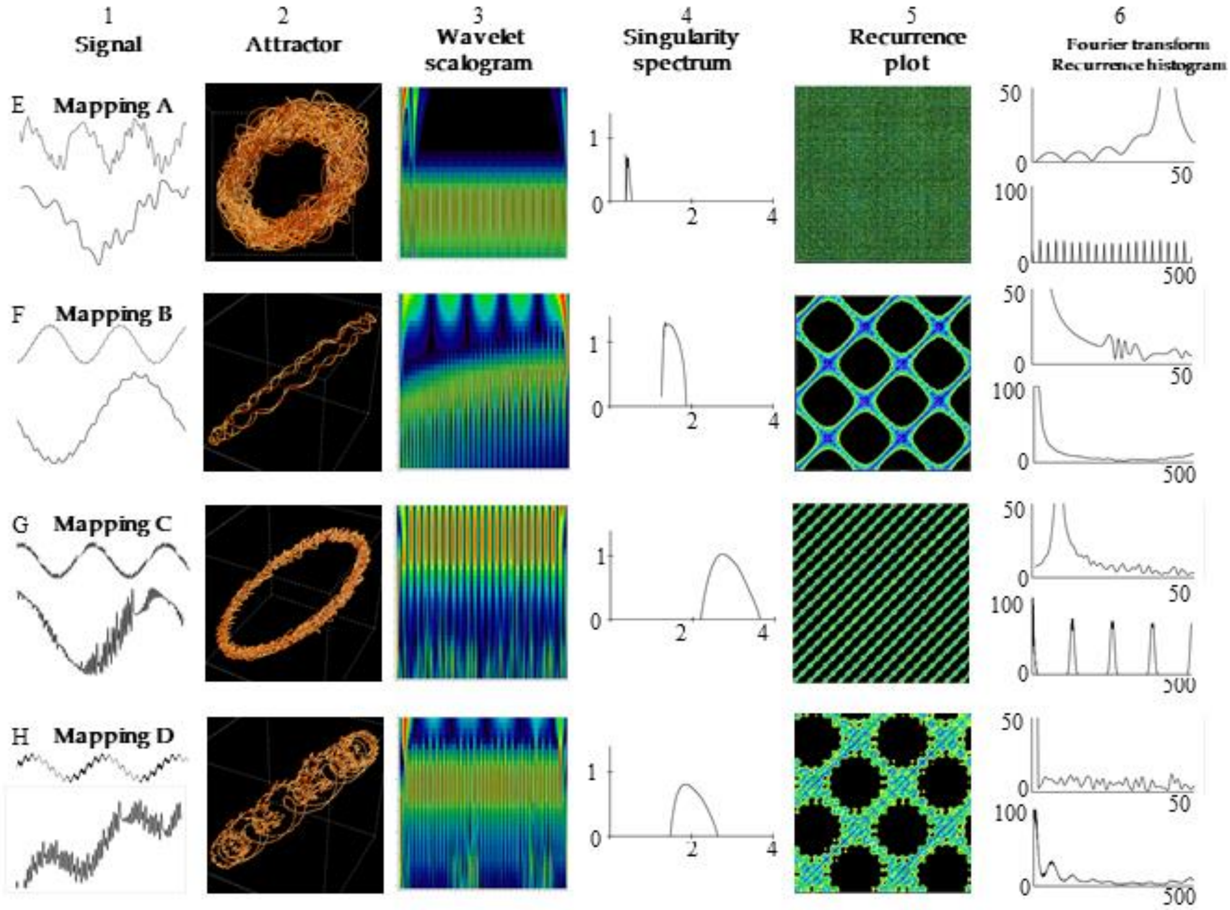

Figure 4. Row E Mapping A. Row F Mapping B. Row G Mapping C. Row H Mapping D. Column 1 Signal (at two scales to show details). Column 2 Attractor. Column 3 2D wavelet scalogram. Column 4 Singularity spectrum. Column 5 Recurrence plot. Column 6 Upper: Fourier transform Lower: Recurrence histogram.

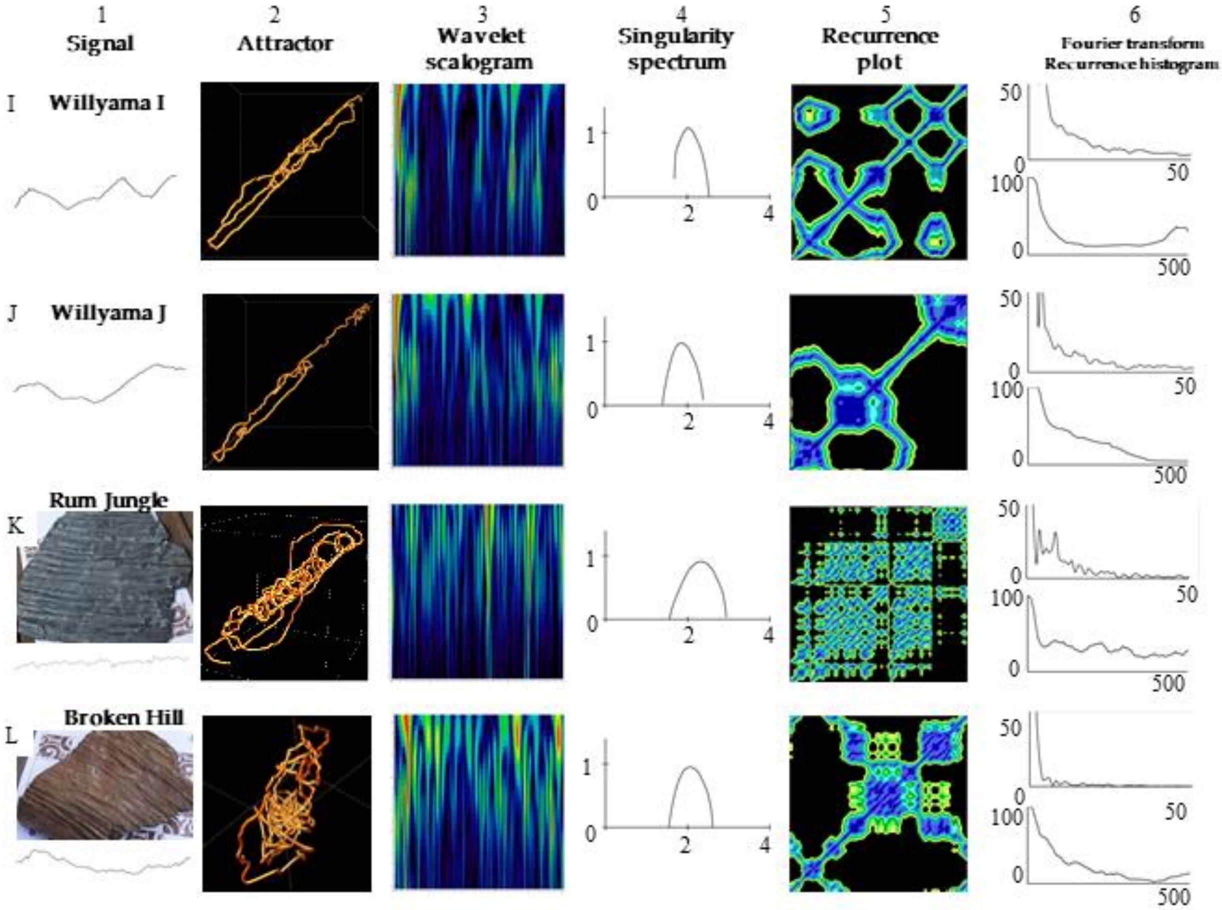

Figure 6. Row I Willyama section I. Row J Willyama section J. Row K Rum Jungle rock. Row L Broken Hill rock. Column 1 Signal. Column 2 Attractor. Column 3 2D wavelet scalogram. Column 4 Singularity spectrum. Column 5 Recurrence plot. Column 6 Upper: Fourier transform. Lower: Recurrence histogram.

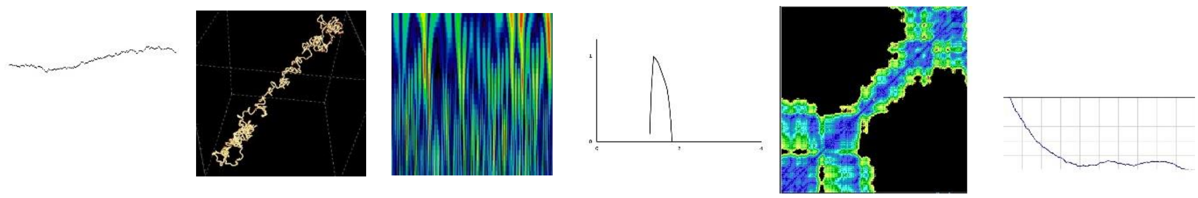

Figure New. Rule 30. Column 1 Signal. Column 2 Attractor. Column 3 2D wavelet scalogram. Column 4 Singularity spectrum. Column 5 Recurrence plot. Column 6 (Upper: Fourier transform). Lower: Recurrence histogram.

Table 3. Measures of the singularity spectra
There are not similarities for the singularity spectrum for Rule 30, but there are not for the other data either. The Rule 30 data are not poorly behaved, but they are not well behaved either.

Data set	D_0	D_1	D_2	D_∞	$D_{-\infty}$	D_1/D_0	D_2/D_0	$D_{-\infty}$ - D_∞
white noise	n/a							
Sine	n/a							
Sine + noise	0.99	0.93	0.78	1.7	2.8	0.94	0.79	1.1
Mapping A	0.68	0.53	0.68	0.4	0.5	0.78	1.00	0.1
Mapping B	1.27	1.31	1.24	1.3	1.9	1.03	0.98	0.6
Mapping C	1.03	0.96	0.77	2.2	3.6	0.93	0.75	1.4
Mapping D	0.81	0.75	0.64	1.5	2.7	0.93	0.79	1.2
Corrugated	0.97	0.78	0.35	1.9	3.6	0.80	0.36	1.7
Rum Jungle	0.91	0.73	0.25	1.5	2.9	0.80	0.28	1.4
Broken Hill	0.95	0.87	0.68	1.5	2.6	0.92	0.72	1.1
Willyama I sections	1.00-1.08	0.29-1.01	-0.09-0.80	1.1-1.70	2.10-3.00	0.29-0.94	-0.09-0.74	0.80-1.90
Willyama J sections	0.98-1.07	0.58-1.00	-0.28-0.97	1.00-1.90	2.30-2.80	0.56-0.96	-0.27-0.93	0.60-1.70
Rule 30	1.0	0.99	0.99	1.3	1.8	0.99	0.99	0.5

Table 4. Results of RQA for an assumed embedding dimension of 3 and a delay of 10.

Added Rule 30 to table from Ord et al. (2019) Phil Trans A Nonlinear analysis of natural folds using wavelet transforms and recurrence plots. The numbers for Rule 30 are most similar to those for the rocks. Note DMAX for Broken Hill (rock4z) is 1241 and that for Rule 30 is 1242 (DMAX is interpreted to be the inverse of the maximum Lyapunov exponent).

Data set	%REC	%DET	DMAX	Entropy	Trend	%LAM	VMAX	TT
white noise	9.2	17.1	6	0.5	-0.6	19.7	4	2.1
Sine	17	100	979	3.5	-3.8	99.9	21	15.2
Sine + noise	18.3	82.8	142	3.0	-3.1	87.3	30	6
Mapping A	18.8	79.7	225	2.7	0.34	89.5	10	3.9
Mapping B	32.2	100	1479	6.5	9.44	100	274	96.4
Mapping C	21.8	79.5	1479	4.5	-0.81	83.5	45	17.7
Mapping D	35.2	87.8	1479	6.0	12.17	91.4	261	50
Corrugated	22	99.3	1674	6.2	0.4	99.9	62	25.4
Rum Jungle	47.4	99.9	2187	7.6	-43.1	100	754	101.1
Broken Hill	40.2	99.9	1241	7.6	-56.4	100	592	121.8
Willyama I sections	35.4-45.8	99.93-99.98	1339-1641	6.04-8.43	-78.6-23.9	99.97-100	365-839	131-246
Willyama J sections	32.2-43.4	99.93-99.99	1143-1543	6.73-8.36	-89.7--6.78	99.97-100	459-748	137-215
Rule 30	38.0	99.75	1242	6.6	-88.4	99.77	526	98.4

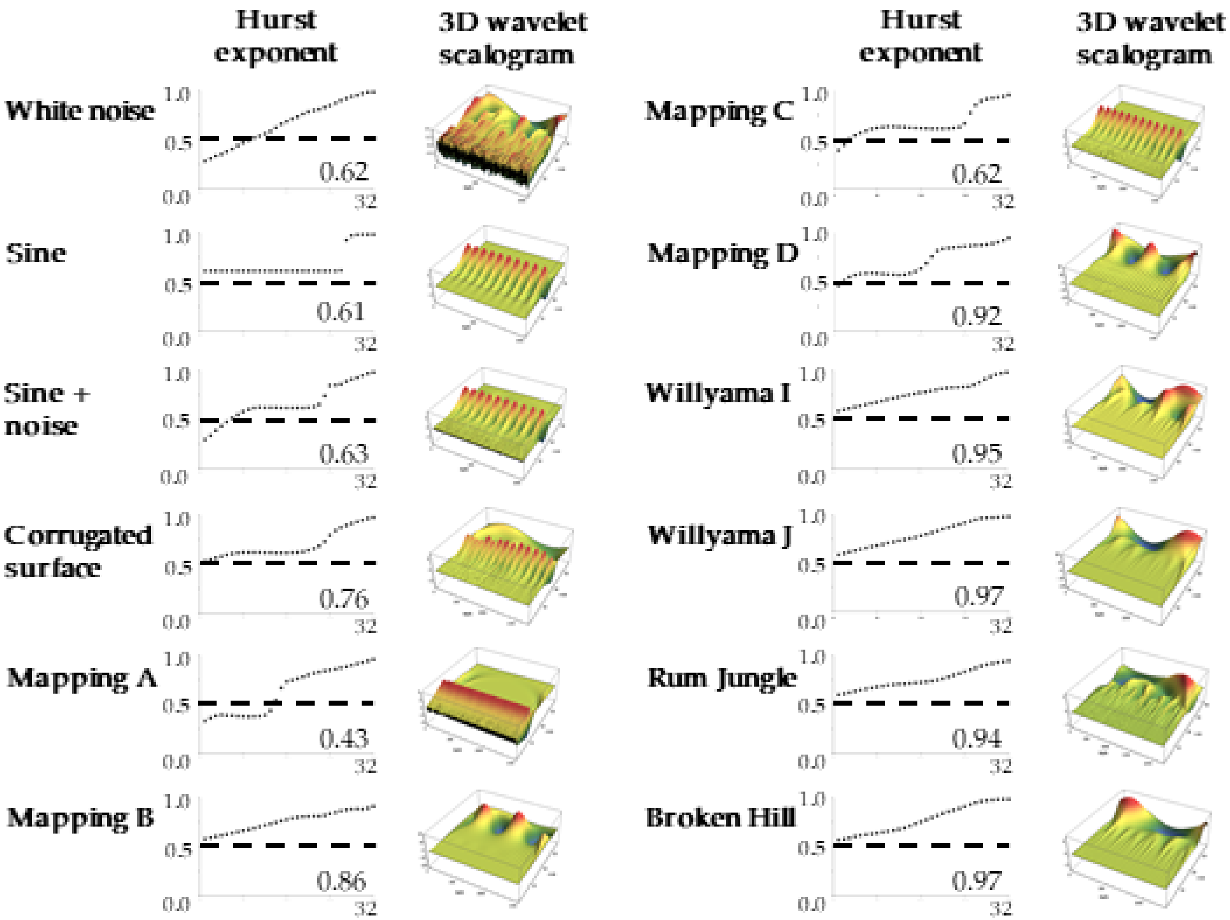

Figure 7. Columns 1 and 3. Measures of the Hurst exponents (y axis, 0-1, horizontal dashed line denotes an Hurst exponent of 0.5) at different scales (x axis, 0-32). Columns 2 and 4. Three dimensional wavelet scalogram. (z axis represents the wavelet coefficient). Column 1, from the top down: white noise, sine, sine plus noise, corrugated surface, Mapping A, Mapping B. Column 2, from the top down: Mapping C, Mapping D, Willyama I, Willyama J, Rum Jungle, Broken Hill. The number on each figure in Columns 1 and 3 is the Hurst exponent for each complete signal.