**Supporting Information Text S1: Measurement of constancy and contingency using the method proposed by Colwell 1974**

Measures of predictability, constancy and contingency are derived from the mathematics of information theory, more precisely from the Shannon information statistics. Imagine a frequency matrix, where there are t columns representing times within a cycle (in our case 24 as we considered 2 NDVI values per month) and s rows representing the states of the phenomenon (in our case 10 different NDVI classes; 0-0.1, 0.1-0.2, …0.9-1). Let Nij be the number of cycles for which the phenomenon (in this case the NDVI value) was in state i at time j. Define the column totals (Xj), row totals (Yi) and the grand total (Z) as

$$X\_{j}=\sum\_{i=1}^{s}N\_{ij}$$

$$Y\_{i}=\sum\_{j=1}^{t}N\_{ij}$$

$$Z=\sum\_{j}^{}X\_{j}=\sum\_{i}^{}Y\_{i}=\sum\_{j}^{}\sum\_{i}^{}N\_{ij}$$

Then the uncertainty with respect to time is

$$H\left(X\right)=-\sum\_{j=1}^{t}\frac{X\_{j}}{Z}log\left(\frac{X\_{j}}{Z}\right)$$

The uncertainty with respect to state is then

$$H\left(Y\right)=-\sum\_{i=1}^{s}\frac{Y\_{i}}{Z}log⁡\left(\frac{Y\_{i}}{Z}\right)$$

And the uncertainty with respect to the interaction of time and state is

$$H\left(XY\right)=-\sum\_{i}^{}\sum\_{j}^{}\frac{N\_{ij}}{Z}log\left(\frac{N\_{ij}}{Z}\right)$$

Predictability (P) can then be defined as

$$P=1- \frac{H\left(XY\right)-H(X)}{log⁡(s)}$$

Constancy is maximised when all rows but one are zero, while being minimised when all row totals are equal. A measure of constancy (C) with range (0-1) is given by

$$C=1- \frac{H(Y)}{log⁡(s)}$$

Contingency represents the degree to which time determines state, or the degree to which they are dependent on each other. An adjusted measure of contingency (M) with range (0-1) is given by

$$M= \frac{H\left(X\right)+H\left(Y\right)-H(XY)}{log⁡(s)}$$

In this scenario, predictability (P) is simply the sum of constancy (C) and contingency (M), with P=C+M.