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Supplementary material

Spatiotemporal modeling of the potential range distributions of *Usnea* in the Philippines under changing climate scenarios

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Supplementary Table S1 - The percent contribution and permutation importance of the four predictors used in the MaxEnt models for the two CMIP6 models.

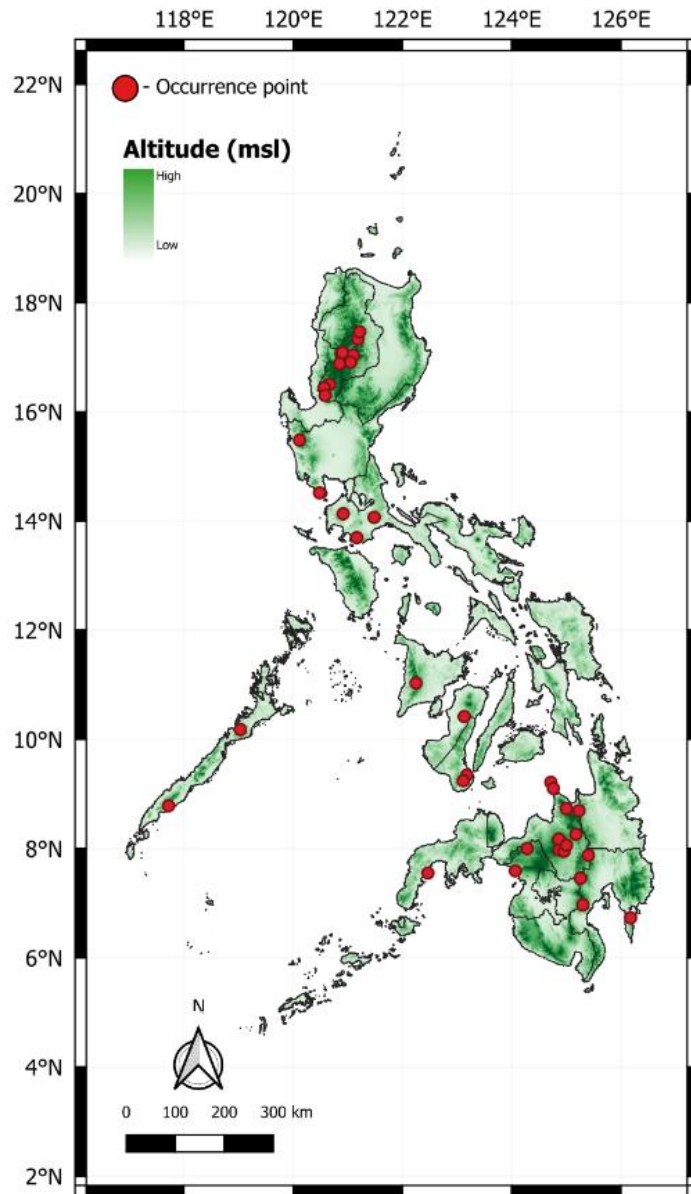
Predictor	Current	EC-Earth-3-Veg		MIROC6	
		SSP1-2.6	SSP3-7.0	SSP1-2.6	SSP3-7.0
(BIO2) Mean Diurnal Range	93.3	0.4	0.3	0.3	0.6
(BIO10) Mean Temperature of Warmest Quarter	0.6	99.6	99.6	99.7	99.4
(BIO11) Mean Temperature of Coldest Quarter	2.6	0	0	0	0
(BIO14) Precipitation of Driest Month	3.5	0	0.1	0	0
Permutation Importance					
(BIO2) Mean Diurnal Range	82.3	1.2	1.1	0.9	1.1
(BIO10) Mean Temperature of Warmest Quarter	4	98.8	97.9	99.1	98.9
(BIO11) Mean Temperature of Coldest Quarter	3.9	0	0	0	0
(BIO14) Precipitation of Driest Month	9.8	0.1	0.9	0	0

Supplementary Table S2 - Change in Habitat Suitability of *Usnea* in the future climate projections per region expressed as the difference between the mean habitat suitability percentage of the future scenario and the current scenario.

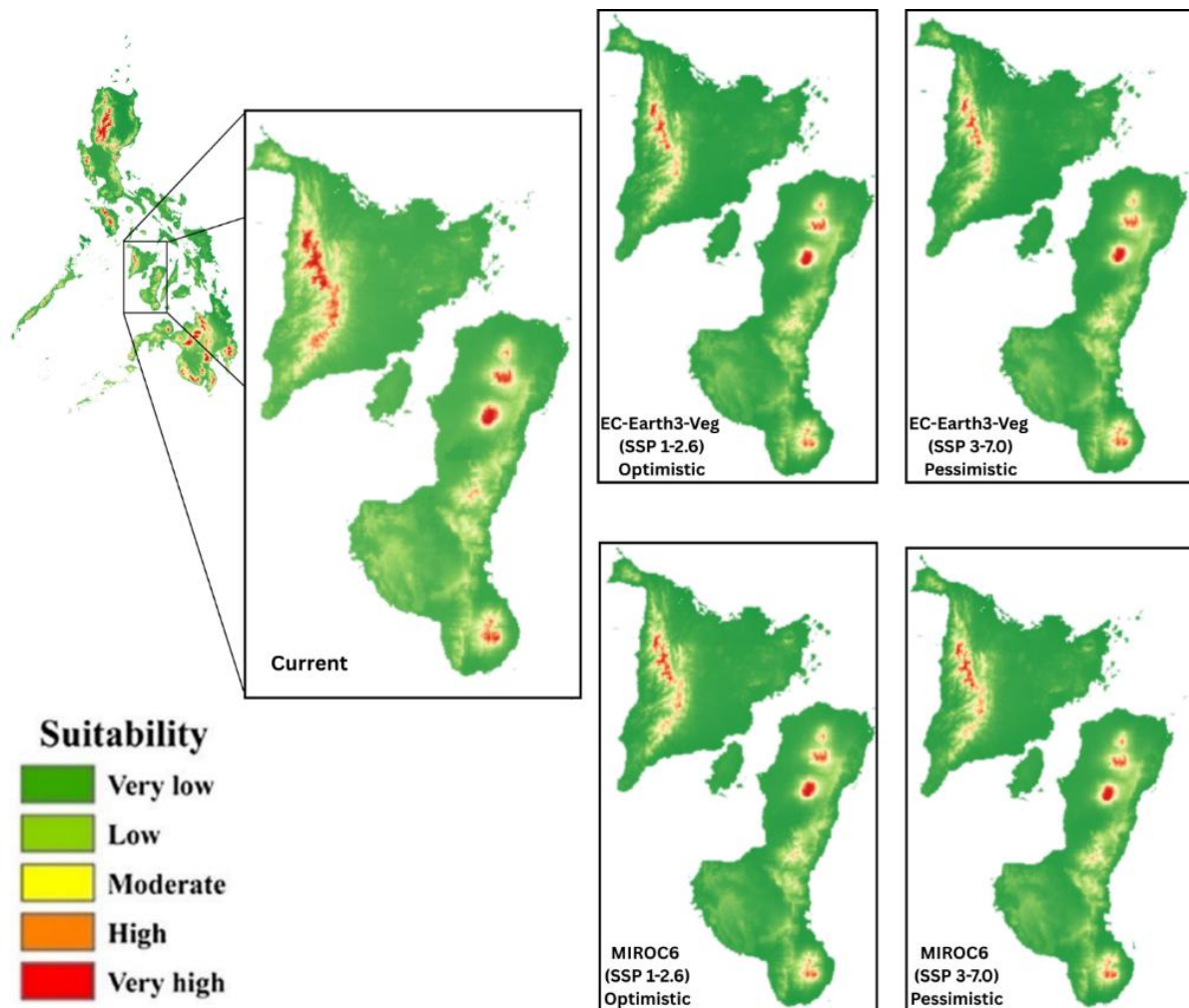
	EC-Earth-3-Veg		MIROC6	
	SSP 1-2.6	SSP 3-7.0	SSP 1-2.6	SSP 3-7.0
Region I (Ilocos Region)	+9.3	+13.4	+3.1	+4.9
Region II (Cagayan Valley)	+95.7	+100.4	+83.6	+90.5
Region III (Central Luzon)	+4.3	+6.4	+2.7	+3.4
Region IV-A (CALABARZON)	+3.5	+12.4	+4.9	+3.1
Region V (Bicol Region)	+37.8	+45.7	+36.2	+35.9
Region VI (Western Visayas)	-20.3	-18.4	-13.5	-13.3
Region VII (Central Visayas)	+6.1	+17.4	+0.9	+0.1
Region VIII (Eastern Visayas)	+86.2	+84.1	+85.3	+81.4
Region IX (Zamboanga Peninsula)	-17.4	-12.6	-22.3	-17.3
Region X (Northern Mindanao)	-8.9	-12.3	-8.1	-7.6
Region XI (Davao Region)	+7.0	+5.4	+3.1	+4.0
Region XII (SOCCSKSARGEN)	-7.2	-7.9	-9.3	-5.8
National Capital Region (NCR)	+0.8	+3.5	+4.4	+4.6
Cordillera Administrative Region (CAR)	+18.7	+18.6	+16.9	+17.1
Region XIII (Caraga)	+88.3	+69.6	+91.8	+88.5
MIMAROPA Region	-1.4	+6.5	-6.7	-5.3
Bangsamoro Autonomous Region in Muslim Mindanao (BARMM)	-16.7	-18.2	-17.6	-14.0

Supplementary Table S3 - The selected predictors used for MaxEnt modeling and their statistical correlates, model performance, and ecological relevance.

Code	Predictor	Unit	Data Type	Statistical	Model Performance	Ecological Relevance
BIO2	Mean Diurnal Range	°C	Bioclimatic	Correlates strongly with BIO1	High percent contribution (60.4%)	Daily temperature variations affect lichen hydration and respiration (Worthy et al., 2024)
BIO10	Mean Temperature of Warmest Quarter	°C	Bioclimatic	Weak correlation to the rest of bioclimatic variables	Some permutation importance (3.4%)	High heat can lead to dessication; <i>Usnea</i> are especially thermally sensitive (Marín et al., 2024)
BIO11	Mean Temperature of Coldest Quarter	°C	Bioclimatic	Correlates strongly with BIO9	Some permutation importance (3.8%)	Cold quarter temperature may constrain photobiont metabolism. (Nelsen et al., 2022)
BIO14	Precipitation of Driest Month	mm	Bioclimatic	Correlates strongly with BIO13	High percent contribution (14.5%) and Permutation importance (54.7%)	Lichens rely on moisture; survival is threatened during drought (Gasulla et al., 2021)



Supplementary Figure S1 - Map of the Philippines, showing the distribution of occurrence points of *Usnea* (red). The background gradient (green) represents Shuttle Radar Topography Mission (SRTM)-derived altitude in meters above sea level (m asl).



Supplementary Figure S2 - MaxEnt models for *Usnea* in the Panay and Negros Islands. Significant reduction in habitat suitability is predicted to occur in the Mountain ranges of Panay Islands and Volcanic Mountains of Negros Island.

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