List of environmental factors and their contribution:

Layers	Abbreviations	% Contribution	Source	Date	Access Year	Unit (Raw data)
aspect	Aspect	3.6	SRTM	2012	5/1/2019	90 m
bio1	Annual Mean Temperature	0.5	Bioclim	2019	5/1/2019	250 m
bio2	Mean Diurnal Range	3.3	Bioclim	2019	5/1/2019	250 m
bio3	Isothermality	3.1	Bioclim	2019	5/1/2019	250 m
bio6	Min Temperature of Coldest Month	3.6	Bioclim	2019	5/1/2019	250 m
bio7	Temperature Annual Range (BIO5-BIO6)	14.4	Bioclim	2019	5/1/2019	250 m
bio8	Mean Temperature of Wettest Quarter	7	Bioclim	2019	5/1/2019	250 m
bio12	Annual Precipitation	19.2	Bioclim	2019	5/1/2019	250 m
bio14	Precipitation of Driest Month	1.1	Bioclim	2019	5/1/2019	250 m
bio15	Precipitation Seasonality	1.3	Bioclim	2019	5/1/2019	250 m
bio19	Precipitation of Coldest Quarter	4.8	Bioclim	2019	5/1/2019	250 m
dem	Digital Elevation Model	1.7	SRTM	2012	5/1/2019	90 m
dist-river	Euclidean Distance of River	0.9	Sikkim Forest Department	2018	5/1/2019	
ndvi_04	Normalize Difference Vegetaion Index (April)	1.2	MODIS	2017	5/1/2019	250 m
ndvi_05	Normalize Difference Vegetaion Index (May)	2.1	MODIS	2017	5/1/2019	250 m
ndvi_06	Normalize Difference Vegetaion Index (June)	2.6	MODIS	2017	5/1/2019	250 m
ndvi_07	Normalize Difference Vegetaion Index (July)	4.1	MODIS	2017	5/1/2019	250 m
ndvi_08	Normalize Difference Vegetaion Index (August)	1.3	MODIS	2017	5/1/2019	250 m
ndvi_09	Normalize Difference Vegetaion Index (September)	1.9	MODIS	2017	5/1/2019	250 m
ndvi_10	Normalize Difference Vegetaion Index (October)	2.5	MODIS	2017	5/1/2019	250 m
nightlight	Nightlight Data	2.1	VIIRS NOAA Night time data	2015	5/1/2019	500 m
slope	Slope	11.7	SRTM	2012	5/1/2019	90 m
Forest_ed	Euclidean Distance of Forest type	4.1	Sikkim Forest Department	2018	5/1/2019	

pa_ed	Euclidean Distance of Protected Areas	2	Sikkim Forest Department	2018	5/1/2019	

List of All variables

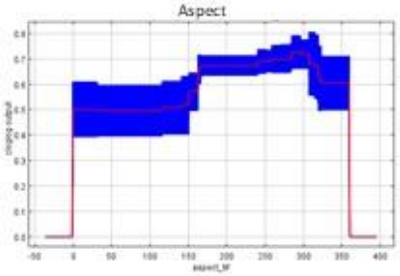
Layers	Abbreviations	Source	Date	Access Year	Unit
aspect	Aspect	SRTM	2012	5/1/2019	90 m
bio1	Annual Mean Temperature	Bioclim	2019	5/1/2019	250 m
bio2	Mean Diurnal Range	Bioclim	2019	5/1/2019	250 m
bio3	Isothermality	Bioclim	2019	5/1/2019	250 m
bio4	Temperature Seasonality	Bioclim	2019	5/1/2019	250 m
bio5	Max Temperature of Warmest Month	Bioclim	2019	5/1/2019	250 m
bio6	Min Temperature of Coldest Month	Bioclim	2019	5/1/2019	250 m
bio7	Temperature Annual Range (BIO5-BIO6)	Bioclim	2019	5/1/2019	250 m
bio8	Mean Temperature of Wettest Quarter	Bioclim	2019	5/1/2019	250 m
bio9	Mean Temperature of Driest Quarter	Bioclim	2019	5/1/2019	250 m
bio10	Mean Temperature of Warmest Quarter	Bioclim	2019	5/1/2019	250 m
bio11	Mean Temperature of Coldest Quarter	Bioclim	2019	5/1/2019	250 m
bio12	Annual Precipitation	Bioclim	2019	5/1/2019	250 m
bio13	Precipitation of Wettest Month	Bioclim	2019	5/1/2019	250 m
bio14	Precipitation of Driest Month	Bioclim	2019	5/1/2019	250 m
bio15	Precipitation Seasonality	Bioclim	2019	5/1/2019	250 m
bio16	Precipitation of Wettest Quarter	Bioclim	2019	5/1/2019	250 m
bio17	Precipitation of Driest Quarter	Bioclim	2019	5/1/2019	250 m
bio18	Precipitation of Warmest Quarter	Bioclim	2019	5/1/2019	250 m
bio19	Precipitation of Coldest Quarter	Bioclim	2019	5/1/2019	250 m
dem	Digital Elevation Model	SRTM	2012	5/1/2019	90 m
dist-river	Euclidean Distance of River	Sikkim Forest Department	2018	5/1/2019	
ndvi_01	Normalize Difference Vegetaion Index (January)	MODIS	2017	5/1/2019	250 m
ndvi_02	Normalize Difference Vegetaion Index (February)	MODIS	2017	5/1/2019	250 m

ndvi_03	Normalize Difference Vegetaion Index (March)	MODIS	2017	5/1/2019	250 m
ndvi_04	Normalize Difference Vegetaion Index (April)	MODIS	2017	5/1/2019	250 m
ndvi_05	Normalize Difference Vegetaion Index (May)	MODIS	2017	5/1/2019	250 m
ndvi_06	Normalize Difference Vegetaion Index (June)	MODIS	2017	5/1/2019	250 m
ndvi_07	Normalize Difference Vegetaion Index (July)	MODIS	2017	5/1/2019	250 m
ndvi_08	Normalize Difference Vegetaion Index (August)	MODIS	2017	5/1/2019	250 m
ndvi_09	Normalize Difference Vegetaion Index (September)	MODIS	2017	5/1/2019	250 m
ndvi_10	Normalize Difference Vegetaion Index (October)	MODIS	2017	5/1/2019	250 m
ndvi_11	Normalize Difference Vegetaion Index (November)	MODIS	2017	5/1/2019	250 m
ndvi_12	Normalize Difference Vegetaion Index (December)	MODIS	2017	5/1/2019	250 m
nightlight	Nightlight Data	VIIRS NOAA Night time data	2015	5/1/2019	
slope	Slope	SRTM	2012	5/1/2019	90 m
Forest_ed	Euclidean Distance of Forest type	Sikkim Forest Department	2018	5/1/2019	
pa_ed	Euclidean Distance of Protected Areas	Sikkim Forest Department	2018	5/1/2019	

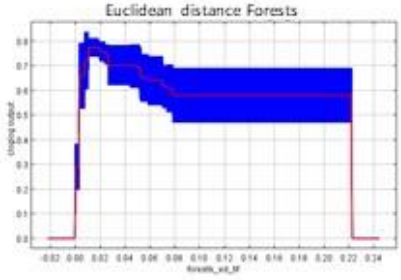
Id	PA1	PA2	Euclidean Distance (eucDist, km)	Least Cost Distance (km)	Least Cost Path Length (LCP, km)	CWD:EucD	CWD:LCP
1	Kyongnosla	Fambonglho	9.93	73.83	10.83	7.44	6.82
2	Kyongnosla	Khangchendzonga	20.32	170.36	25.75	8.39	6.62
3	Kyongnosla	Pangalokha	6.75	76.60	7.39	11.35	10.37

4	Kyongnosla	Singba	32.45	339.30	33.29	10.46	10.19
5	Fambonglho	Kitam	20.75	175.80	23.12	8.47	7.60
6	Fambonglho	Khangchendzonga	18.01	122.54	19.86	6.80	6.17
7	Fambonglho	Maenam	6.56	52.34	7.66	7.97	6.83
8	Fambonglho	Pangalokha	17.60	126.87	20.35	7.21	6.23
9	Kitam	Maenam	20.92	149.67	24.67	7.15	6.07
10	Kitam	Pangalokha	33.02	316.04	36.28	9.57	8.71
11	Kitam	Barsey	14.31	131.56	15.81	9.20	8.32
12	Khangchendzonga	Maenam	8.11	66.02	9.21	8.14	7.17
13	Khangchendzonga	Singba	12.79	134.46	13.11	10.51	10.26
14	Khangchendzonga	Barsey	15.27	57.06	17.28	3.74	3.30
15	Barsey	Maenam	15.51	89.34	23.82	5.76	3.75

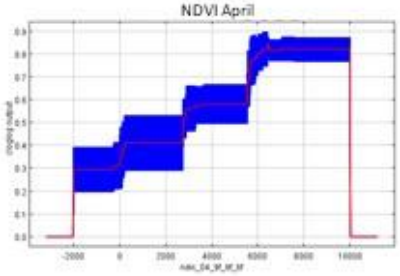
Aspect



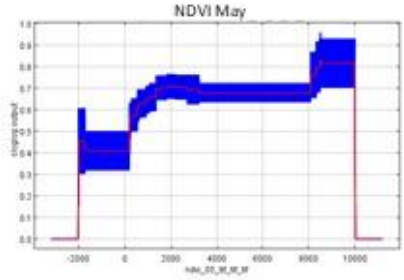
Euclidean distance Forests



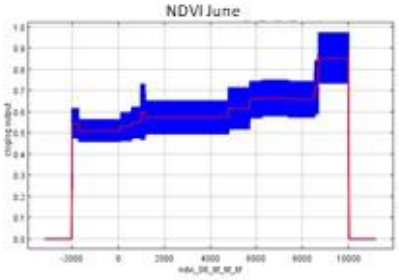
NDVI April



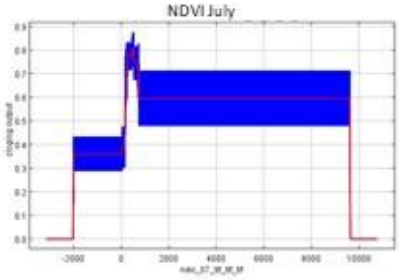
NDVI May



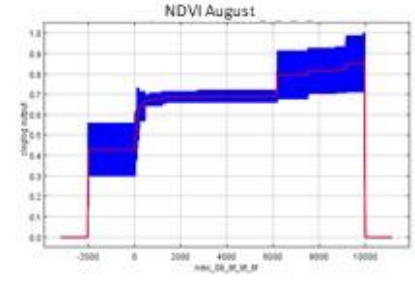
NDVI June



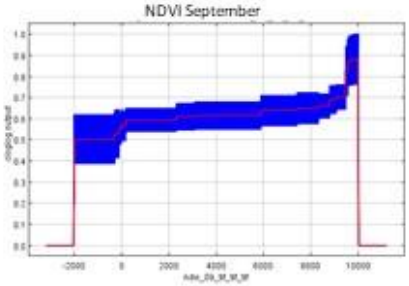
NDVI July



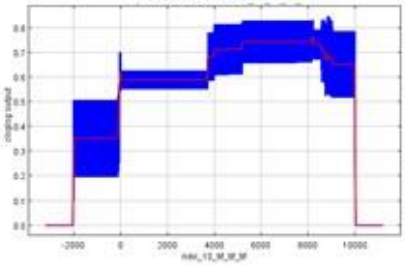
NDVI August



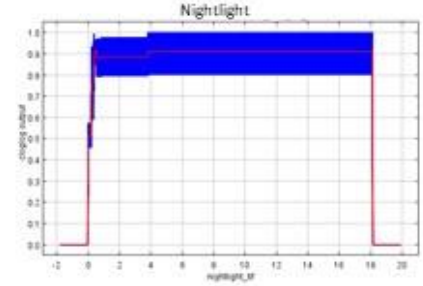
NDVI September



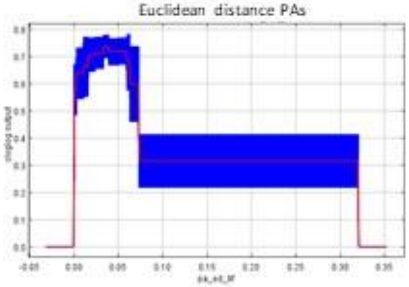
NDVI October



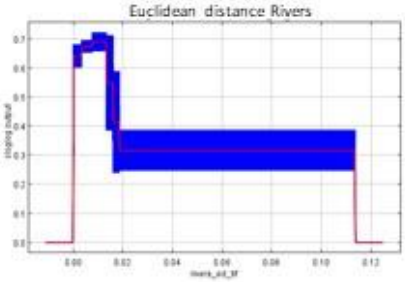
Nightlight



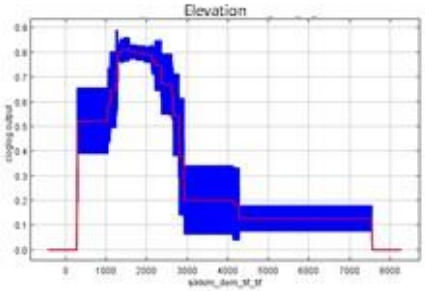
Euclidean distance PAs



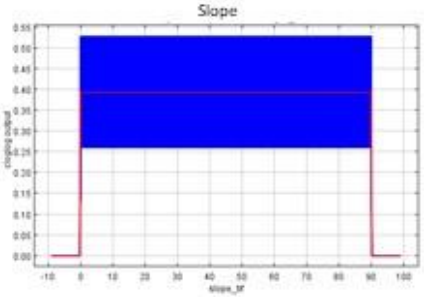
Euclidean distance Rivers

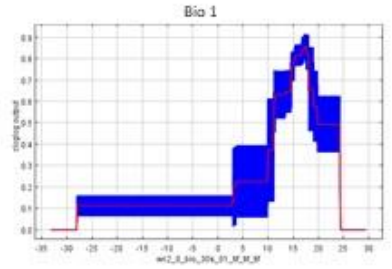


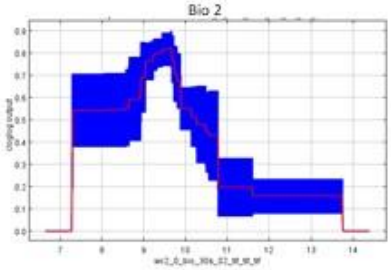
Elevation

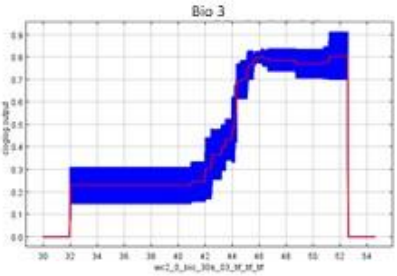


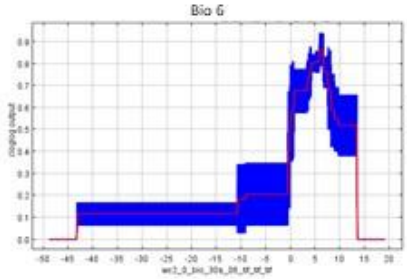
Slope

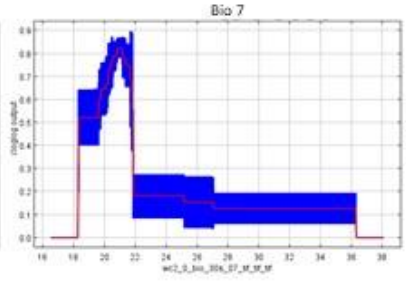


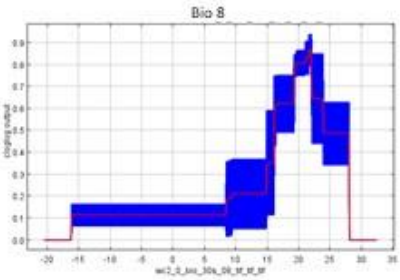

Bio 1

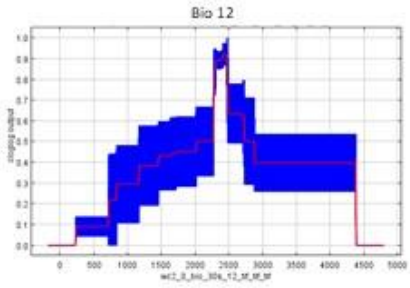

Bio 2

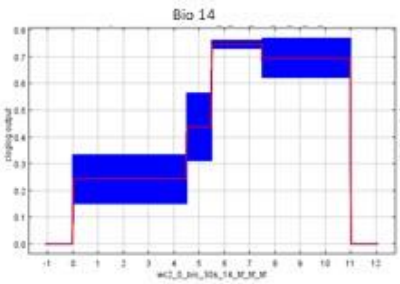

Bio 3

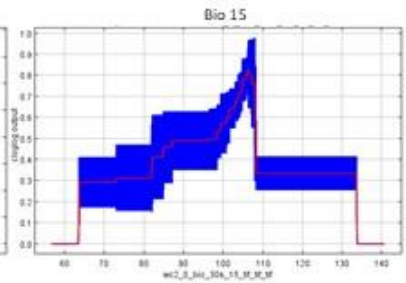

Bio 6

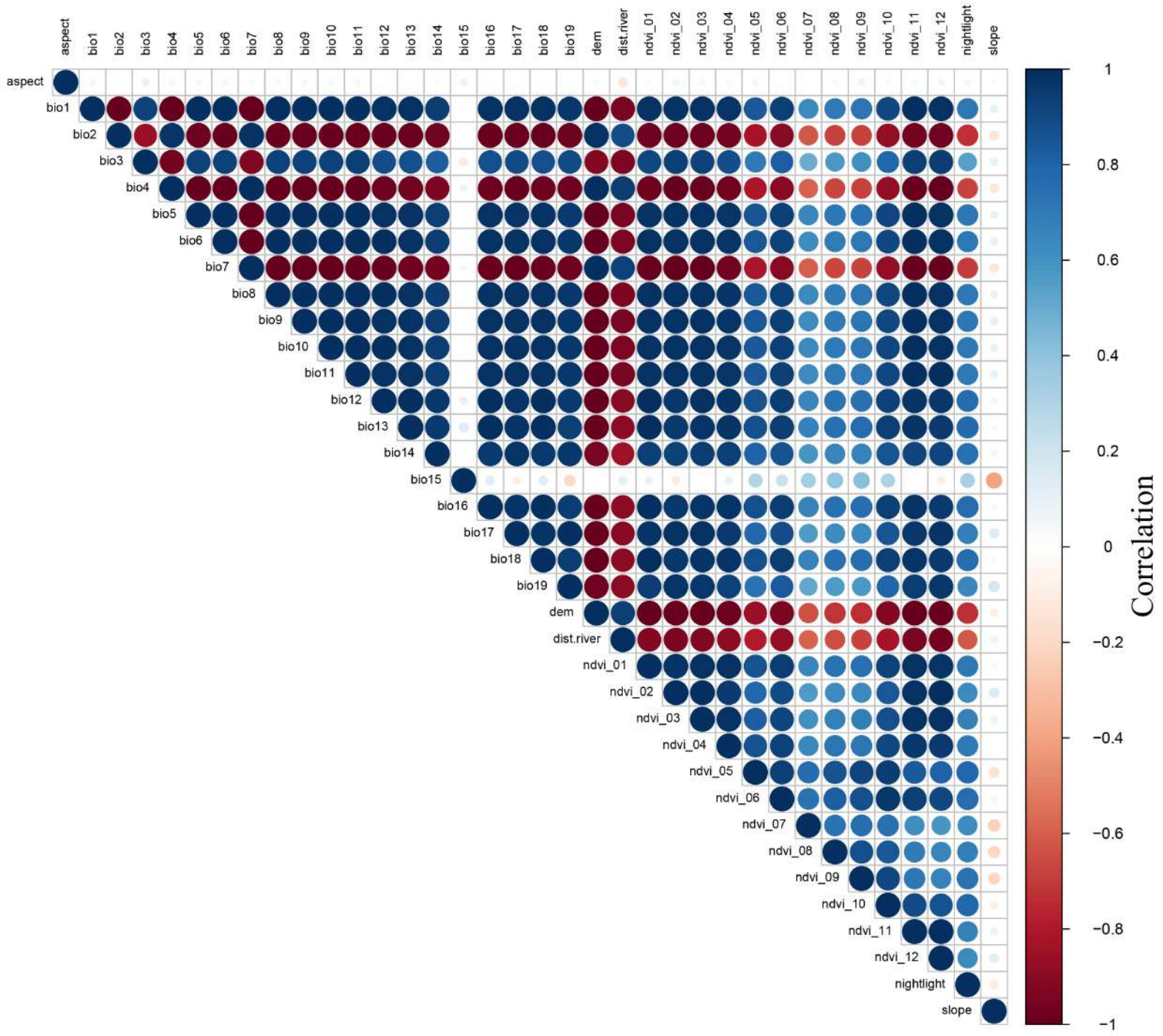

Bio 7

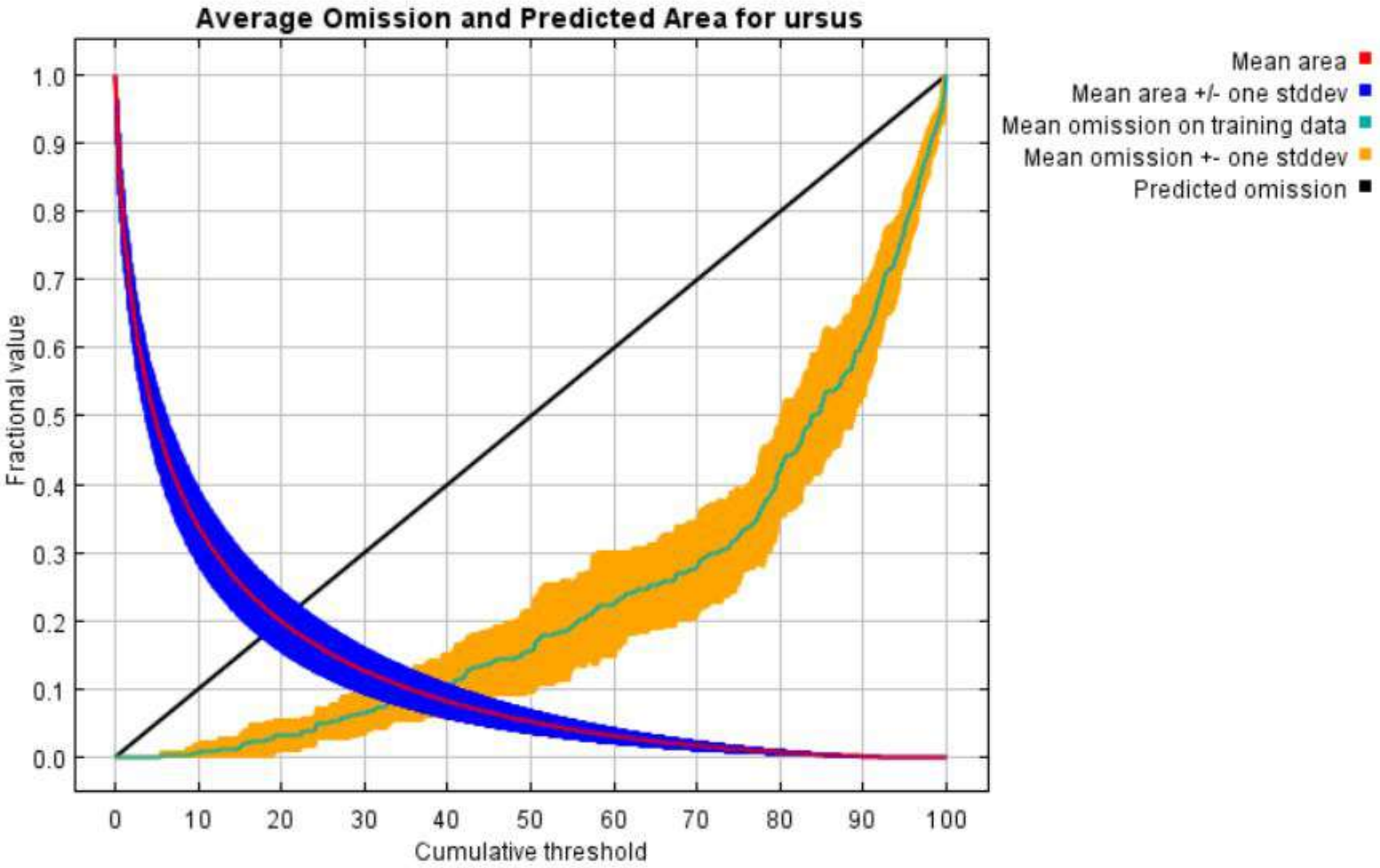

Bio 8

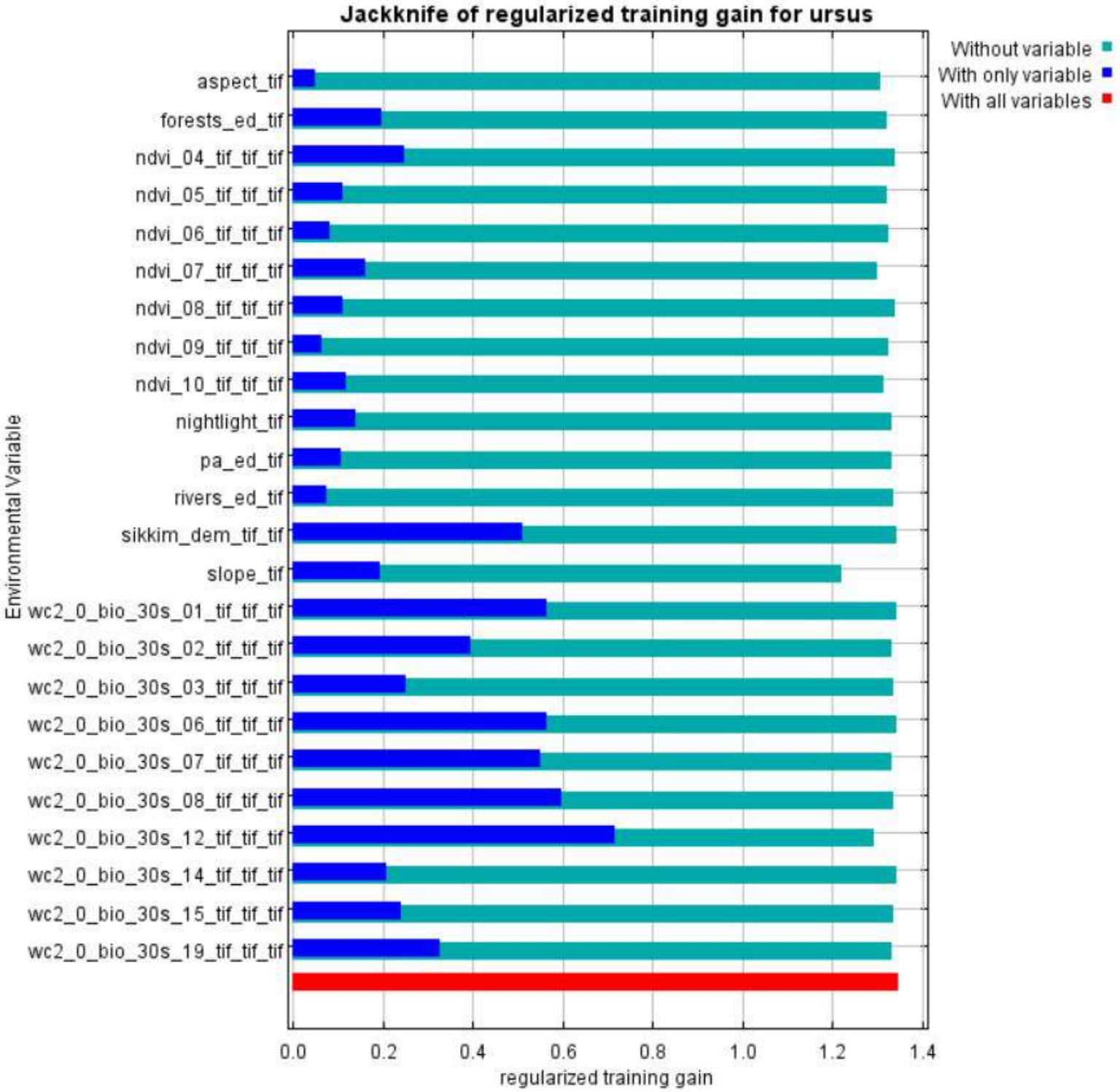

Bio 12

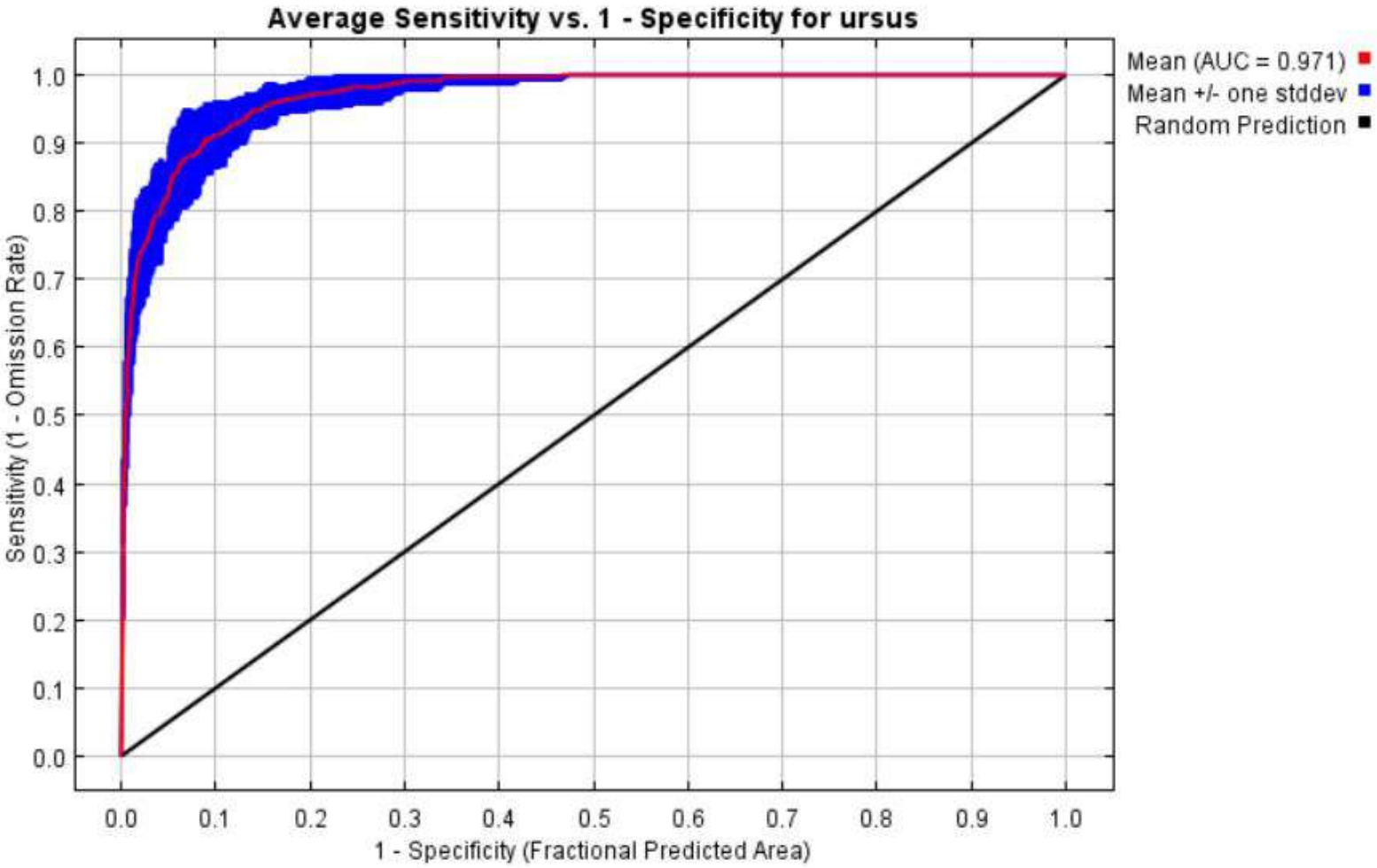

Bio 14

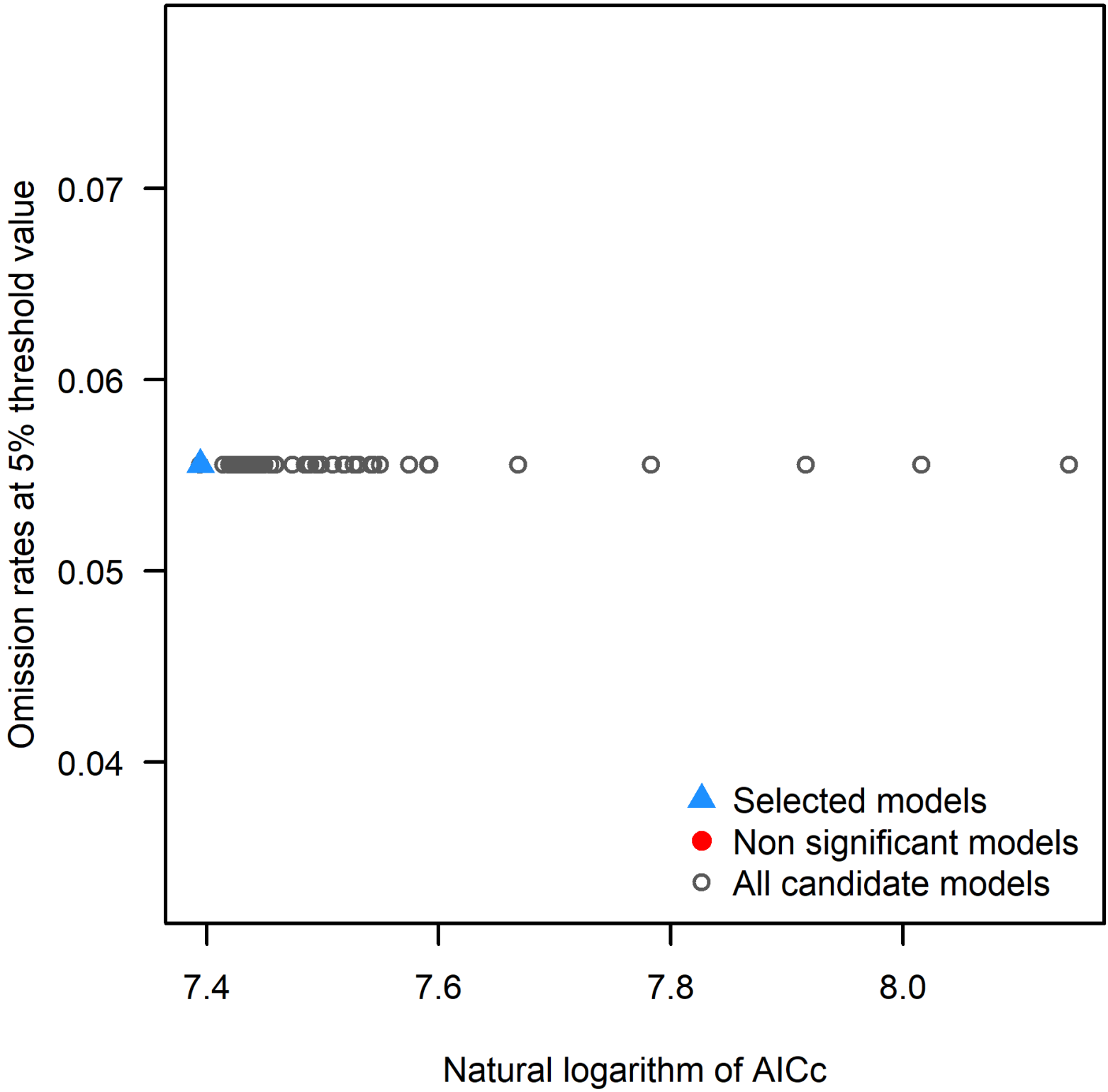

Bio 15


aspect
bio1
bio2
bio3
bio4
bio5
bio6
bio7
bio8
bio9
bio10
bio11
bio12
bio13
bio14
bio15
bio16
bio17
bio18
bio19
dem
dist.river
ndvi_01
ndvi_02
ndvi_03
ndvi_04
ndvi_05
ndvi_06
ndvi_07
ndvi_08
ndvi_09
ndvi_10
ndvi_11
ndvi_12
nightlight
slope
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
Correlation


Average Omission and Predicted Area for ursus
Fractional value
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
10
20
30
40
50
60
70
80
90
100
Cumulative threshold
Mean area
Mean area +/- one stddev
Mean omission on training data
Mean omission +- one stddev
Predicted omission


Jackknife of regularized training gain for ursus
Without variable
With only variable
With all variables
aspect_tif
forests_ed_tif
ndvi_04_tif_tif_tif
ndvi_05_tif_tif_tif
ndvi_06_tif_tif_tif
ndvi_07_tif_tif_tif
ndvi_08_tif_tif_tif
ndvi_09_tif_tif_tif
ndvi_10_tif_tif_tif
nightlight_tif
pa_ed_tif
rivers_ed_tif
sikkim_dem_tif_tif
slope_tif
wc2_0_bio_30s_01_tif_tif_tif
wc2_0_bio_30s_02_tif_tif_tif
wc2_0_bio_30s_03_tif_tif_tif
wc2_0_bio_30s_06_tif_tif_tif
wc2_0_bio_30s_07_tif_tif_tif
wc2_0_bio_30s_08_tif_tif_tif
wc2_0_bio_30s_12_tif_tif_tif
wc2_0_bio_30s_14_tif_tif_tif
wc2_0_bio_30s_15_tif_tif_tif
wc2_0_bio_30s_19_tif_tif_tif
Environmental Variable
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
regularized training gain


Average Sensitivity vs. 1 - Specificity for ursus
Mean (AUC = 0.971)
Mean +/- one stddev
Random Prediction
Sensitivity (1 - Omission Rate)
1 - Specificity (Fractional Predicted Area)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0

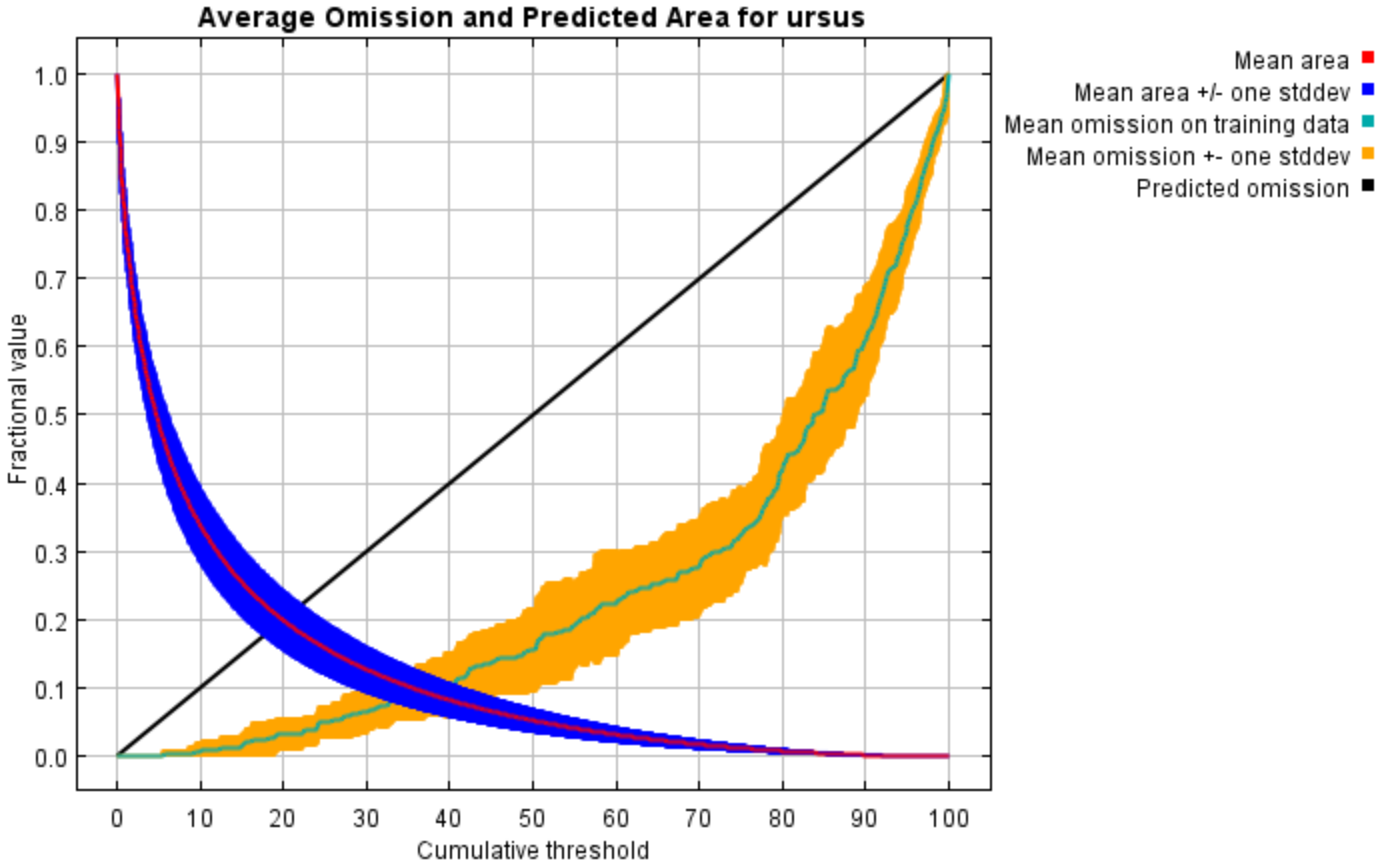

Omission rates at 5% threshold value
0.07
0.06
0.05
0.04
Selected models
Non significant models
All candidate models
7.4
7.6
7.8
8.0
Natural logarithm of AICc

Replicated maxent model for ursus

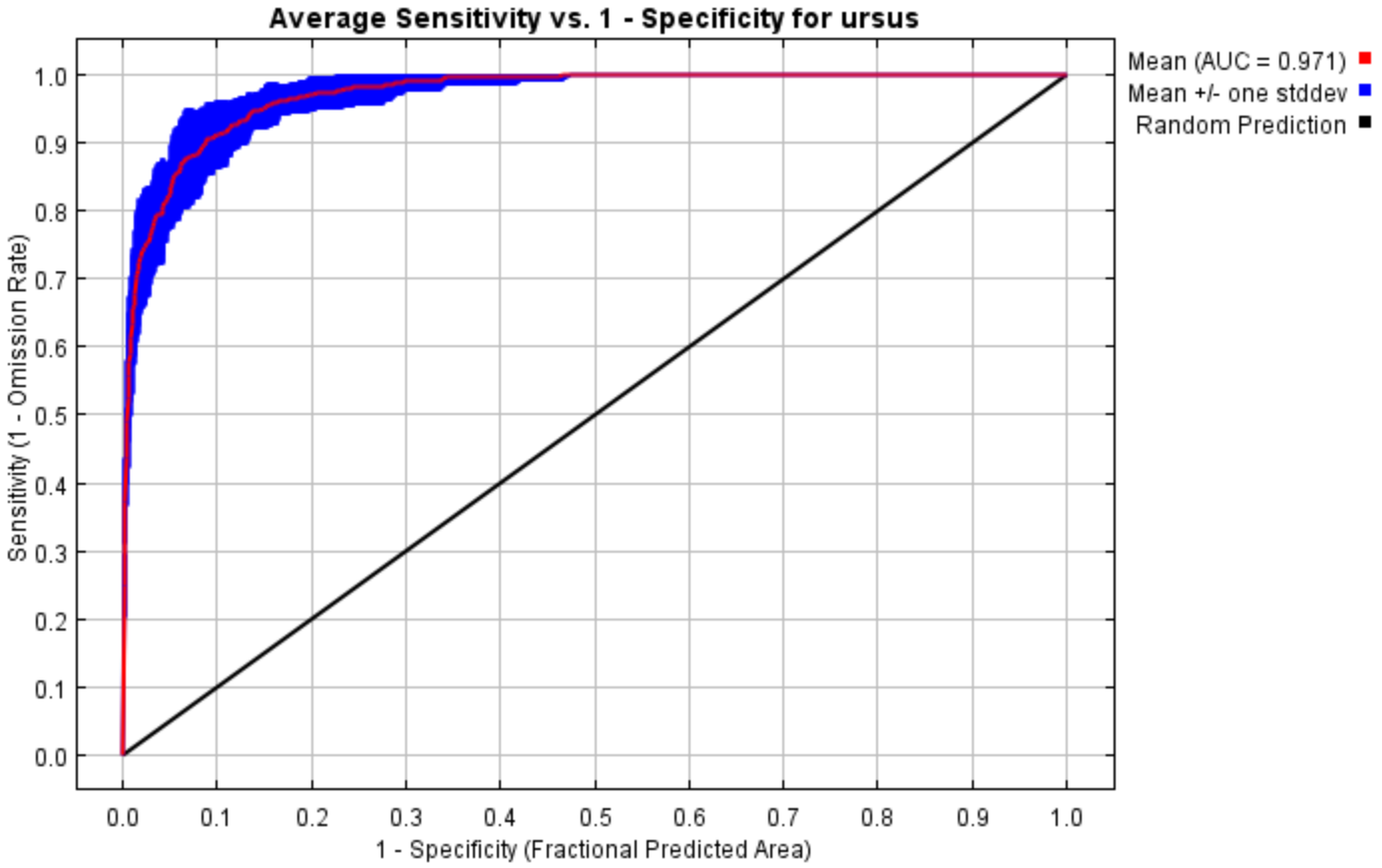
This page summarizes the results of 10 bootstrap models for ursus, created Thu Apr 08 18:07:58 IST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

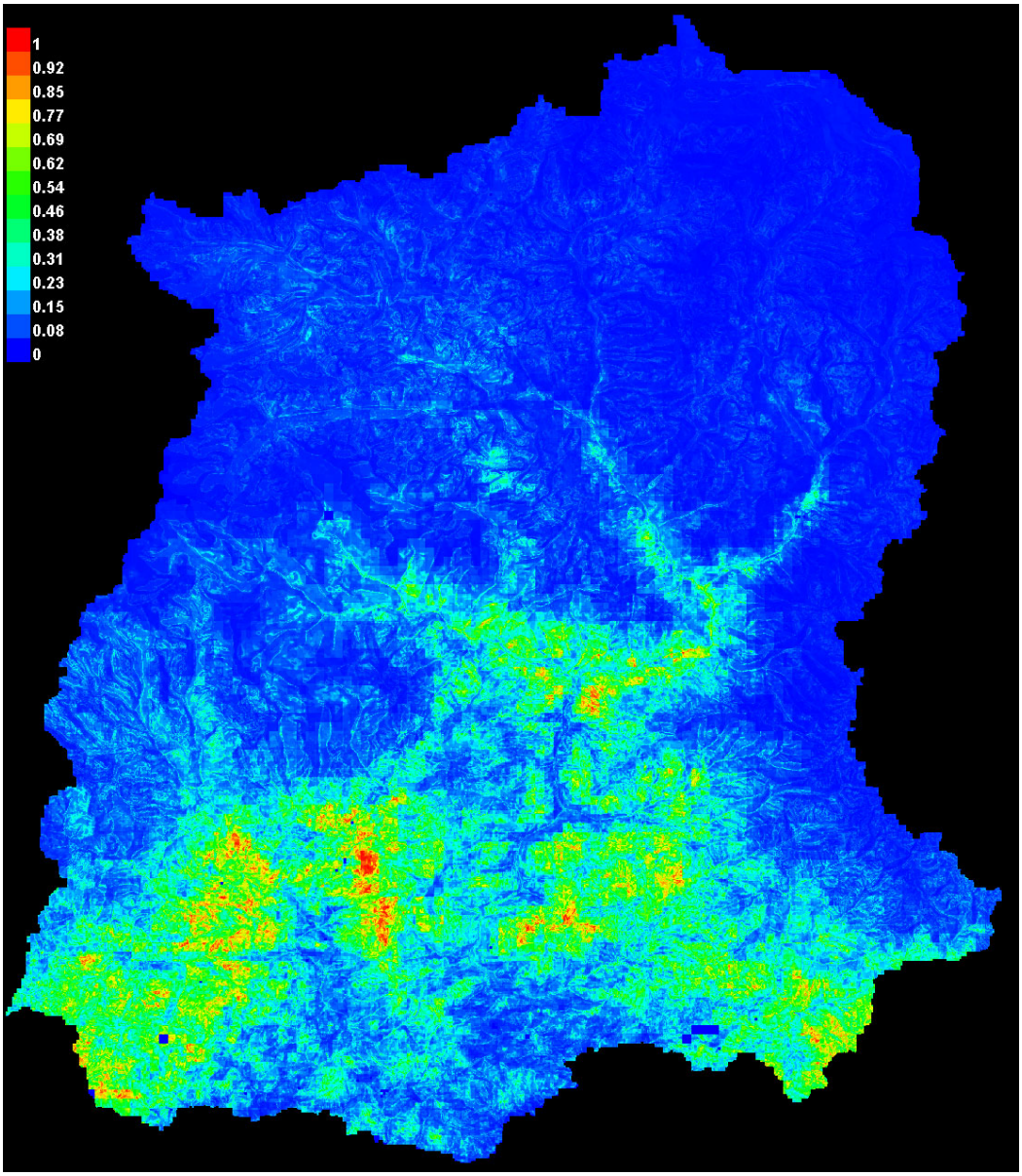


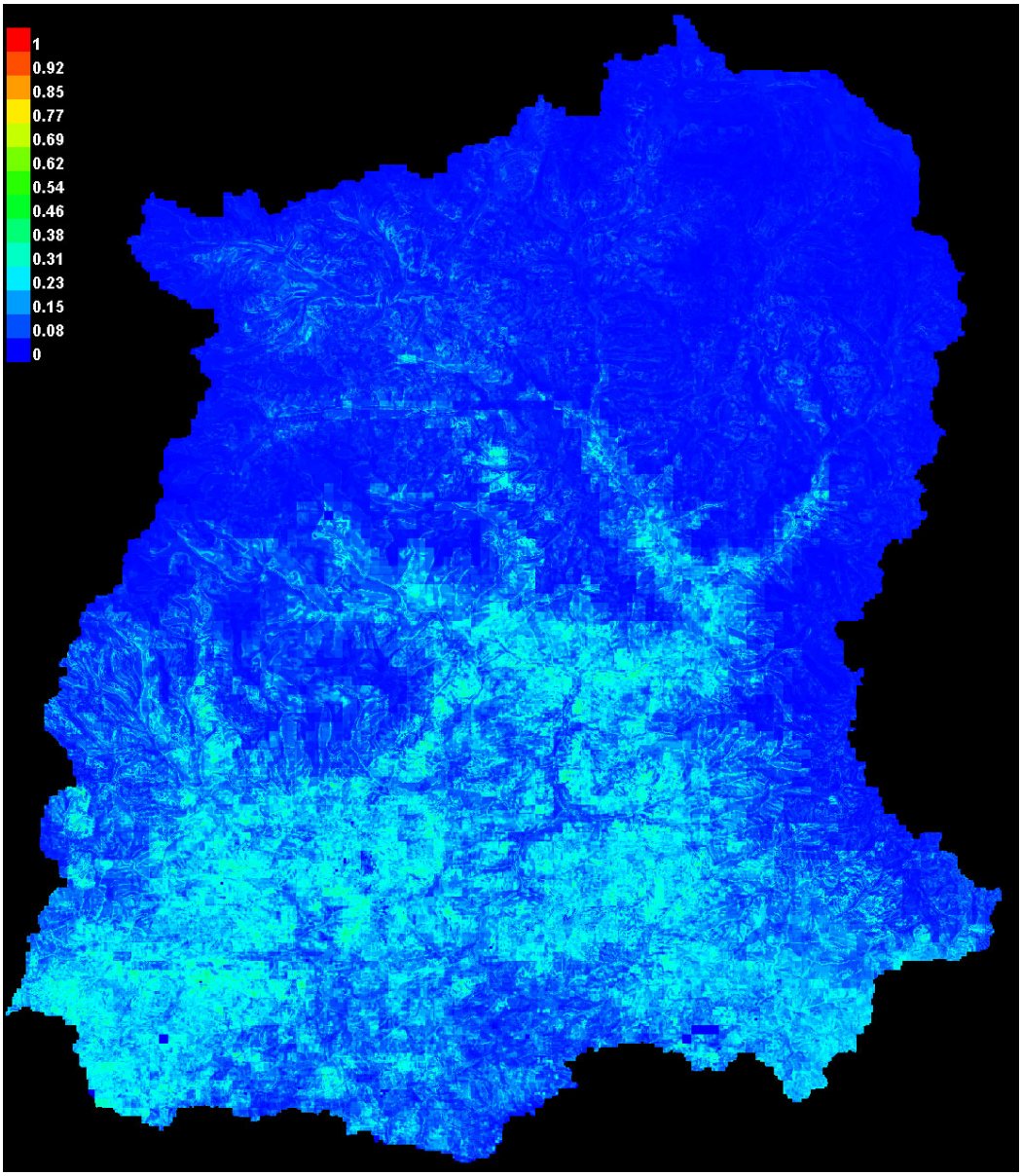
The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.971, and the standard deviation is 0.010.



Pictures of the model

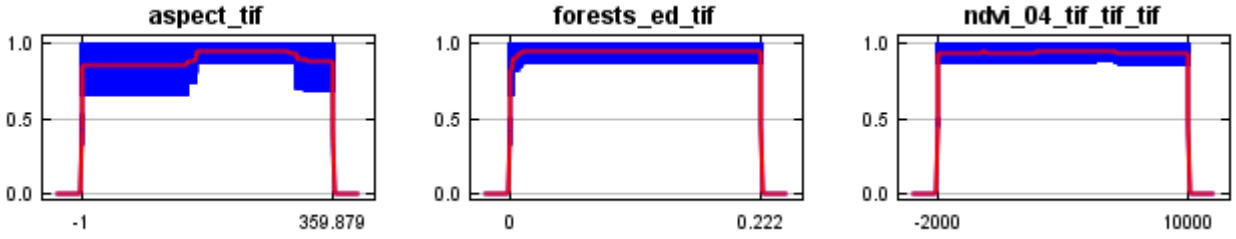
The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.

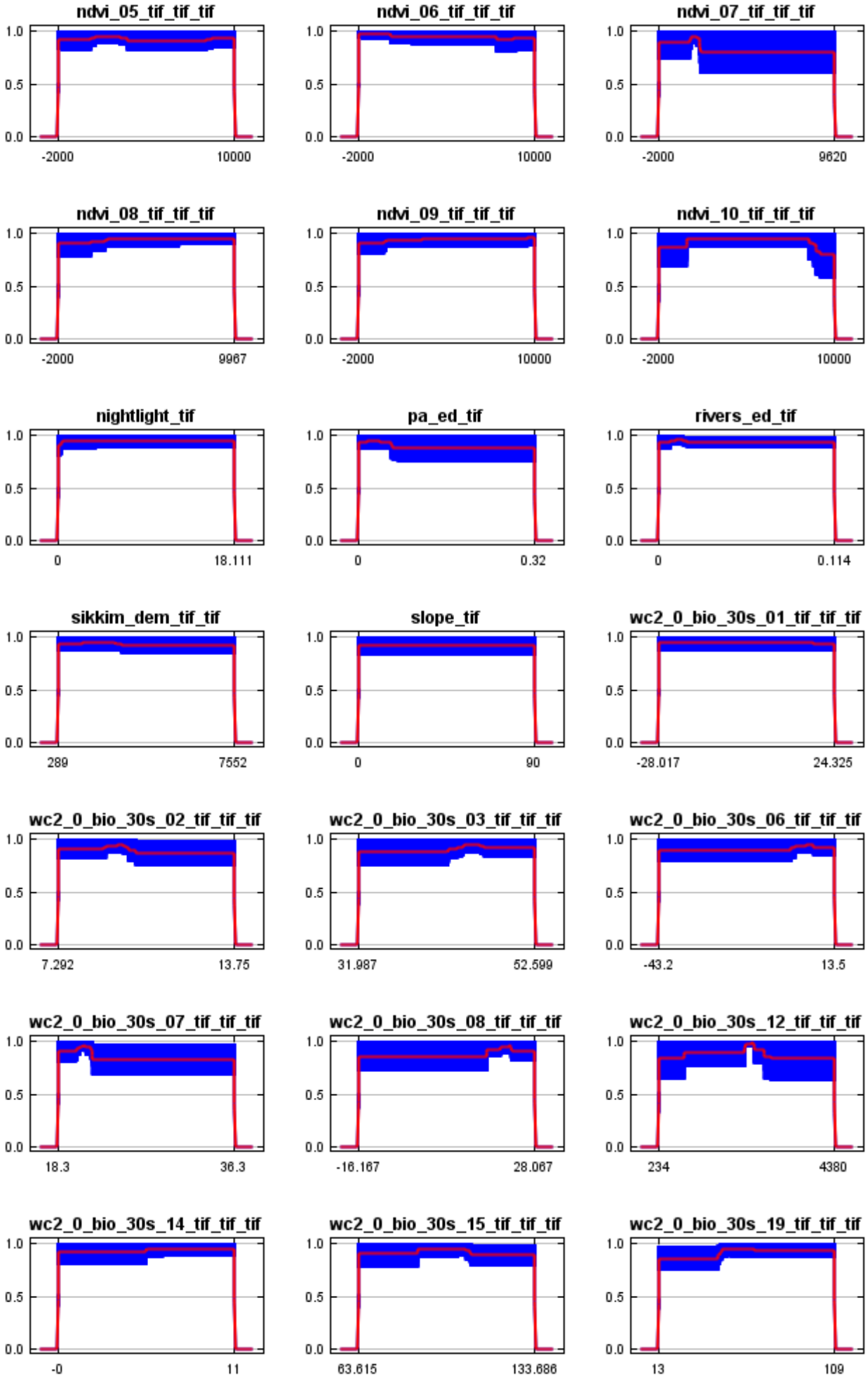

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0



Response curves

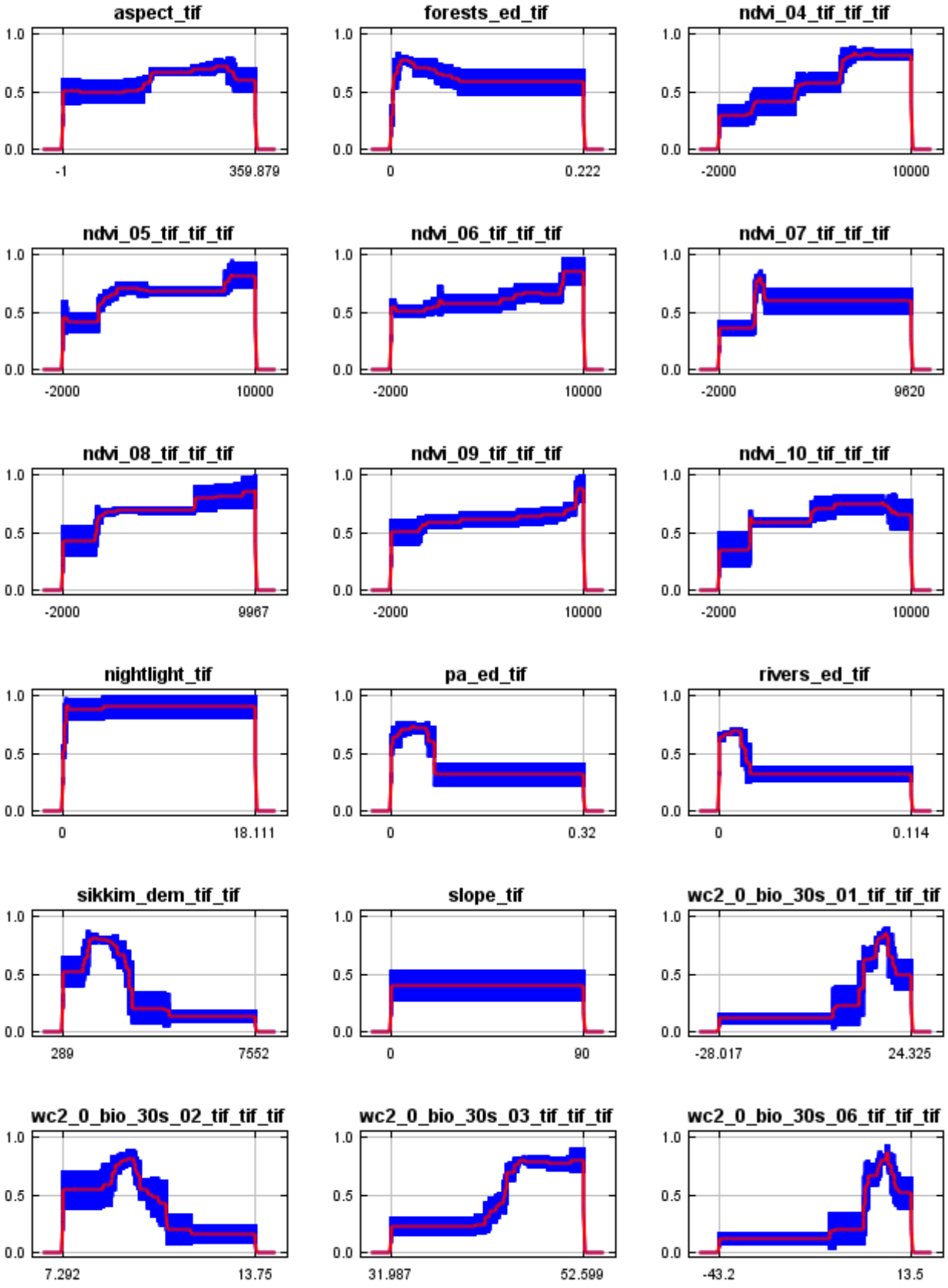
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

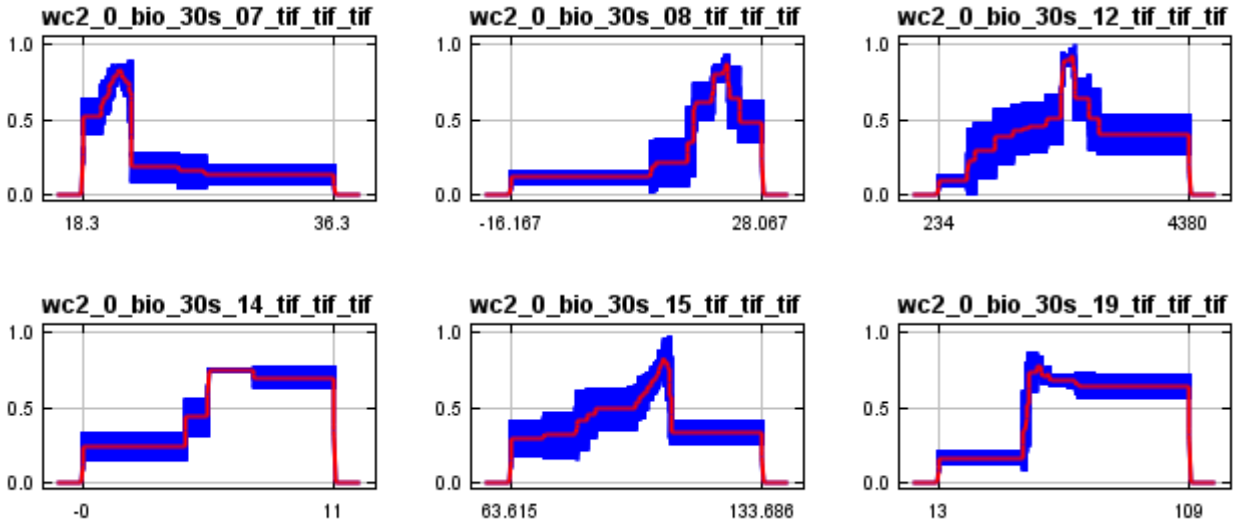




In contrast to the above marginal response curves, each of the following curves represents a different model,

namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.





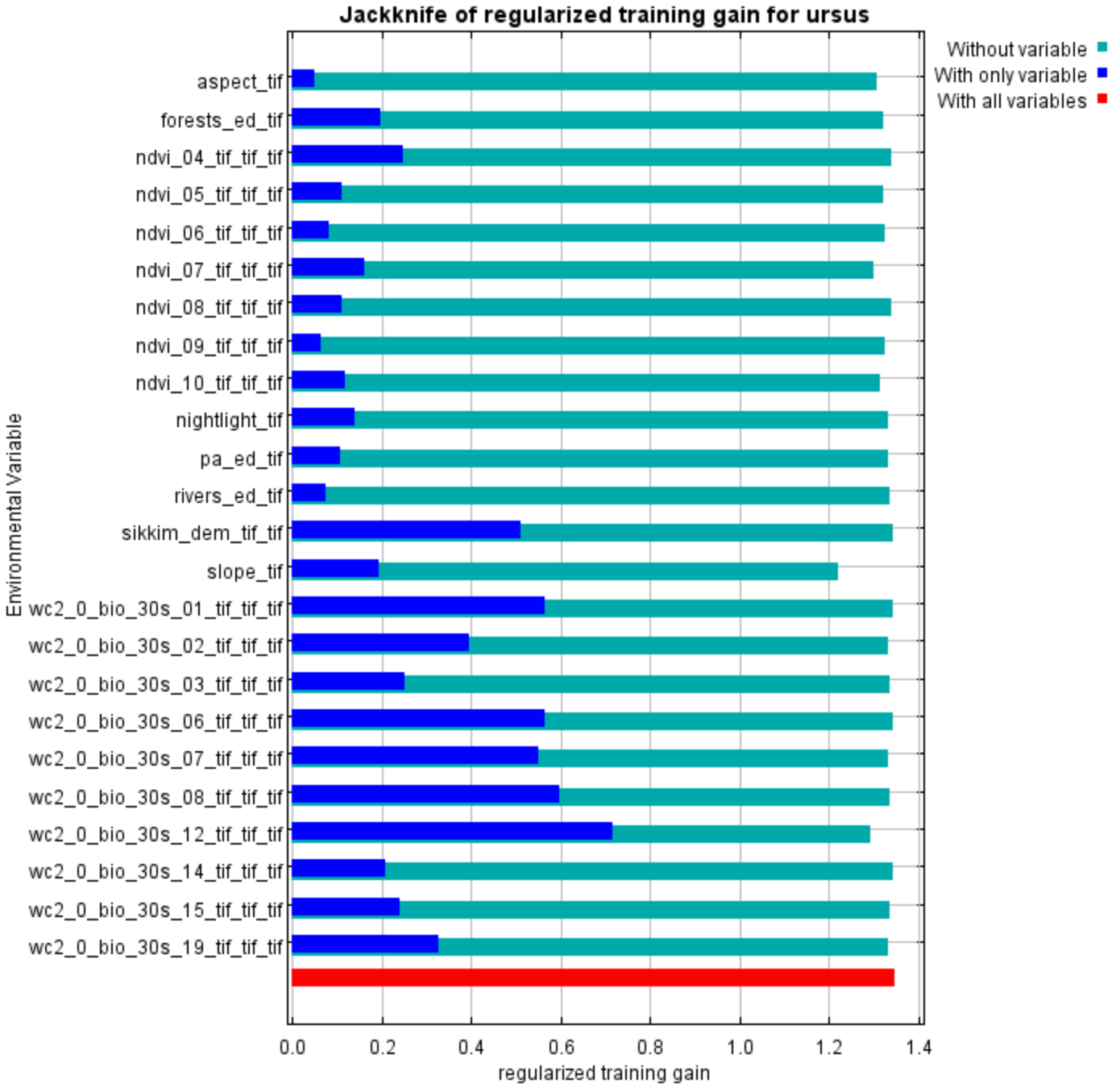
Analysis of variable contributions

The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
wc2_0_bio_30s_12_tif_tif_tif	19.2	9.2
wc2_0_bio_30s_07_tif_tif_tif	14.4	4.3
slope_tif	11.7	21.2
wc2_0_bio_30s_08_tif_tif_tif	7	2.8
wc2_0_bio_30s_19_tif_tif_tif	4.8	4.6
ndvi_07_tif_tif_tif	4.1	10.6
forests_ed_tif	4.1	3.2
aspect_tif	3.6	4.3
wc2_0_bio_30s_06_tif_tif_tif	3.6	1.7
wc2_0_bio_30s_02_tif_tif_tif	3.3	3.7
wc2_0_bio_30s_03_tif_tif_tif	3.1	3
ndvi_06_tif_tif_tif	2.6	6.3
ndvi_10_tif_tif_tif	2.5	2.9
ndvi_05_tif_tif_tif	2.1	4.2
nightlight_tif	2.1	1.9
pa_ed_tif	2	1.3
ndvi_09_tif_tif_tif	1.9	4.8
sikkim_dem_tif_tif	1.7	0.8
ndvi_08_tif_tif_tif	1.3	2.3

wc2_0_bio_30s_15_tif_tif_tif	1.3	1.4
ndvi_04_tif_tif_tif	1.2	1.5
wc2_0_bio_30s_14_tif_tif_tif	1.1	0.4
rivers_ed_tif	0.9	3.1
wc2_0_bio_30s_01_tif_tif_tif	0.5	0.3

The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is wc2_0_bio_30s_12_tif_tif_tif, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is slope_tif, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E ursus responsecurves jackknife outputdirectory=E:\SIKKIM_CORRIDOR\Final_models\M_1_F_t_Set_1

samplesfile=E:\SIKKIM_CORRIDOR\occ_joint.csv environmentallayers=E:\SIKKIM_CORRIDOR\M_variables\Set_1 randomseed nowarnings noaskoverwrite nowriteclampgrid nowritemess replicates=10 replicatetype=bootstrap nolinear noquadratic noproduct threshold nohinge autorun noextrapolate novisible noautofeature nodoclamp