

**Additional file 1:****Table S1 General circulation models and the two emissions scenarios used in our models**

<b>General circulation model</b>	<b>RCP<sup>a</sup></b>	<b>Year</b>	<b>Resolution (min.)</b>
bcc_csm1_1_m	4.5, 8.5	2050	2.5
bcc_csm1_1	4.5, 8.5	2050	2.5
bnu_esm	4.5, 8.5	2050	2.5
cccma_canesm2	4.5, 8.5	2050	2.5
cesm1_bgc	4.5, 8.5	2050	2.5
cesm1_cam5	4.5, 8.5	2050	2.5
csiro_access1_0	4.5, 8.5	2050	2.5
csiro_access1_3	4.5, 8.5	2050	2.5
csiro_mk3_6_0	4.5, 8.5	2050	2.5
fio_esm	4.5, 8.5	2050	2.5
gfdl_esm2g	4.5, 8.5	2050	2.5
gfdl_esm2m	4.5, 8.5	2050	2.5
giss_e2_r	4.5, 8.5	2050	2.5
inm_cm4	4.5, 8.5	2050	2.5
ipsl_cm5a_lr	4.5, 8.5	2050	2.5
ipsl_cm5a_mr	4.5, 8.5	2050	2.5
lasg_fgoals_g2	4.5, 8.5	2050	2.5
miroc_esm_chem	4.5, 8.5	2050	2.5
miroc_esm	4.5, 8.5	2050	2.5
miroc_miroc5	4.5, 8.5	2050	2.5
mohc_hadgem2_cc	4.5, 8.5	2050	2.5
mohc_hadgem2_es	4.5, 8.5	2050	2.5
mpi_esm_lr	4.5, 8.5	2050	2.5
mri_cgcm3	4.5, 8.5	2050	2.5
ncar_ccsm4	4.5, 8.5	2050	2.5
ncc_noresm1_m	4.5, 8.5	2050	2.5
nimr_hadgem2_ao	4.5, 8.5	2050	2.5

<sup>a</sup> IPCC Representative concentration pathway emissions scenarios.

**Table S2 Metrics of final best models selected from the calibration of climatic and MODIS data**

<b>Model</b>	<b>AUC ratio</b>	<b>Partial ROC</b>	<b>5% Omission rate</b>	<b>AICc score</b>	<b>Weighted AICc</b>	<b>Parameters</b>	<b>Sample size</b>
Climate	1.78	0	0	573	0.55	9	31
MODIS	1.74	0	0	1723	0.55	10	67