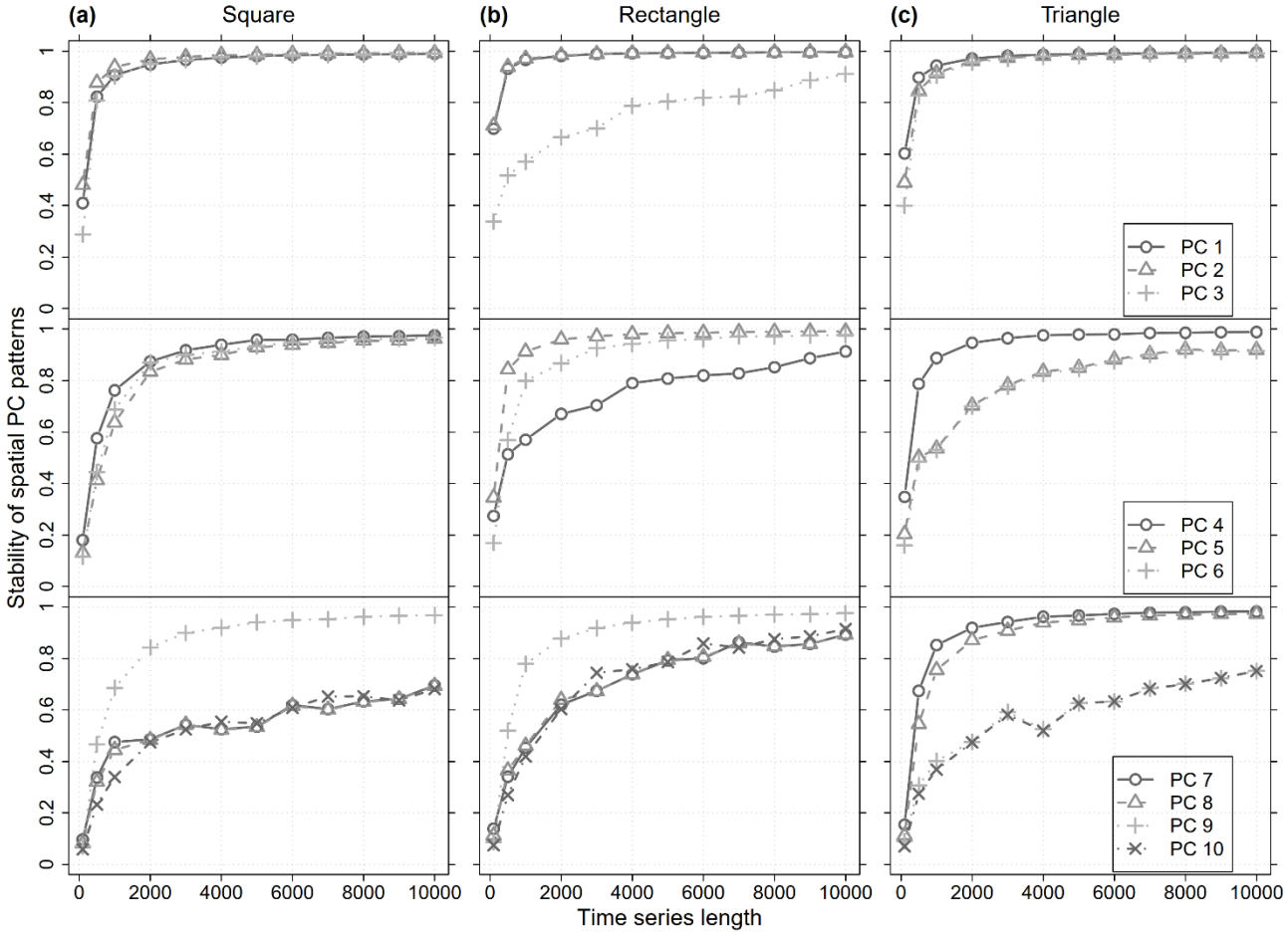

Figure S1 Stability of the spatial PC patterns as in Figure 4 but for the patterns of Figure 9.

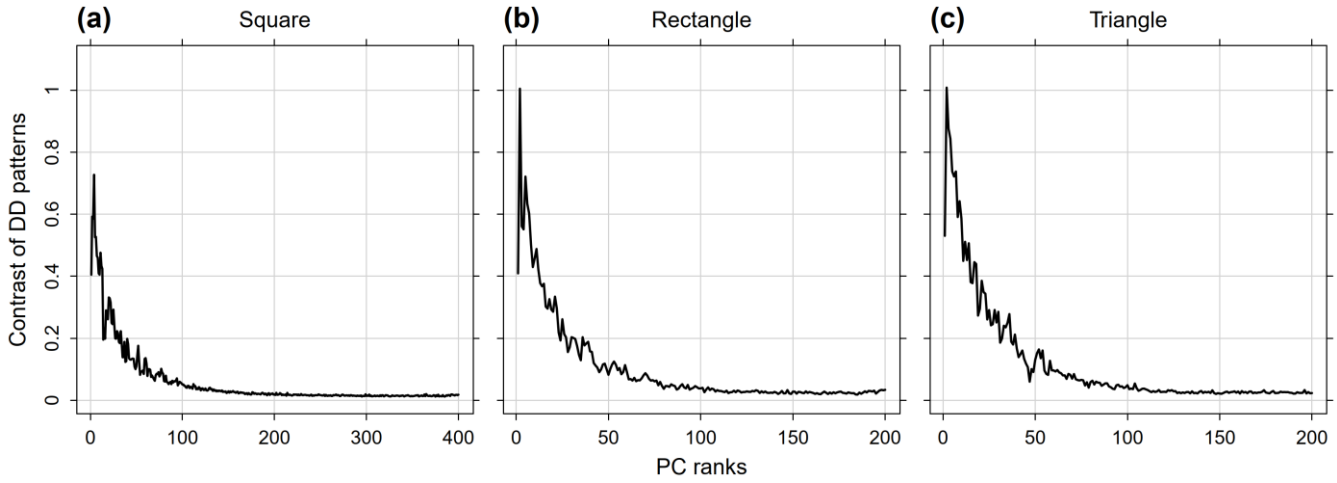

Figure S2 Contrast of all DD patterns modelled with the analytic DD reference method using an isotropic exponential covariance model, spatial correlation length of 10 cells and the domain boundaries (a) square, (b) rectangle and (c) triangle from Figure 3. All cells within the boundaries were used. Note that the number of PCs depends on the number of analysed series, which equals here the number of cells in the domains.

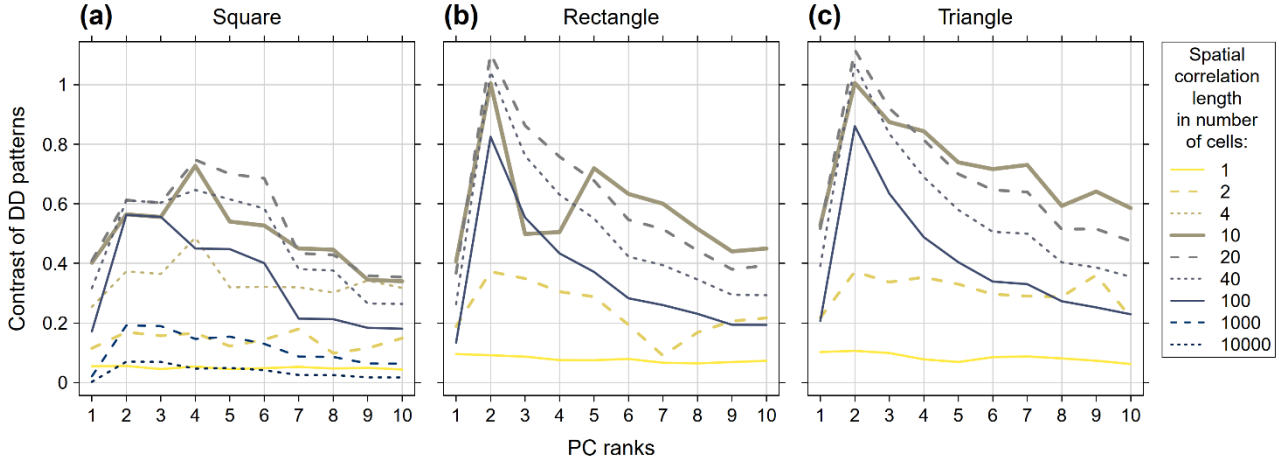

Figure S3 Contrast of the ten leading DD patterns PCs modelled with the stochastic DD reference method using an isotropic exponential covariance model, nine different spatial correlation lengths and the domain boundaries (a) square, (b) rectangle and (c) triangle from Figure 3. All cells within the boundaries were used. For each correlation length, the DD reference patterns were estimated from ensembles with 100 simulated data sets, each with time series length 10 000.

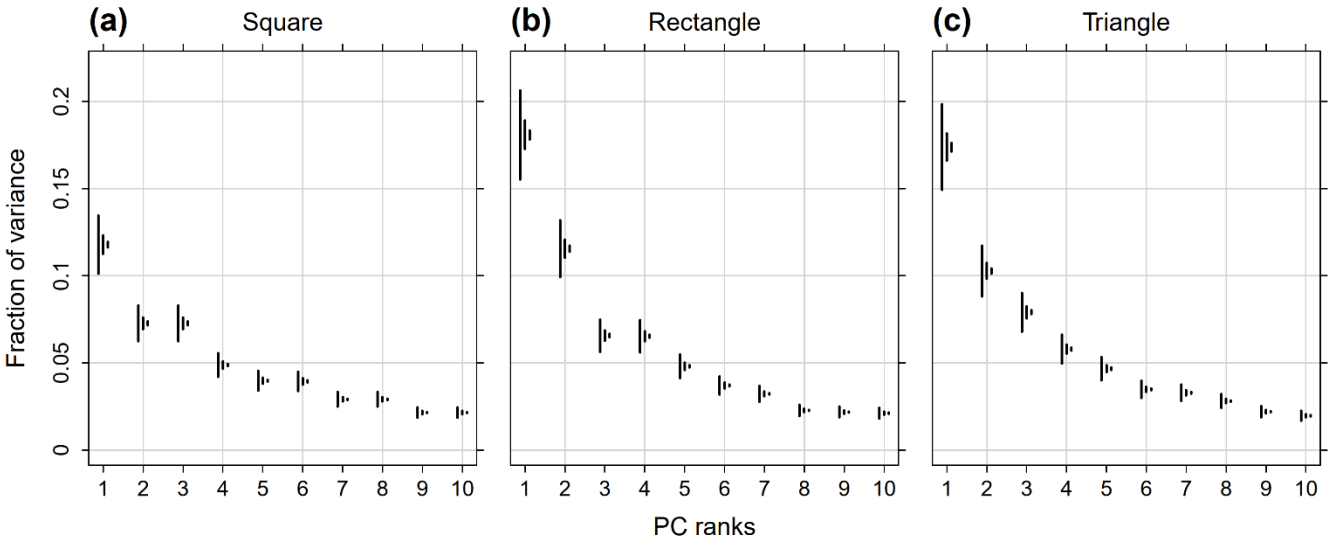

Figure S4 Variance representation of the ten leading PCs modelled with the analytic DD reference method using an isotropic exponential covariance model, a spatial correlation length of 10 cells and the domain boundaries (a) square, (b) rectangle and (c) triangle from Figure 3. All cells within the boundaries were used. The upright bars show from left to right the 95 % confidence interval for an effective sample size of 100, 1 000 and 10 000 estimated with North´s rule of thumb (North et al., 1982; Hannachi et al., 2007). For time series without temporal autocorrelation the effective sample size equals the time series length.

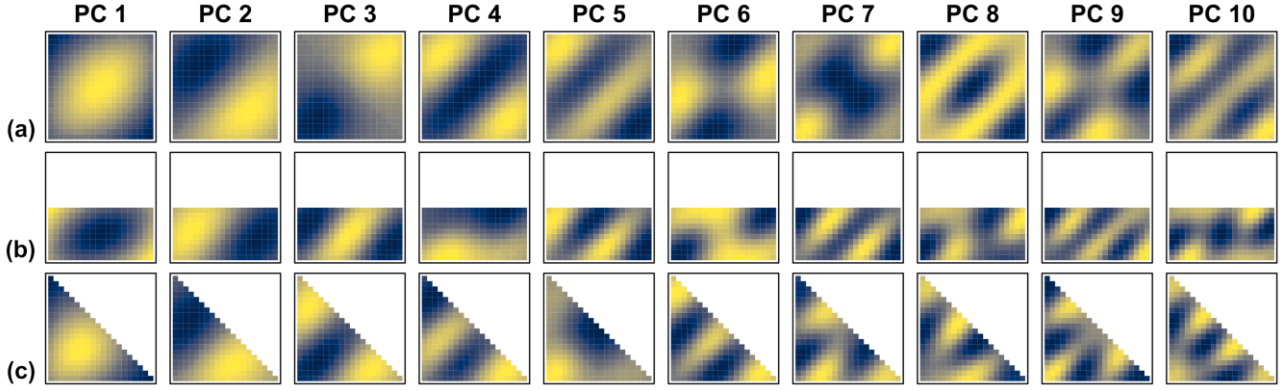

Figure S5 Anisotropic example: Overview of the ten leading DD reference patterns for anisotropic spatial correlation with a direction (angle) of 45° clockwise from North and an anisotropy ratio of 2 with the longer spatial correlation length being 10 cells, and the domain boundaries (a) square, (b) rectangle and (c) triangle from Figure 3. All cells within the boundaries were used. The patterns were estimated with the stochastic method from ensembles with 100 data sets, each with time series length 10 000.

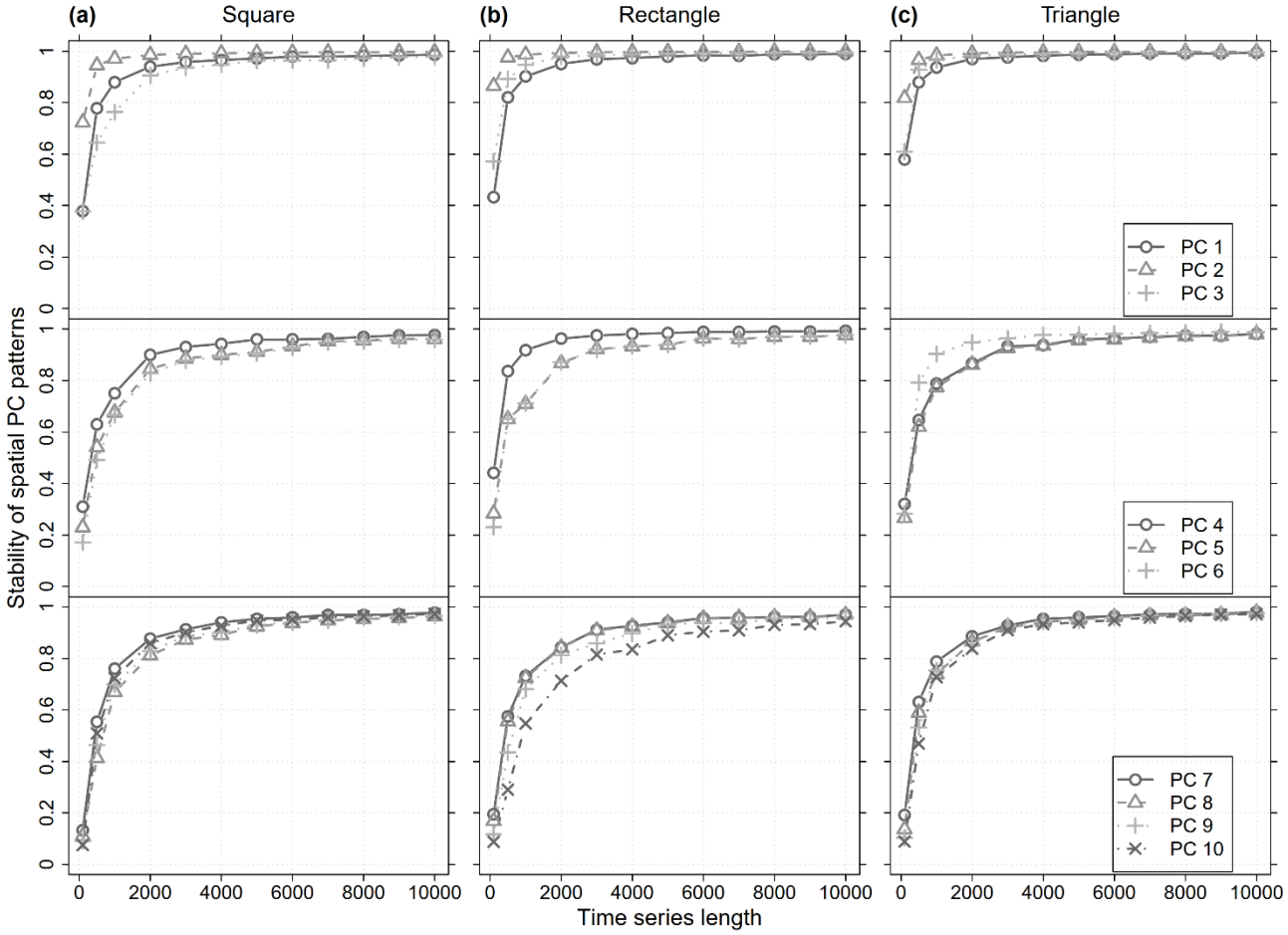

Figure S6 Stability of the spatial PC patterns from the anisotropic example in Figure S5 for the domain shapes (a) square, (b) rectangle and (c) triangle, all for different time series length of the simulated data. For each time series length 100 data sets were simulated with identical parametrisation. Each simulated data set was analysed separately with PCA. Symbols depict the mean R^2 of the correlation between the spatial patterns of all PCs with identical rank derived from the respective ensemble of all 100 simulated data sets. The legends in (c) apply also to (a) and (b) of the respective row.

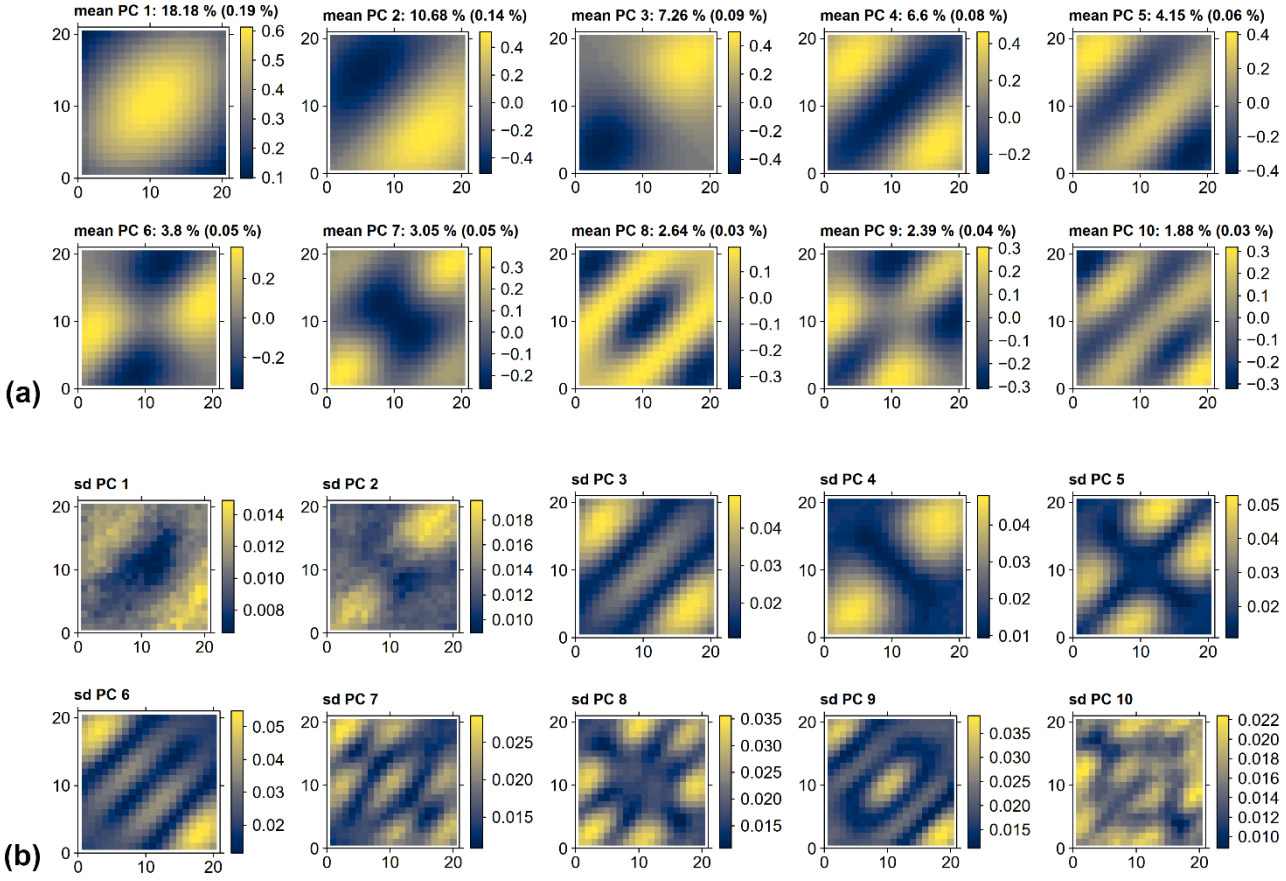

Figure S7 Detail plot of mean (a) and standard deviation (b) of the spatial patterns from the leading ten PCs of the data set ensemble with the square domain shown in Figure S5a. The mean (and standard deviation) of the fractions of variance assigned to the respective PCs from the 100 PCAs of the ensemble is given in the panel titles of (a).

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