Supplementary Materials: Modelling the Whole Profile Soil Organic Carbon Dynamics Considering Soil Redistribution under Future Climate Change and Landscape Projections over the Lower Hunter Valley, Australia

Yuxin Ma, Budiman Minasny, Valérie Viaud, Christian Walter, Brendan Malone and Alex McBratney

Table S1. Relative differences in percentiles (10th, 50th and 90th) for observed SOC stocks in 2016 in five fields and entire study area (t C ha^{-1}).

Location	0-30 cm			30-60 cm			60-100 cm		
	10th	50th	90th	10th	50th	90th	10th	50th	90th
Benwarin	50.6	70.2	96.6	16.5	23.0	27.3	14.4	19.2	26.8
Breamore	16.4	26.0	33.2	6.0	12.4	17.7	3.3	10.1	18.7
Draytons	26.1	34.2	46.4	15.7	21.1	30.3	15.4	25.4	33.6
Scarborough	53.8	69.0	89.0	20.3	29.4	53.5	11.0	21.4	34.8
Talavera	36.8	62.3	113.3	15.4	26.8	58.1	14.8	26.6	41.7
Entire Study area	28.4	55.7	94.5	9.6	22.8	49.2	5.6	18.5	35.1

Table S2. Eight selected models from the 40 CMIP5 models.

Eight models	Institute	Climate Futures
ACCESS1.0	CSIRO-BOM, Australia	Maximum consensus for many regions
CanESM2	CCCMA, Canada	
CESM1-CAM5	NSF-DOE-NCAR, USA	Hotter and wetter, or hotter and least drying
CNRM-CM5	CNRM-CERFACS, France	Hot /wet end of the range in Southern Australia
GFDL-ESM2M	NOAA, GFDL, USA	Hotter and drier model for many clusters
HadGEM2-CC	MOHC, UK	Maximum consensus for many regions
MIROC5	JAMSTEC, Japan	Low warming wetter model
NorESM1-M	NCC, Norway	Low warming wettest representative model

Table S3 Characteristic of mean monthly rainfall (mm) and temperature (°C) for the BAU and climate change scenarios (period 2017–2045).

	BAU	**Climate change**	
		RCP4.5	RCP8.5
Mean rainfall (mm)	95.59	63.74	64.14
Mean temperature (°C)	18.93	18.39	18.62

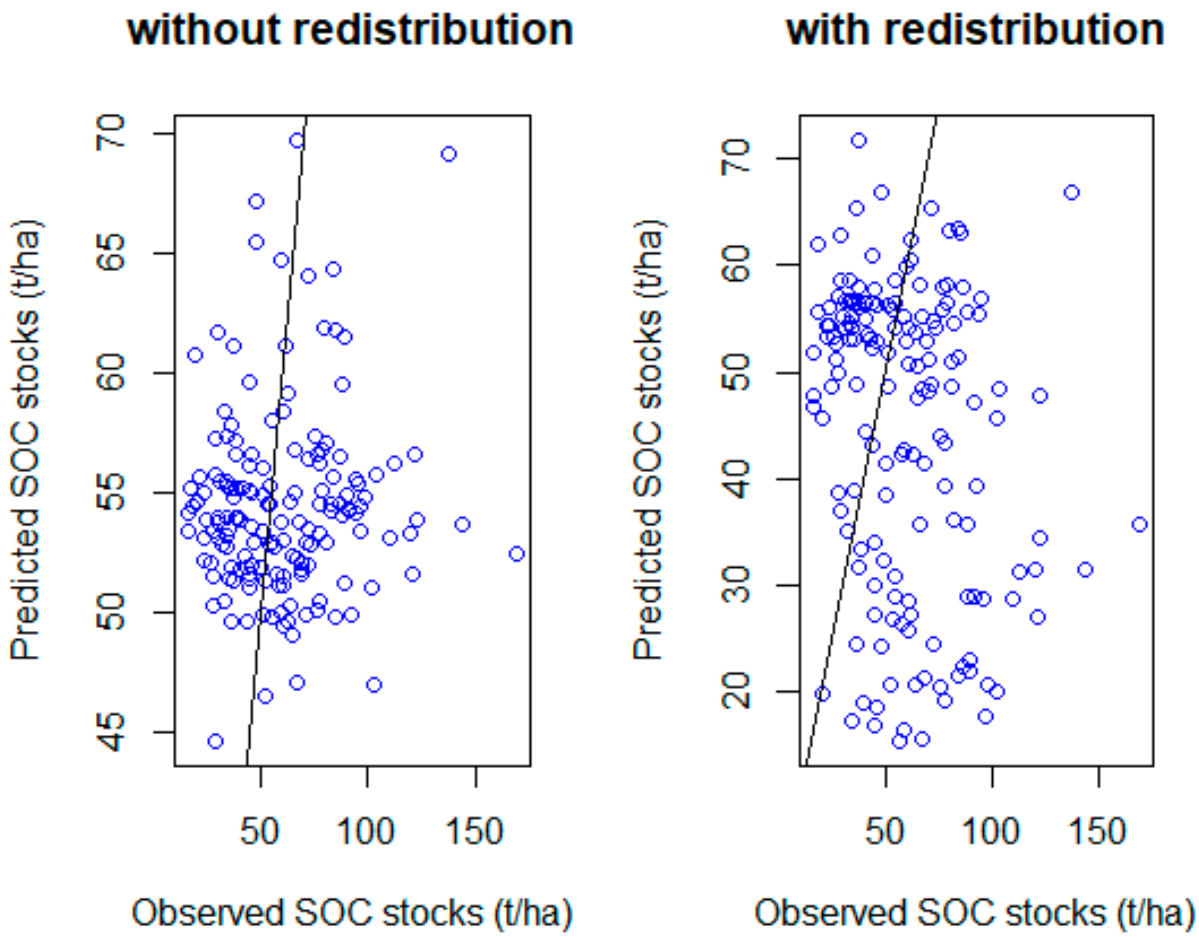

Figure S1. Fits of observed vs. modelled SOC stocks in the 0–30 cm soil layer in 2016 for the entire study area. The line is 1:1 line.

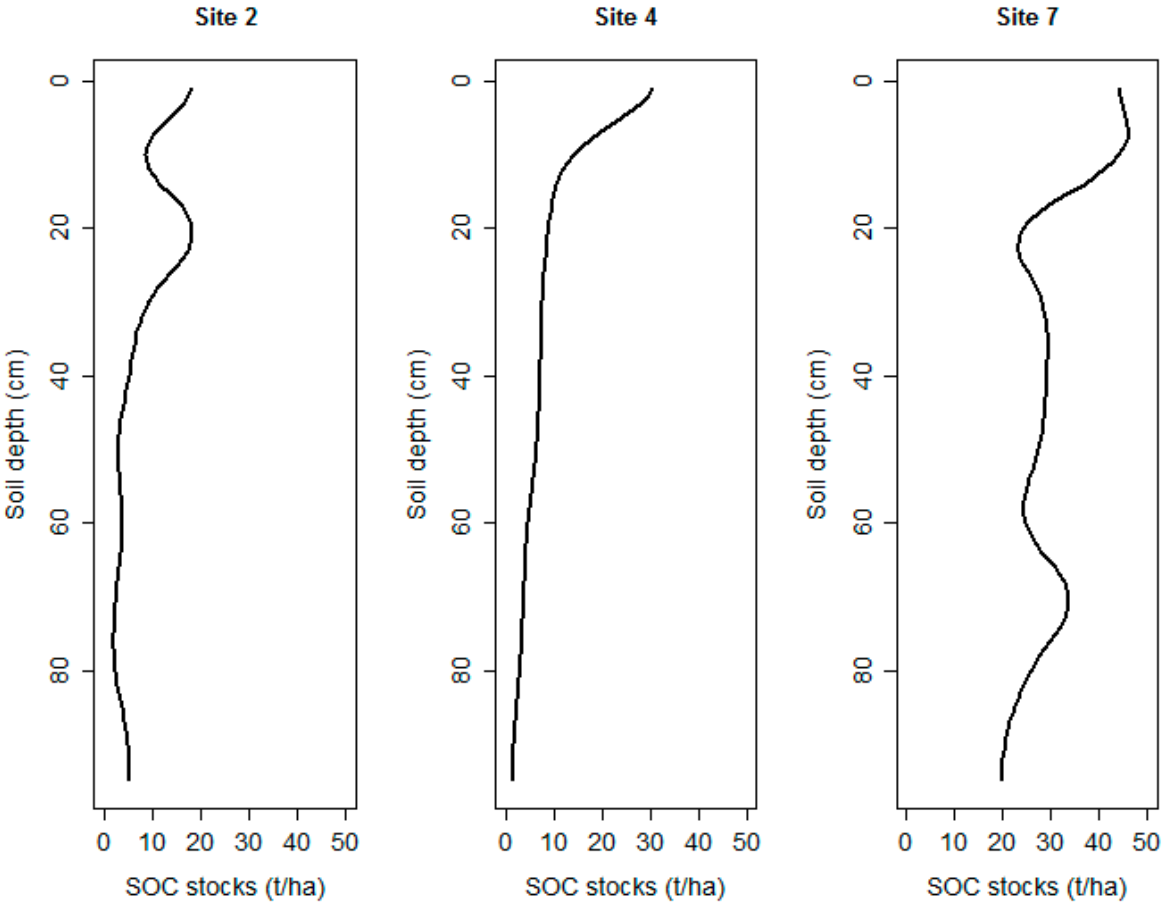

Figure S2. SOC stocks of three profiles (site 2 (top of hill), site 4 (middle) and site 7 (bottom).

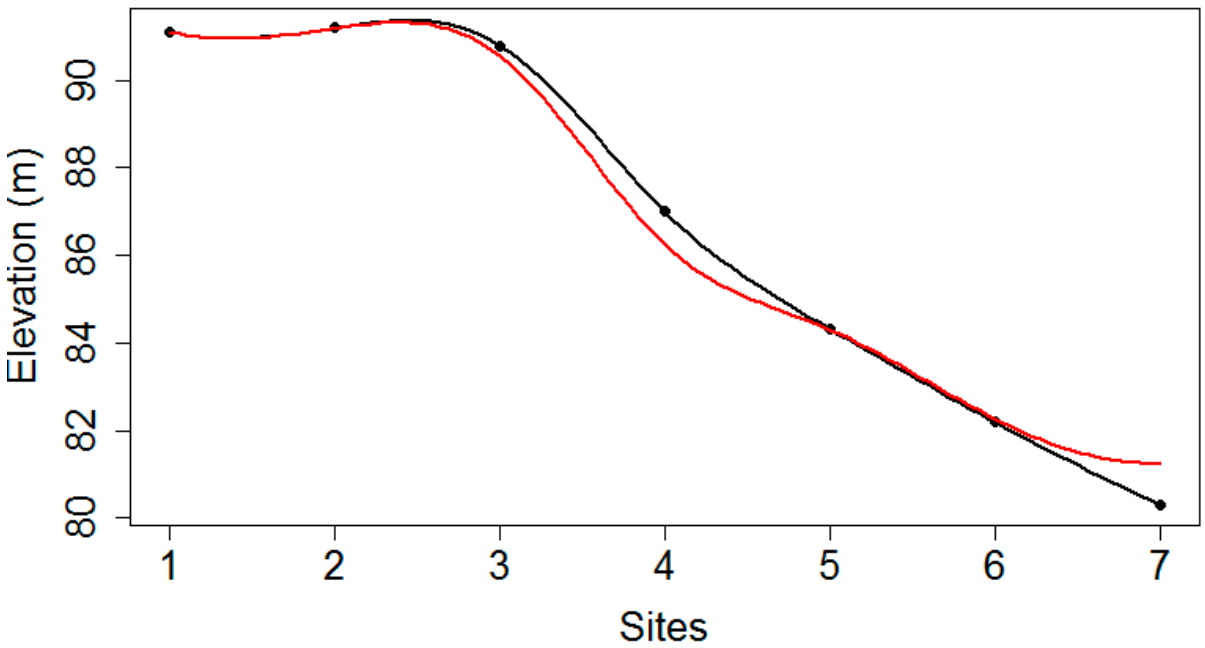

Figure S3. Elevation change of the transect for 100 years. The black line is the current elevation and the red line is simulated elevation after 100 years.

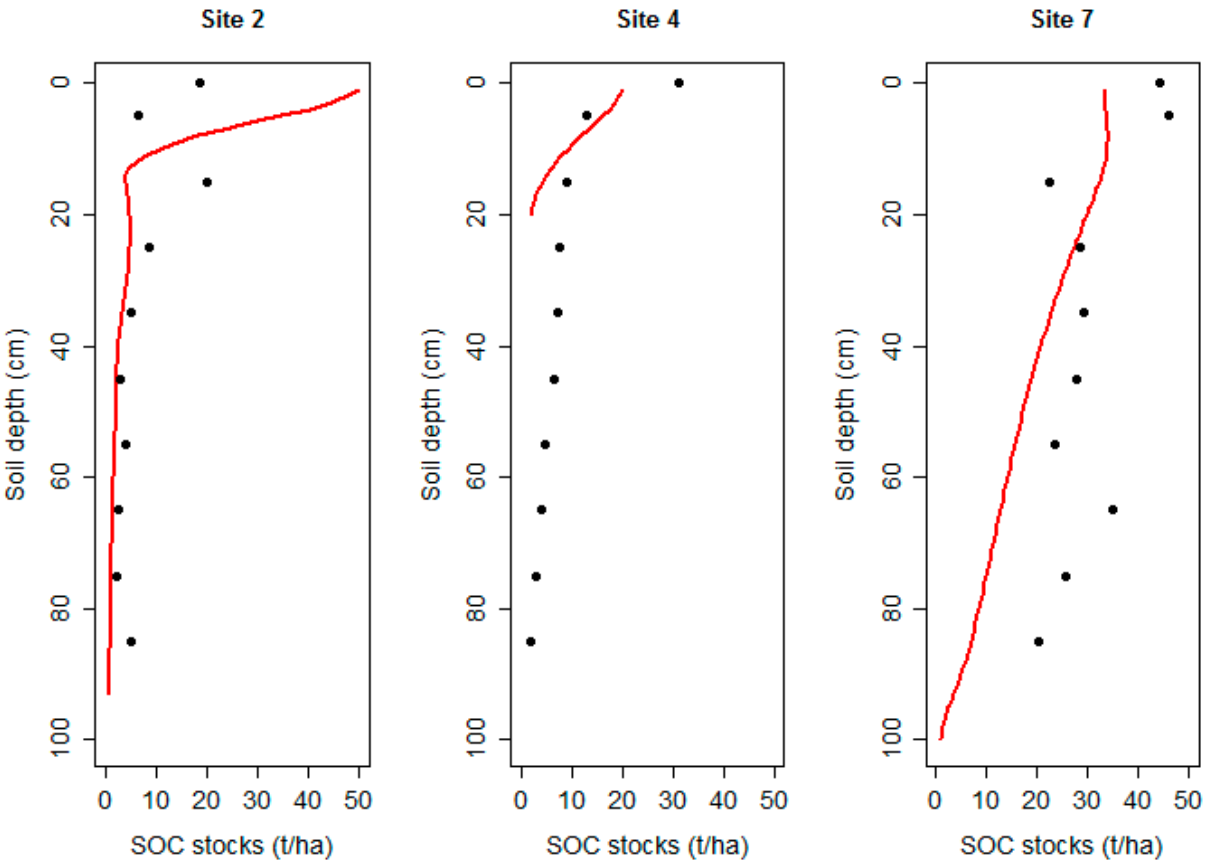

Figure S4. Comparison between observations (black dots) and simulations after 100 years for site 2, 4 and 7 (red line).

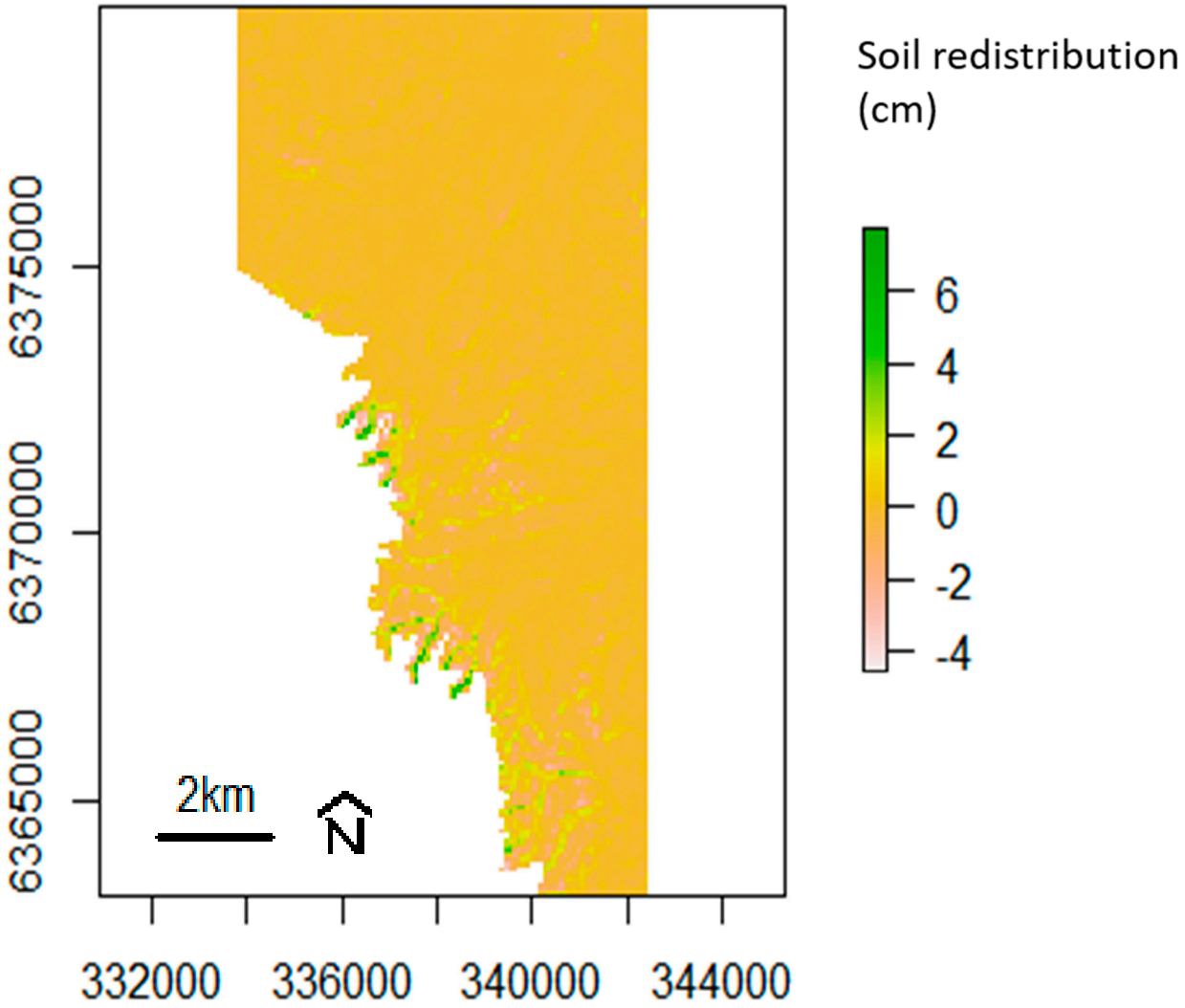

Figure S5. Maps of stable areas, areas with net soil erosion and net deposition.