Supplementary material

May 22, 2020

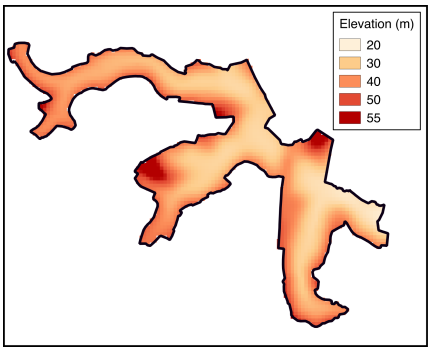
1 *Rattiness* model with only elevation as a covariate

Table 1: Parameter estimates for the full model for *rattiness* with only elevation as a covariate; β_1 is the regression coefficient associated with elevation.

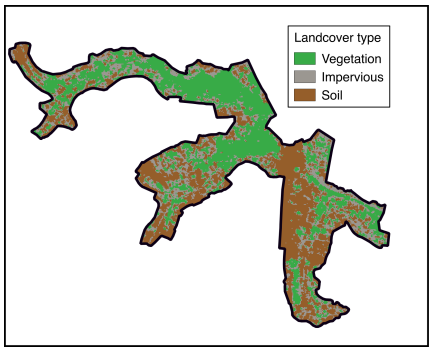
Parameter	**Estimate (95%CI)**
α_1	-0.639 $(-0.890, -0.414)$
α_2	-2.648 $(-3.044, -2.331)$
α_3	-2.473 $(-2.900, -2.091)$
σ_1	0.764 $(0.471, 1.083)$
σ_2	0.932 $(0.632, 1.219)$
σ_3	1.901 $(1.597, 2.224)$
ϕ	14.933 $(9.351, 25.786)$
ψ	0.939 $(0.615, 1.000)$
β_1	-0.184 $(-0.362, -0.020)$

2 Description of covariate data

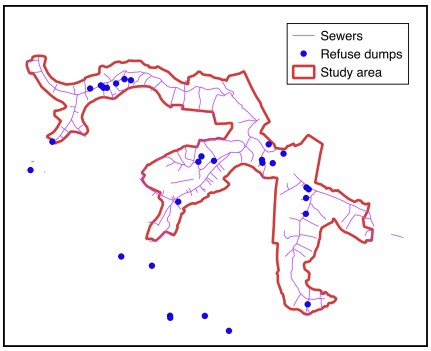
Maps of the explanatory variables are shown in Figure 1. All three valleys have similar elevation profiles (Figure 1a), with low elevations of between 20-30 m above sea level in the central areas and steep gradients on both sides reaching elevations of over 30 m over a horizontal distance of 10-20 m. The three valleys contain all three types of land cover, although their spatial distribution is often heterogeneous. Valley 1 and the northern section of Valley 2 have a considerably higher proportion of vegetation than the rest of the study area (Figure 1b). Valley 3 has a large area of exposed soil. The refuse dump sites were generally located at the lowest point of the valleys or on higher level areas outside of the study area (Figure 1c). Clustering of refuse sites can be seen in each valley.



(a) Elevation



(b) Land cover classification



(c) Locations of refuse dumps (dots)

Figure 1: *Maps of the study area showing elevation, land cover classification and the locations of refuse dumps.*