# Spread of infectious diseases in large geographical areas. Supplementary Material

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15 May 2016

In this supplementary material we provide an alternative plot of the local powers $W_j^{f_k}$. In the main text, Fig. 4 shows the relative local power $\bar{W}_j^{f_k}$ of frequency $f_k$ defined as

$$\bar{W}_j^{f_k} = \frac{W_j^{f_k}}{\max_q W_j^{f_q}} \tag{1}$$

where the local power $W_j^{f_k}$ is defined as the contribution of frequency $f_k$ to the total local power $\int_{\mathbb{R}} P_j(f)\ df$

$$W_j^{f_k} = \frac{1}{\sqrt{2\pi}} \int_{\mathbb{R}} e^{-\frac{(f-f_k)^2}{2\sigma^2}} P_j(f)\ df$$

By normalizing the local power in cell $j$ according to (1) one can easily visualize which frequency is the most relevant for a specific area as well as comparing the relative importance of a specific frequency in neighbouring areas. In low populated areas however the main contribution is unstructured stochastic noise, thus all selected frequencies have the same importance and appear in red in all plots.

An alternative normalization often used to compare power spectra is obtained by normalizing by the total local power $\int_{\mathbb{R}} P_j(f)\ df$:

$$w_j^{f_k} = \frac{W_j^{f_k}}{\int_{\mathbb{R}} P_j(f)\ df}$$

Fig. 1 shows the normalized local powers $w_j^{f_k}$ plotted for all populated cells of the map and for the selected frequencies discussed in the main text. The normalization by the total power insures that stochastic noise has essentially no contribution, and the low populated areas appear in blue in all plots.

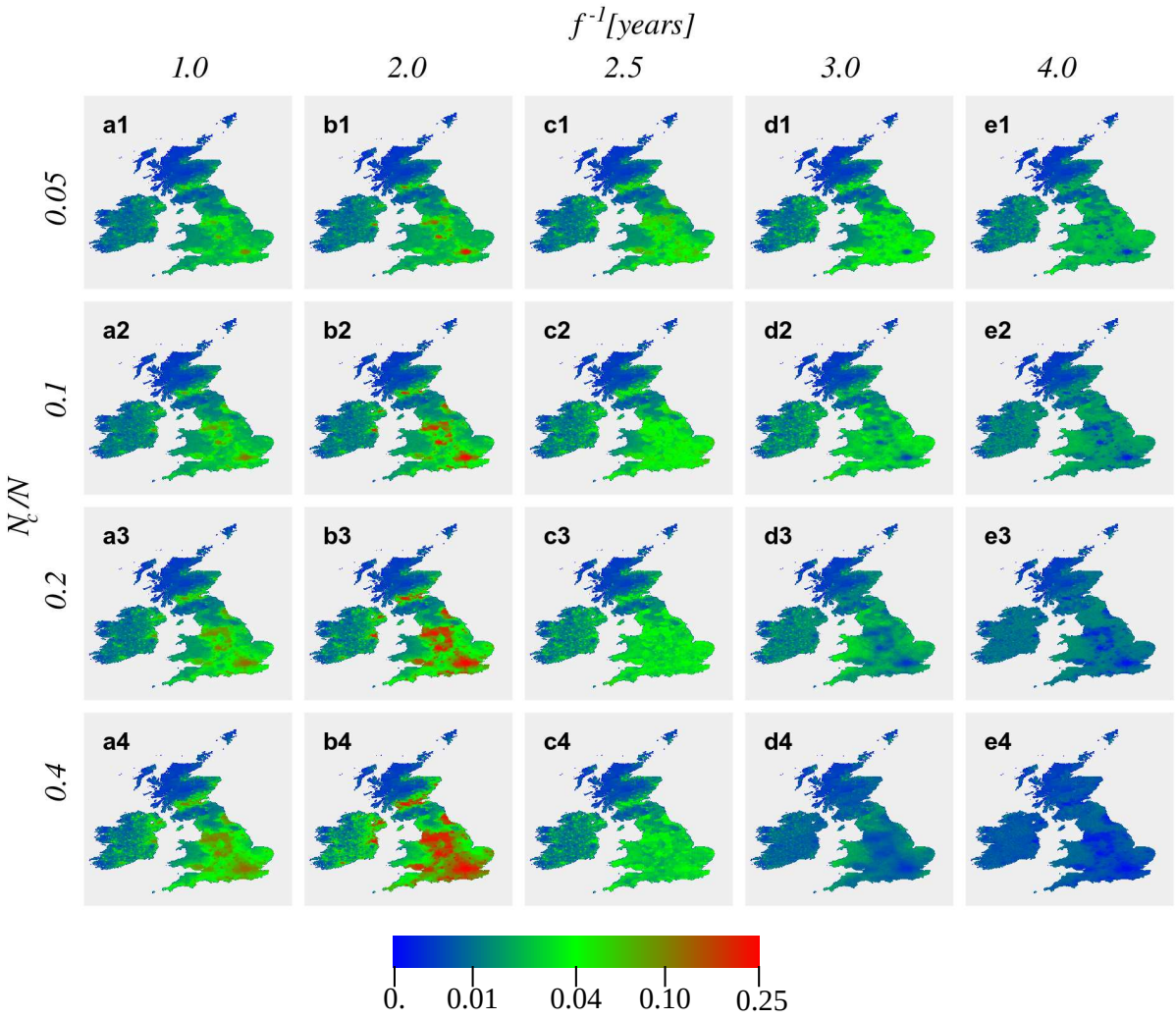


Figure 1: Normalized local powers $w_j^{f_k}$ for the different mobility ratios. Left to right (columns a-e): periodicities corresponding to 1, 2, 2.5, 3 and 4 years. Top to bottom (rows 1-4): mobility ratios corresponding to $N_c/N = 0.05$, $N_c/N = 0.1$, $N_c/N = 0.2$ and $N_c/N = 0.4$.