

Uncertainties in Measuring Precipitation Hinders Precise Evaluation of Loss of Diversity in Biomes and Ecotones

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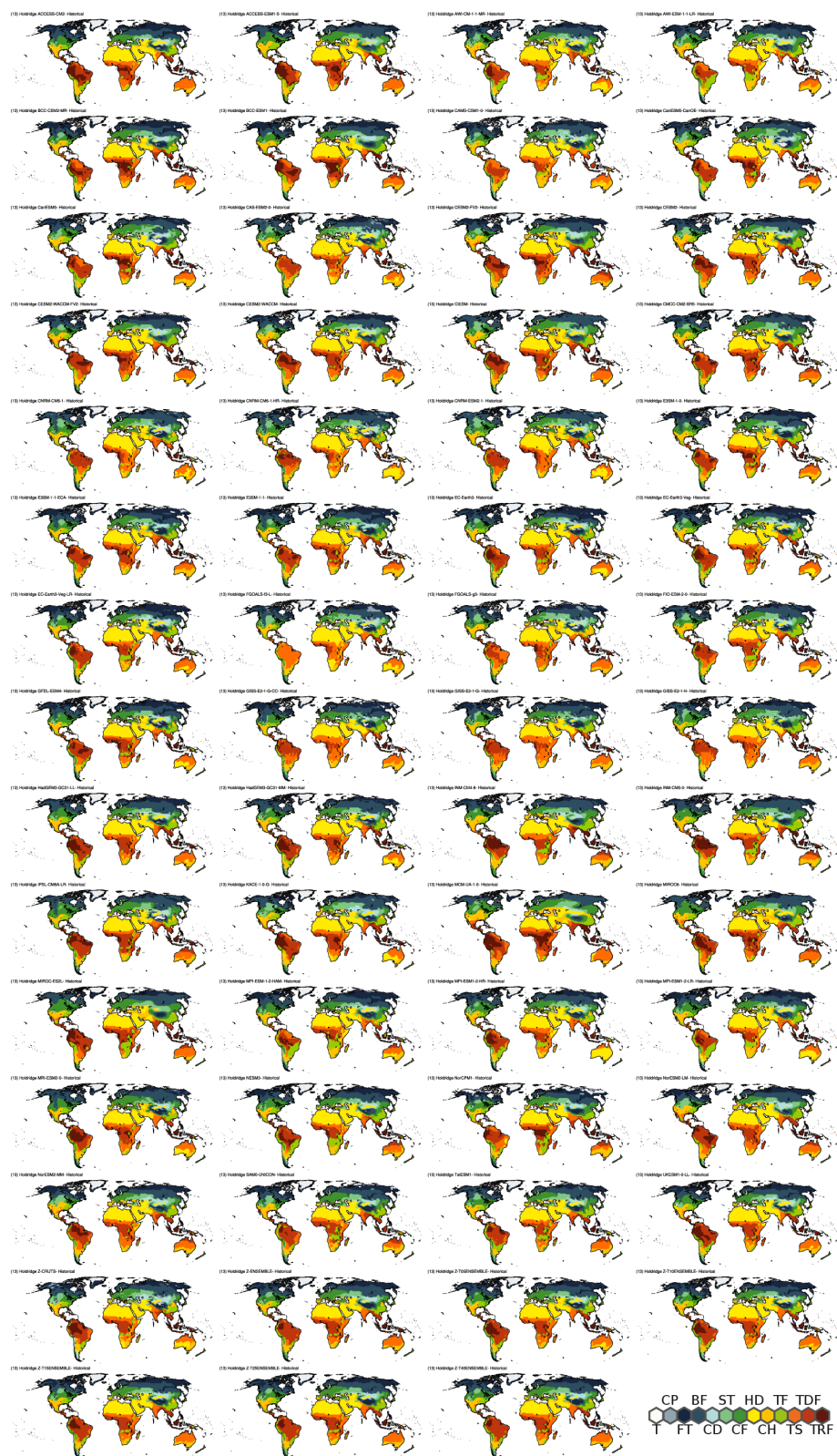
2 Department of Astronomy and Atmospheric Sciences, Center for Atmospheric REMote sensing (CARE), Kyungpook National University, Daegu, Republic of Korea.

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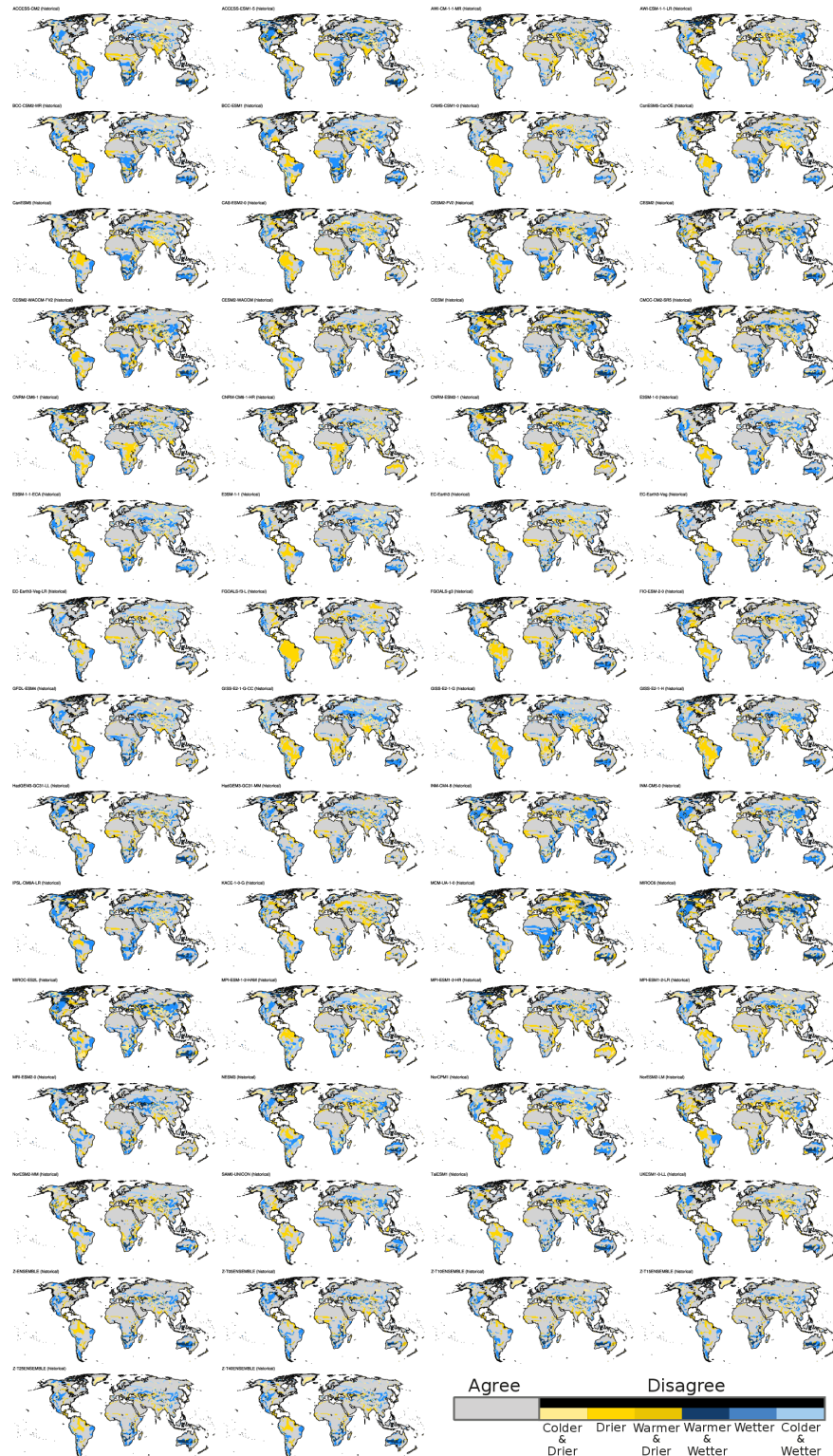
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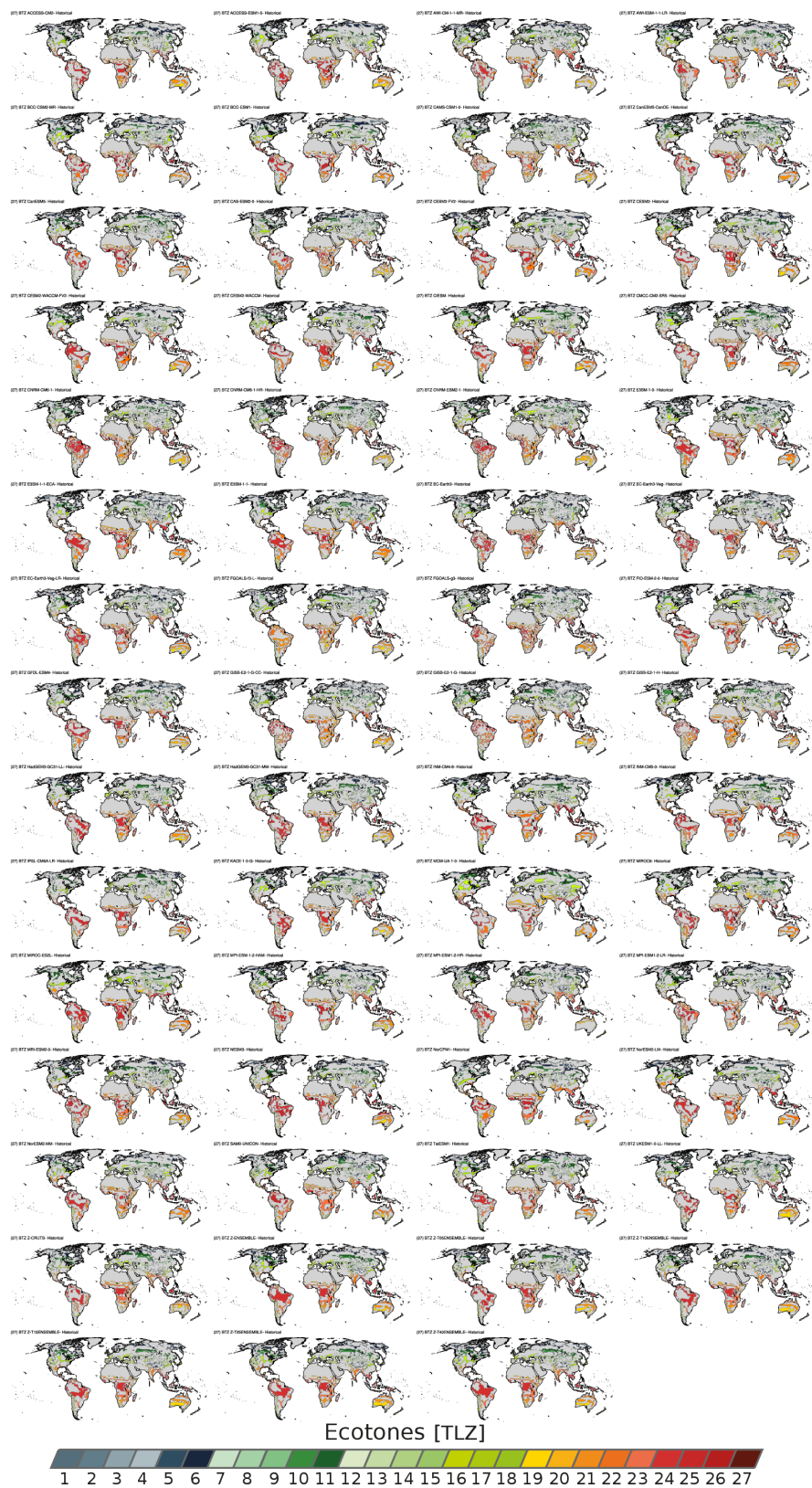
Supplementary Figures 1 to 67
Supplementary Tables 1 to 3
Supplementary References



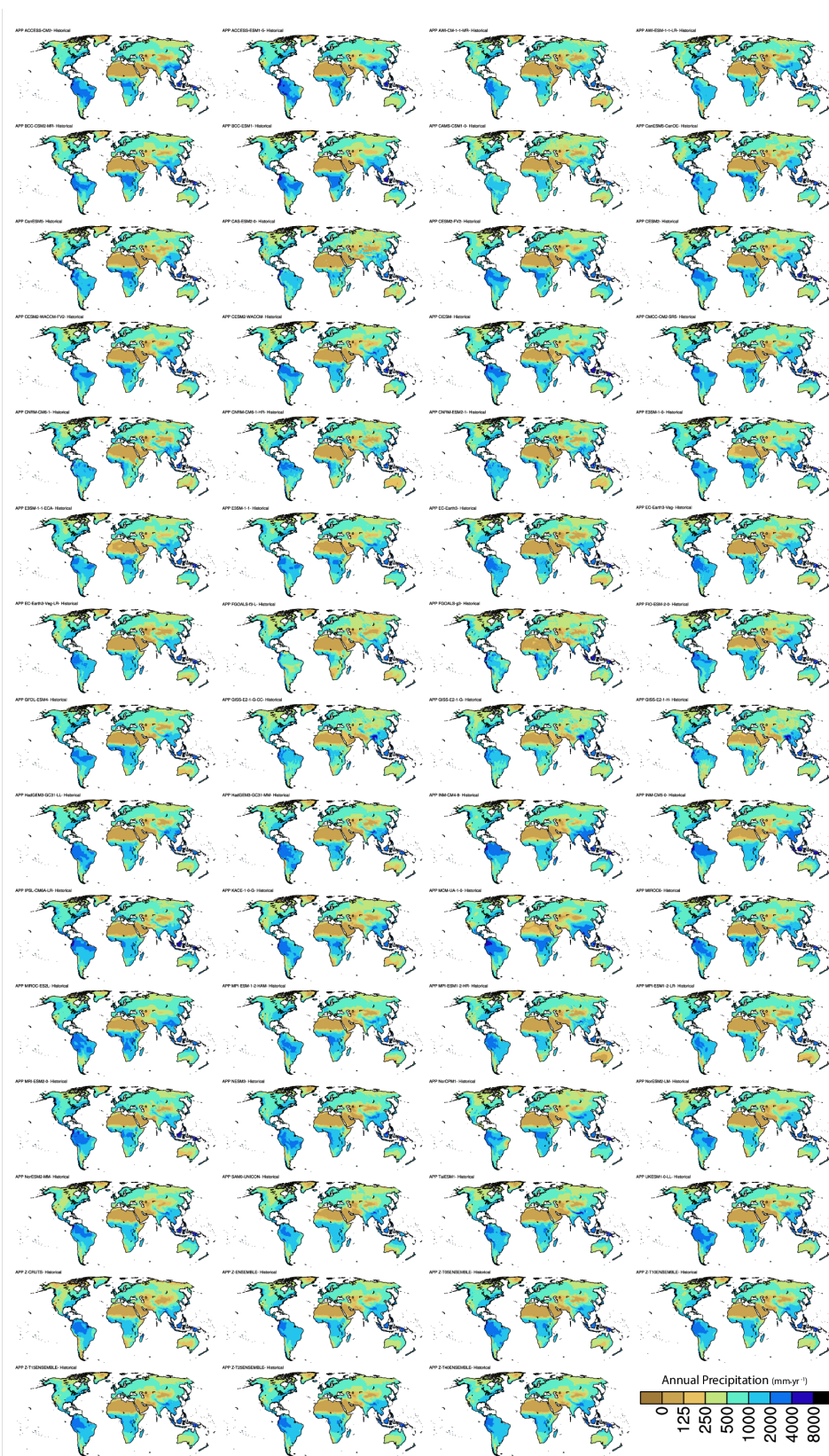
Supplementary Figure 1. Global distribution of Holdridge Life Zones of 52 CMIP6 models, 6 multi-model ensemble means (MMEs), and reference dataset (CRU) for present climate (1980-2014).



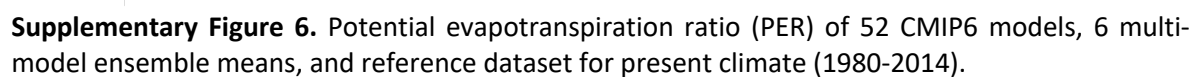
Supplementary Figure 2. Maps of model bias (52 + 6 MMEs) for present climate (1980-2014). Yellow, light yellow and dark yellow are drier, colder & drier, and warmer & drier conditions than reference data. Blue, dark blue and light blue are wetter, warmer & wetter, and colder & wetter conditions. The agreement between modeled and observed life zones is colorized in grey (100% agreement).

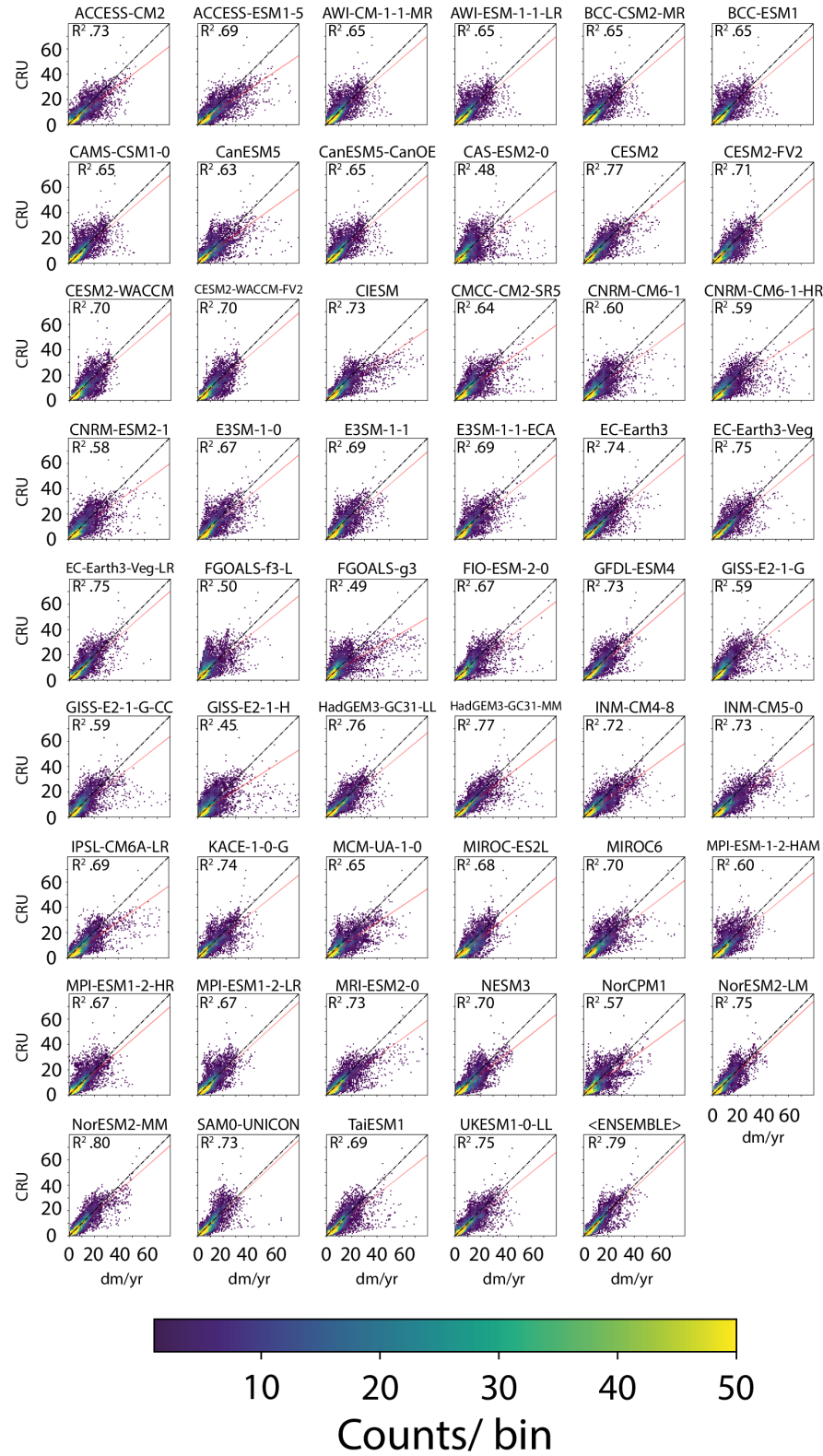


Supplementary Figure 3. Global distribution of Transient Life Zones (TLZs; ecotones) for 52 CMIP6 models, 6 MMEs, and reference dataset (CRU) for present climate (1980-2014).

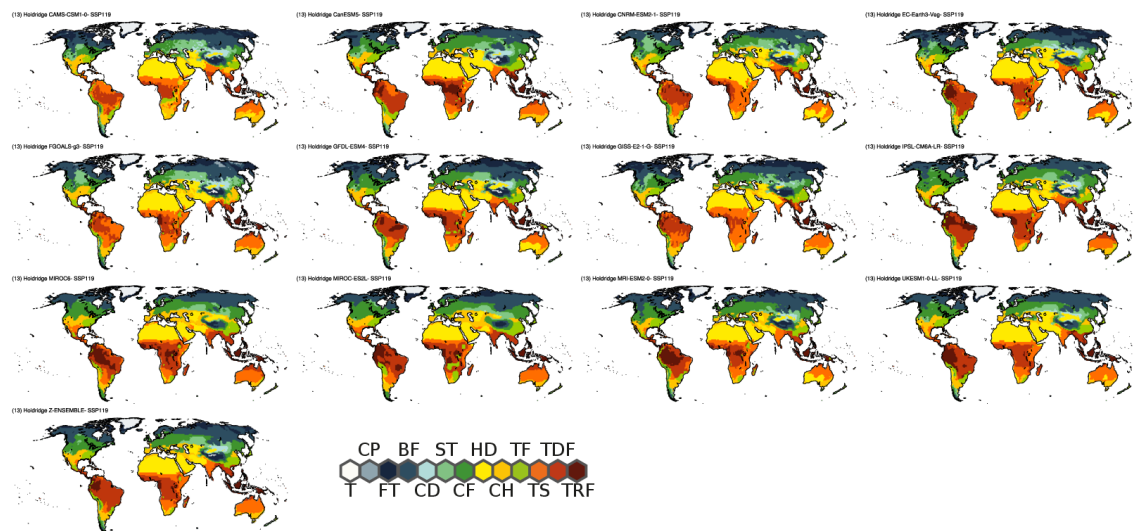


Supplementary Figure 5. Annual precipitation (APR) of 52 CMIP6 models, 6 multi-model ensemble means, and reference dataset for present climate (1980-2014). Units are in mm-yr⁻¹.

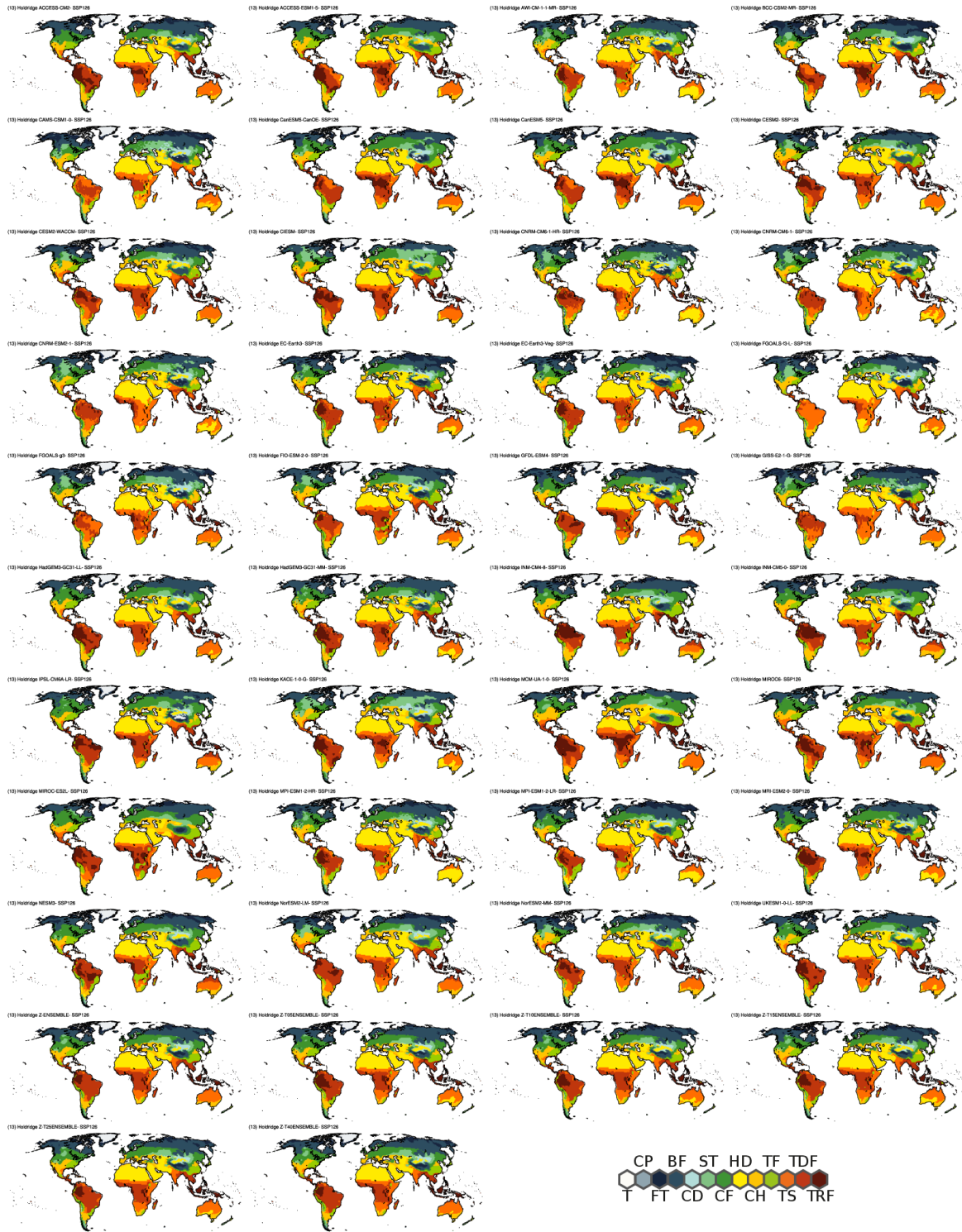




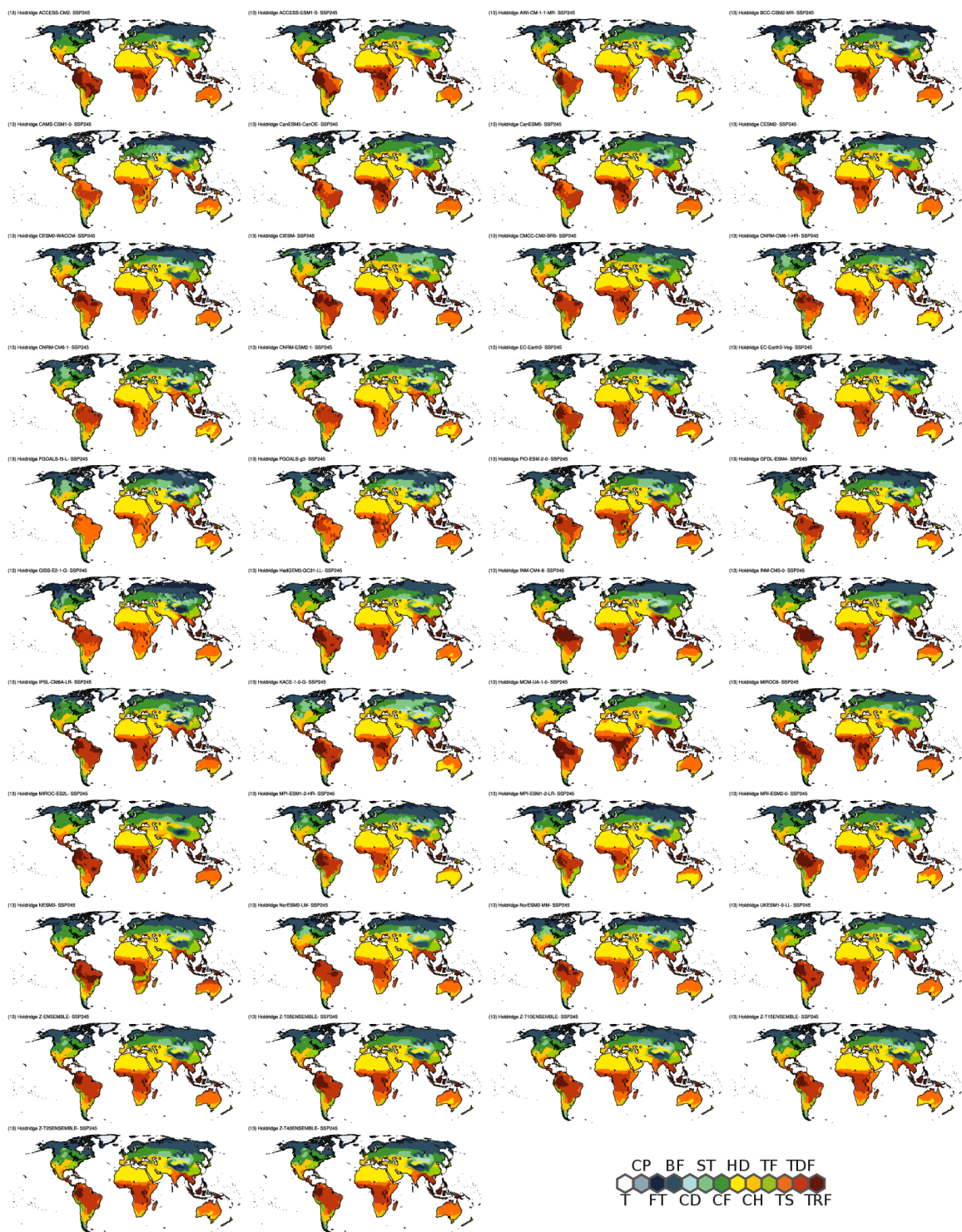
Supplementary Figure 7. Scatter plots comparing annual precipitation at every grid point for reference dataset (CRU) and 52 CMIP6 models (+ 1 MME). Units are $\text{dm}\cdot\text{yr}^{-1}$. Individual scatter plot includes the coefficient of determination of each model (R^2).



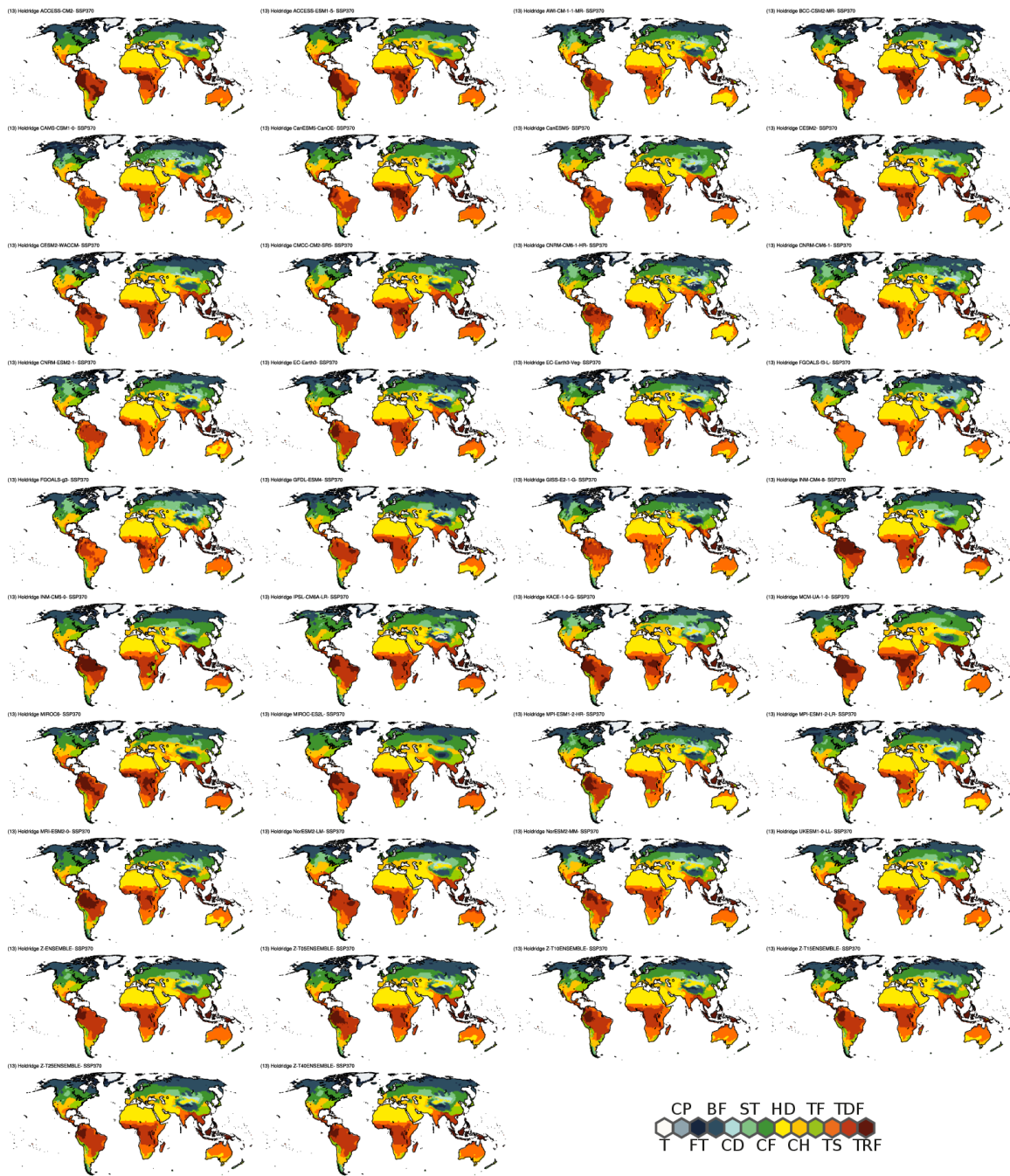
Supplementary Figure 8. Global distribution of future Life Zones of CMIP6 models under SSP1-1.9.



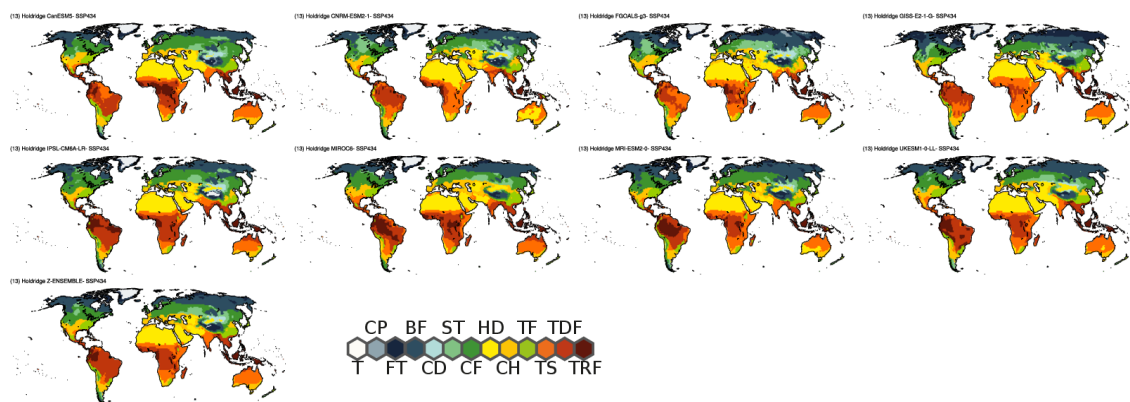
Supplementary Figure 9. Same as Supplementary Figure 08 but for SSP1-2.6.



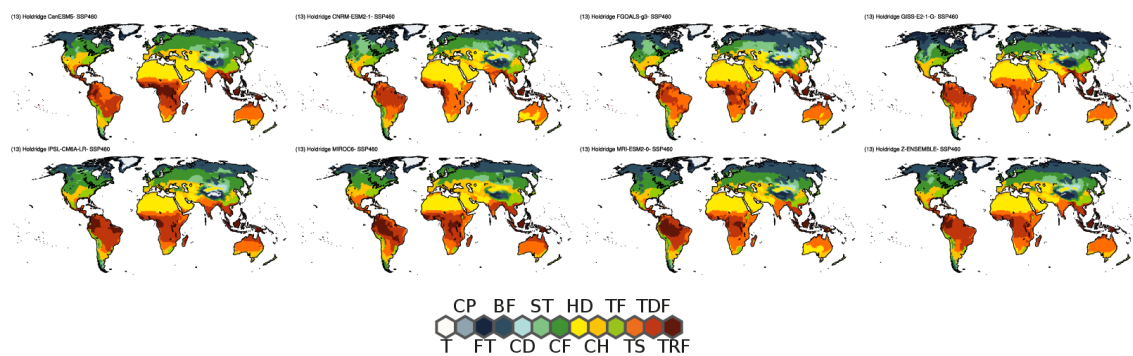
Supplementary Figure 10. Same as Supplementary Figure 08 but for SSP2-4.5.



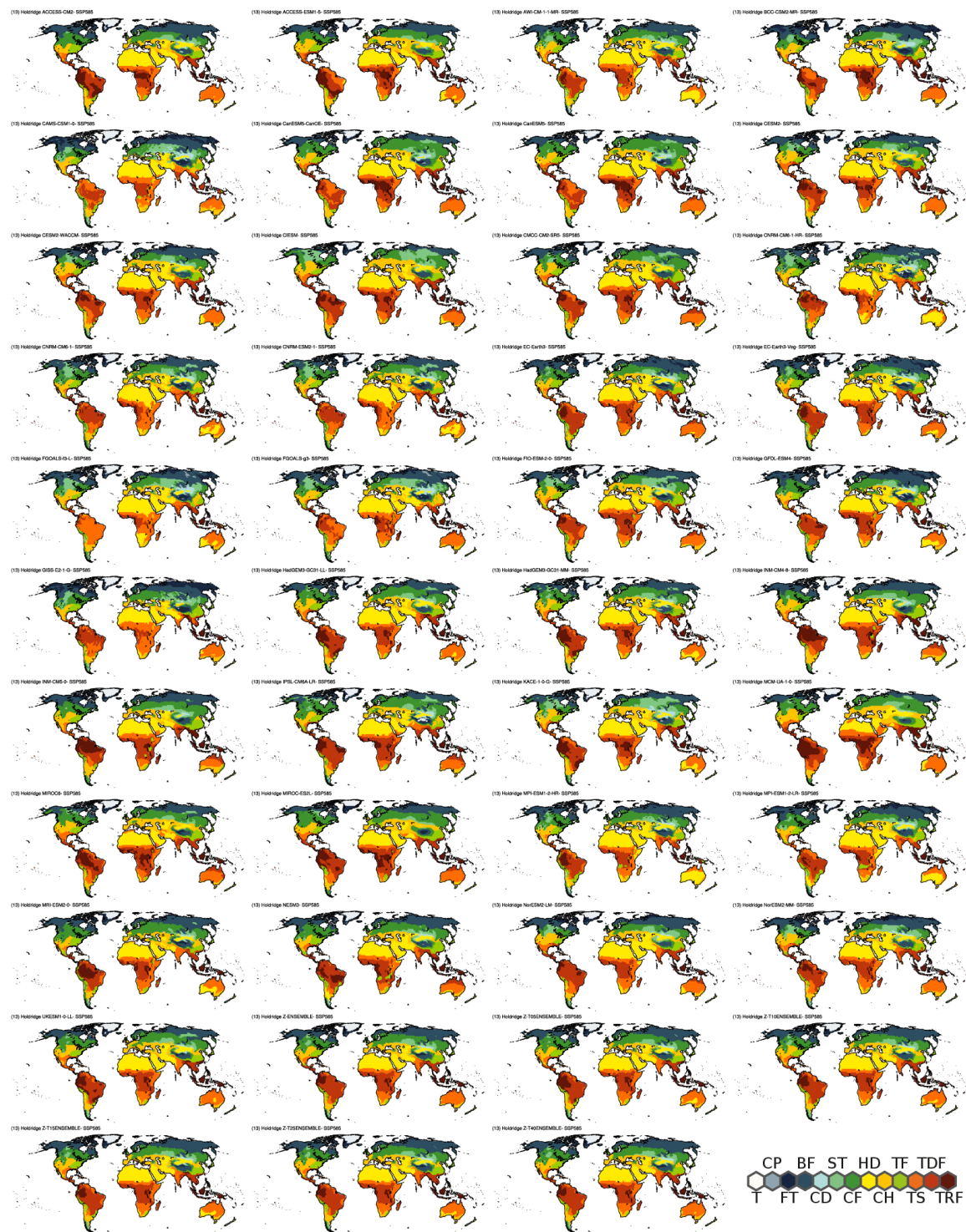
Supplementary Figure 11. Same as Supplementary Figure 08 but for SSP3-7.0.



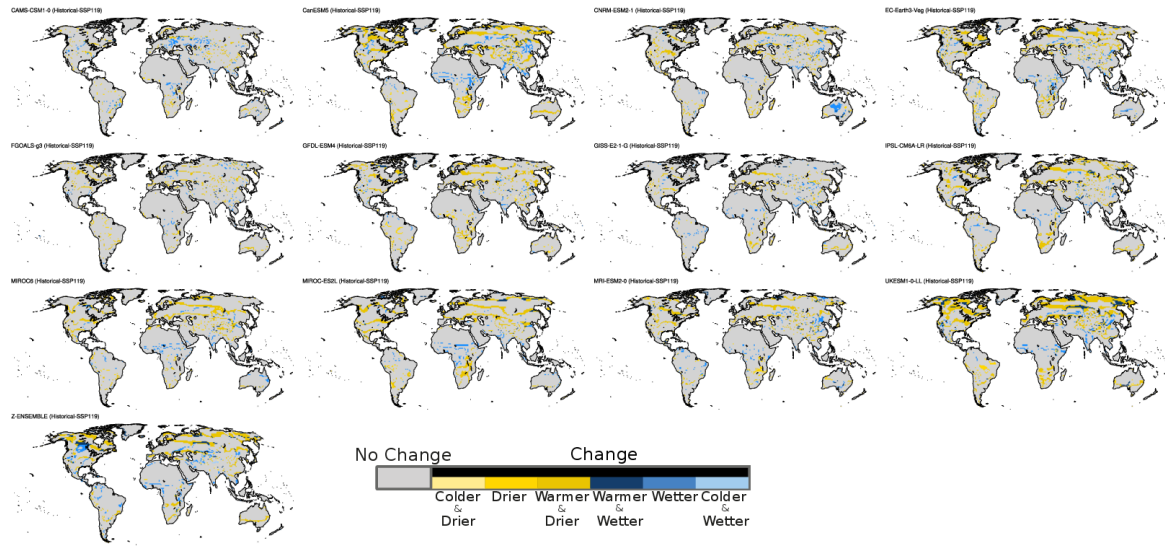
Supplementary Figure 12. Same as Supplementary Figure 08 but for SSP4-3.4.



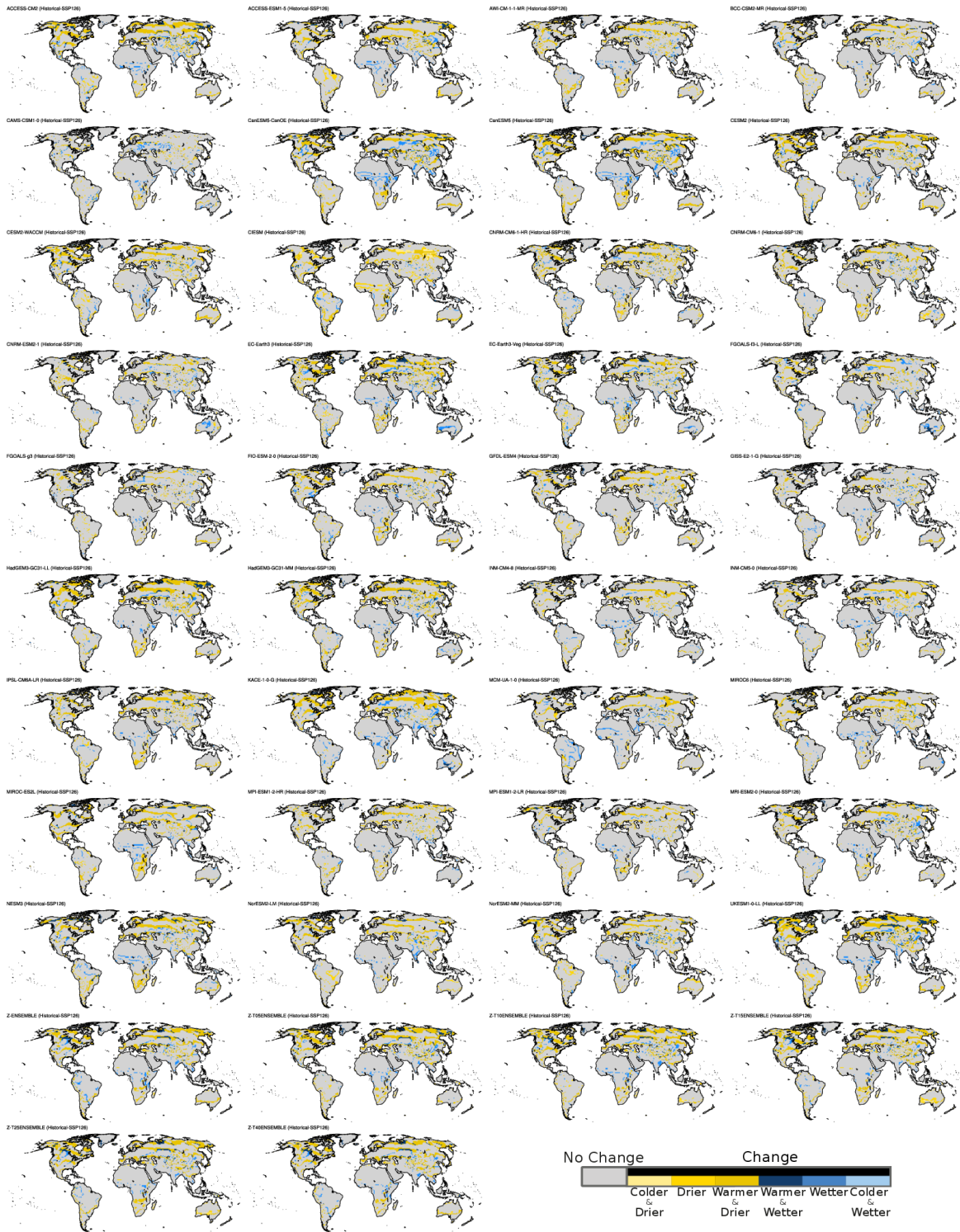
Supplementary Figure 13. Same as Supplementary Figure 08 but for SSP4-6.0.



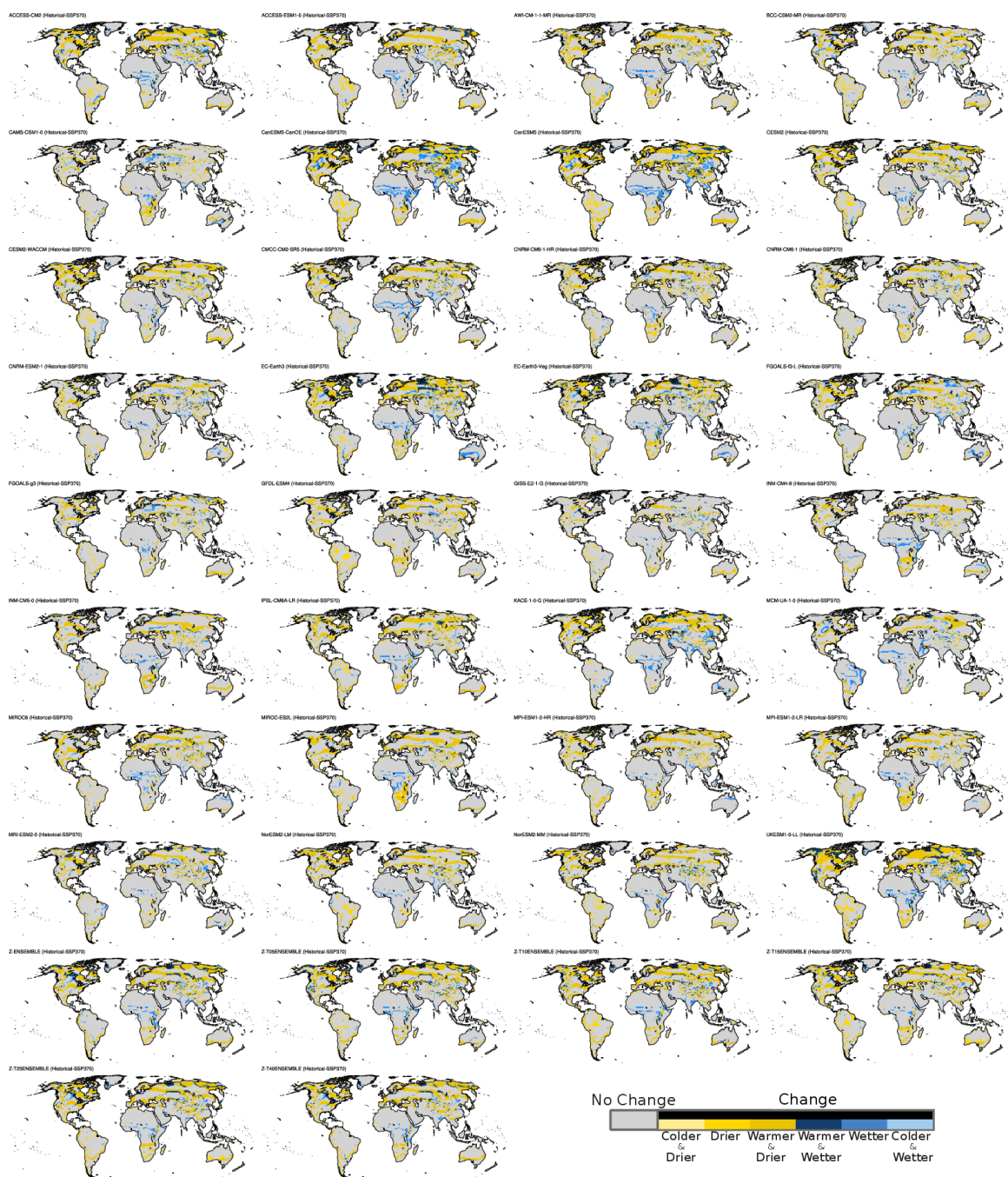
Supplementary Figure 14. Same as Supplementary Figure 08 but for SSP5-8.5.



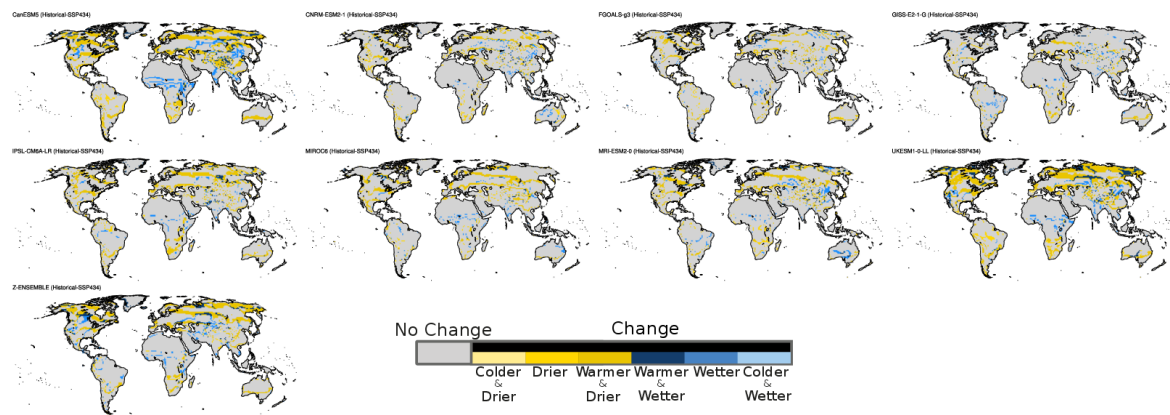
Supplementary Figure 15. Maps of projected changes in major biomes of CMIP6 models under SSP1-1.9. Yellow, light yellow and dark yellow are drier, colder & drier, and warmer & drier conditions than present climate. Blue, dark blue and light blue are wetter, warmer & wetter, and colder & wetter conditions. Areas with no changes are colorized in grey.



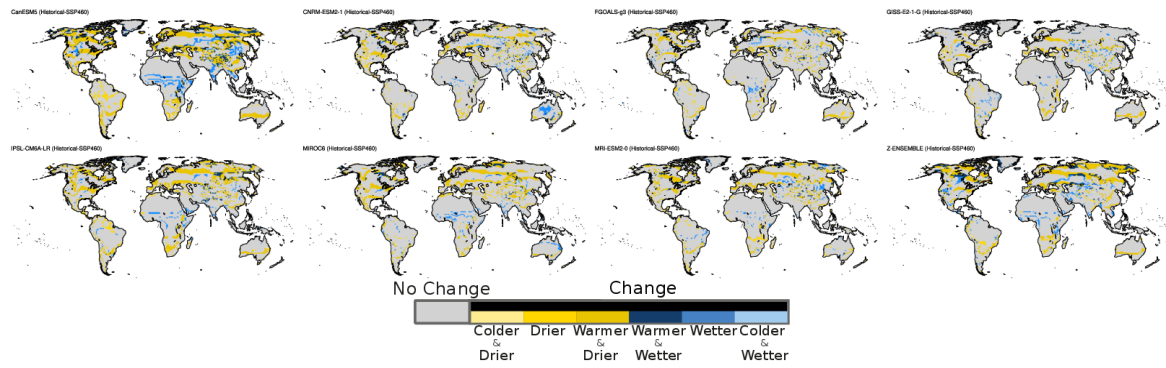
Supplementary Figure 16. Same as Supplementary Figure 15 but for SSP1-2.6.



Supplementary Figure 18. Same as Supplementary Figure 15 but for SSP3-7.0.



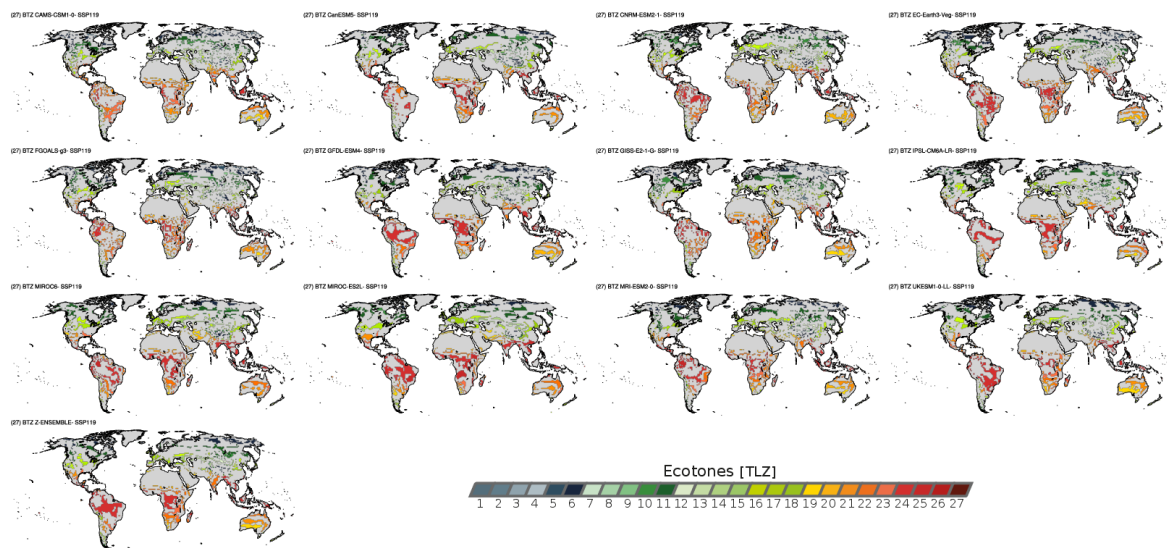
Supplementary Figure 19. Same as Supplementary Figure 15 but for SSP4-3.4.



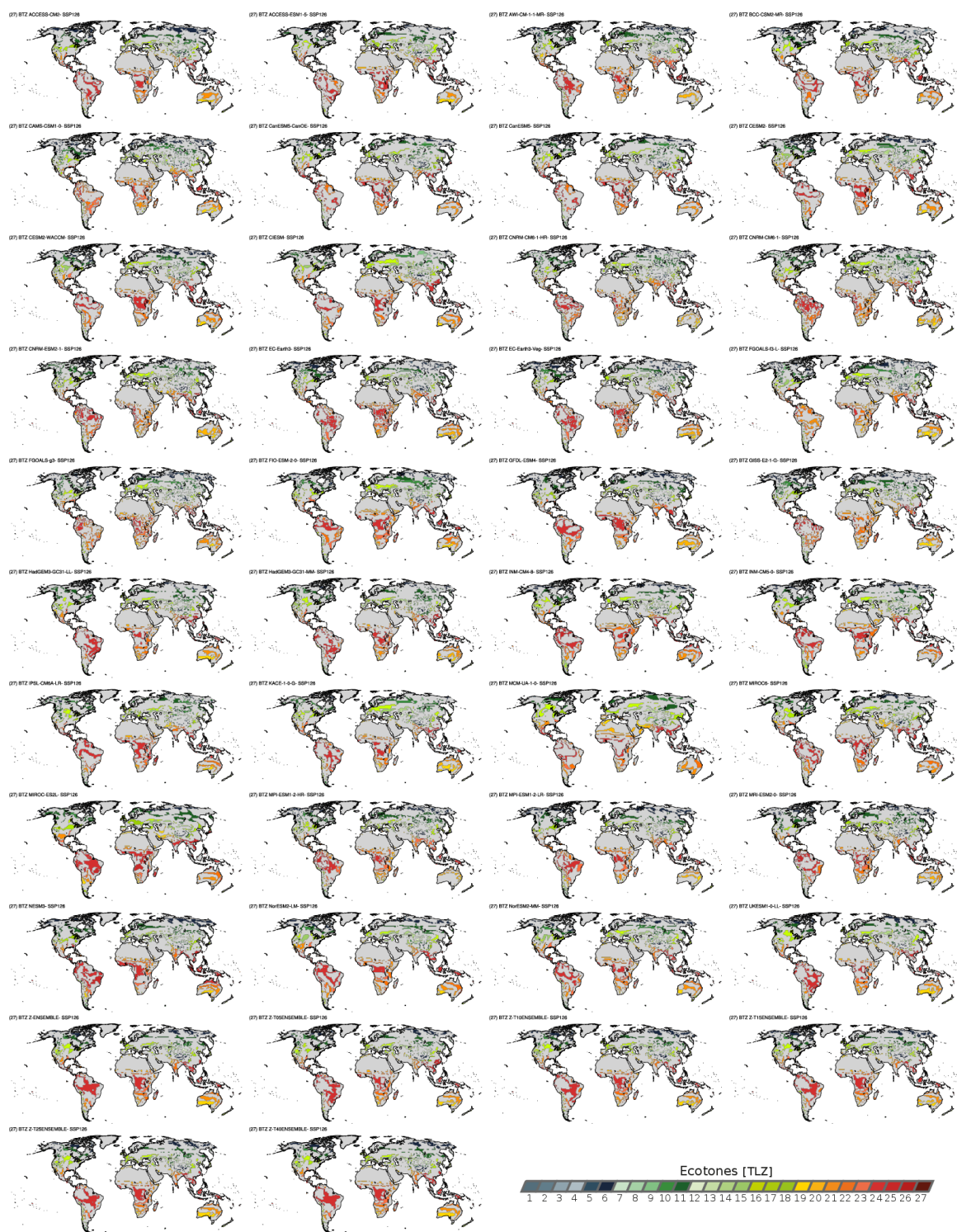
Supplementary Figure 20. Same as Supplementary Figure 15 but for SSP4-6.0.



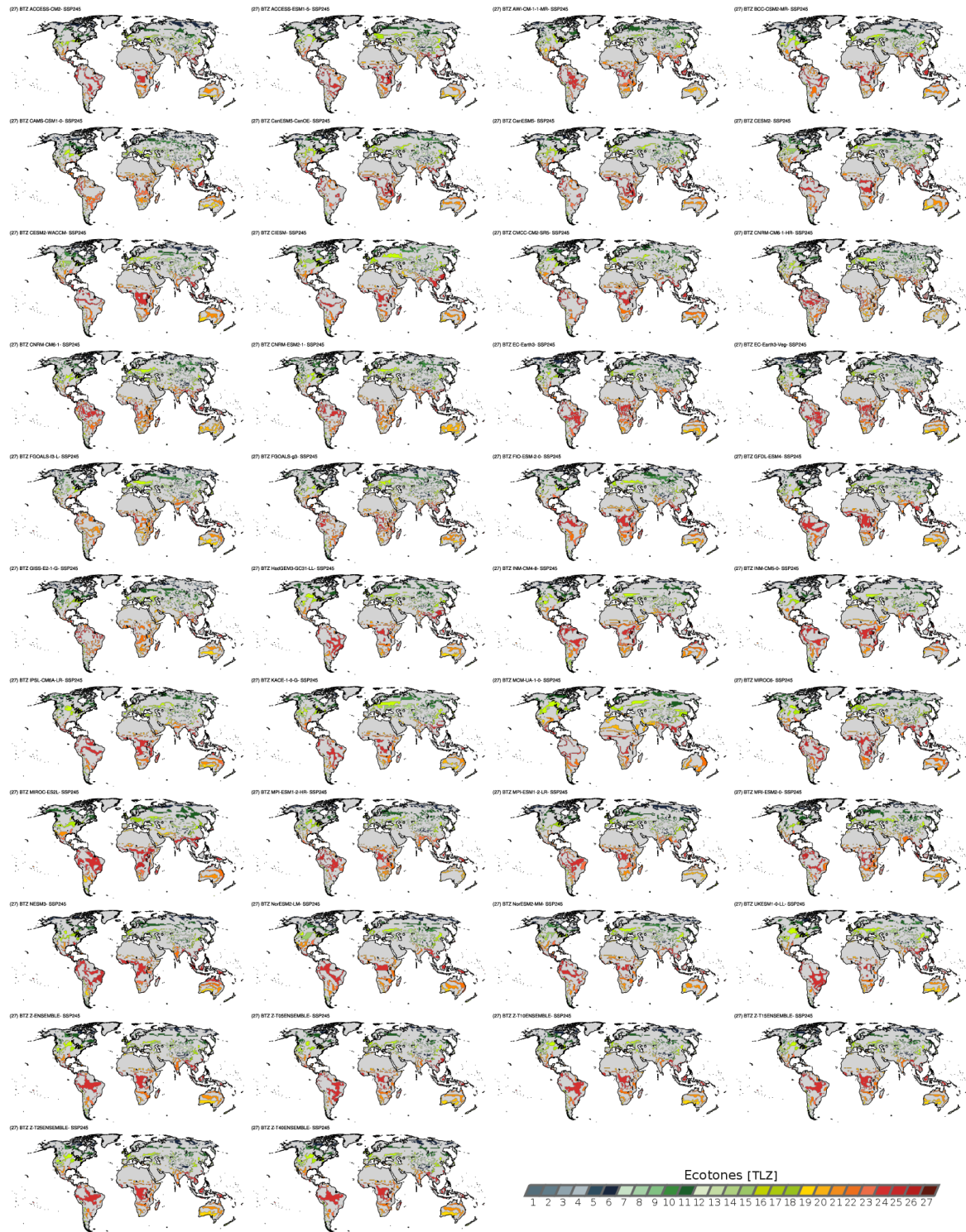
Supplementary Figure 21. Same as Supplementary Figure 15 but for SSP5-8.5.



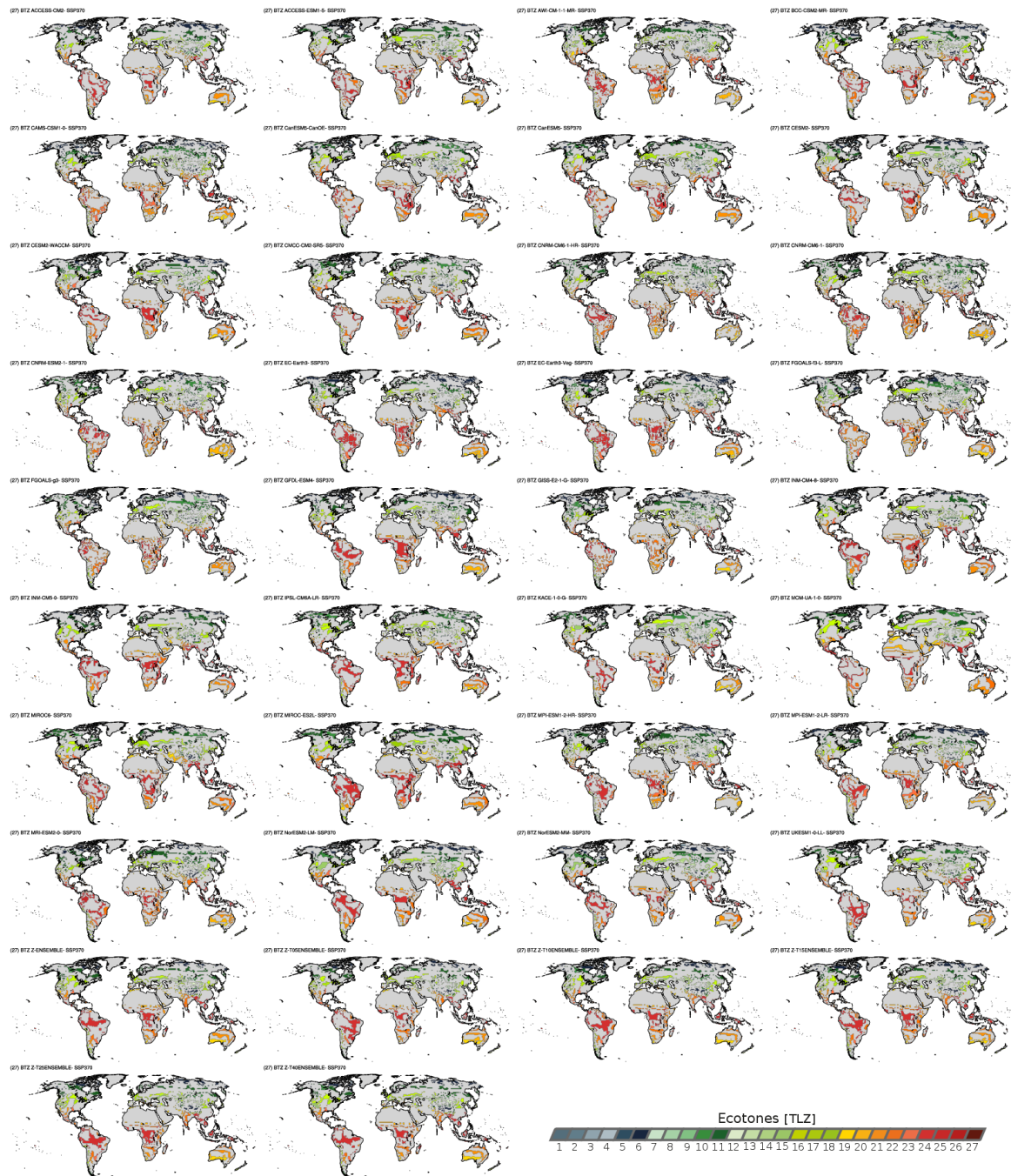
Supplementary Figure 22. Maps of changes in the distribution of Transient Life Zones of CMIP6 models under SSP1-1.9.



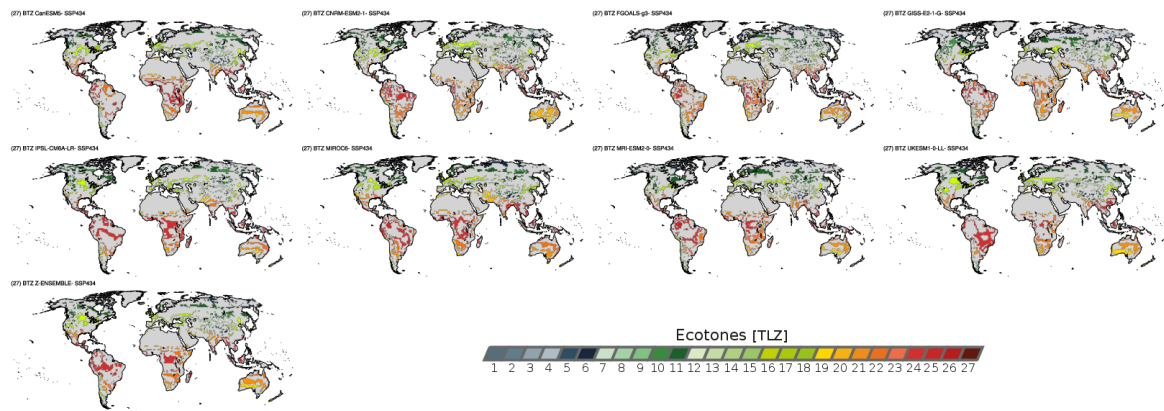
Supplementary Figure 23. Same as Supplementary Figure 22 but for SSP1-2.6.



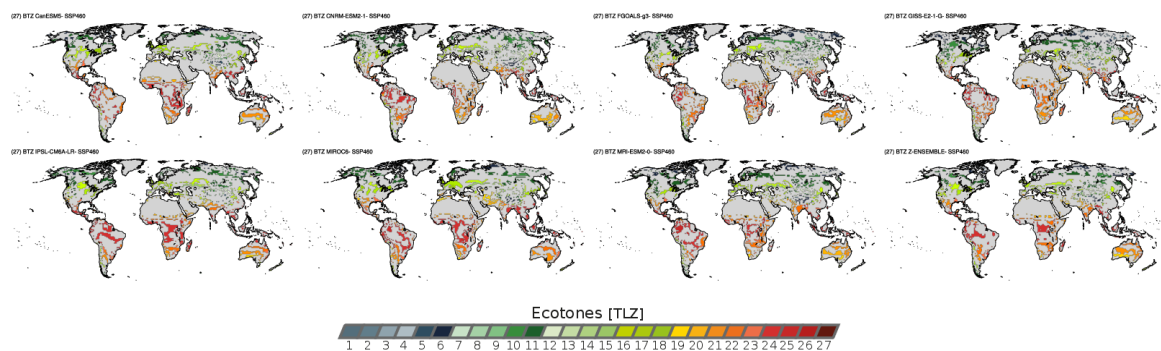
Supplementary Figure 24. Same as Supplementary Figure 22 but for SSP2-4.5.



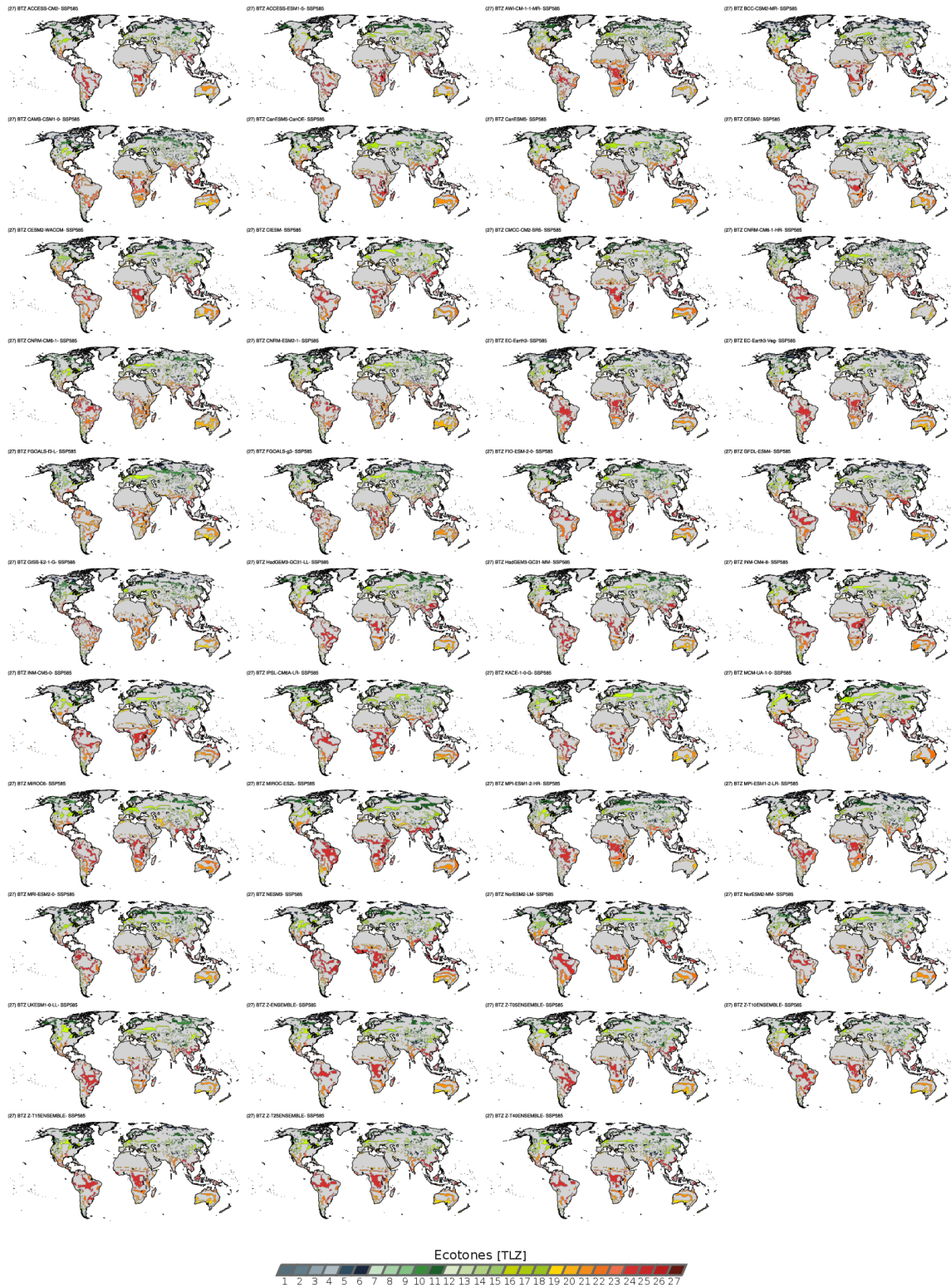
Supplementary Figure 25. Same as Supplementary Figure 22 but for SSP3-7.0.



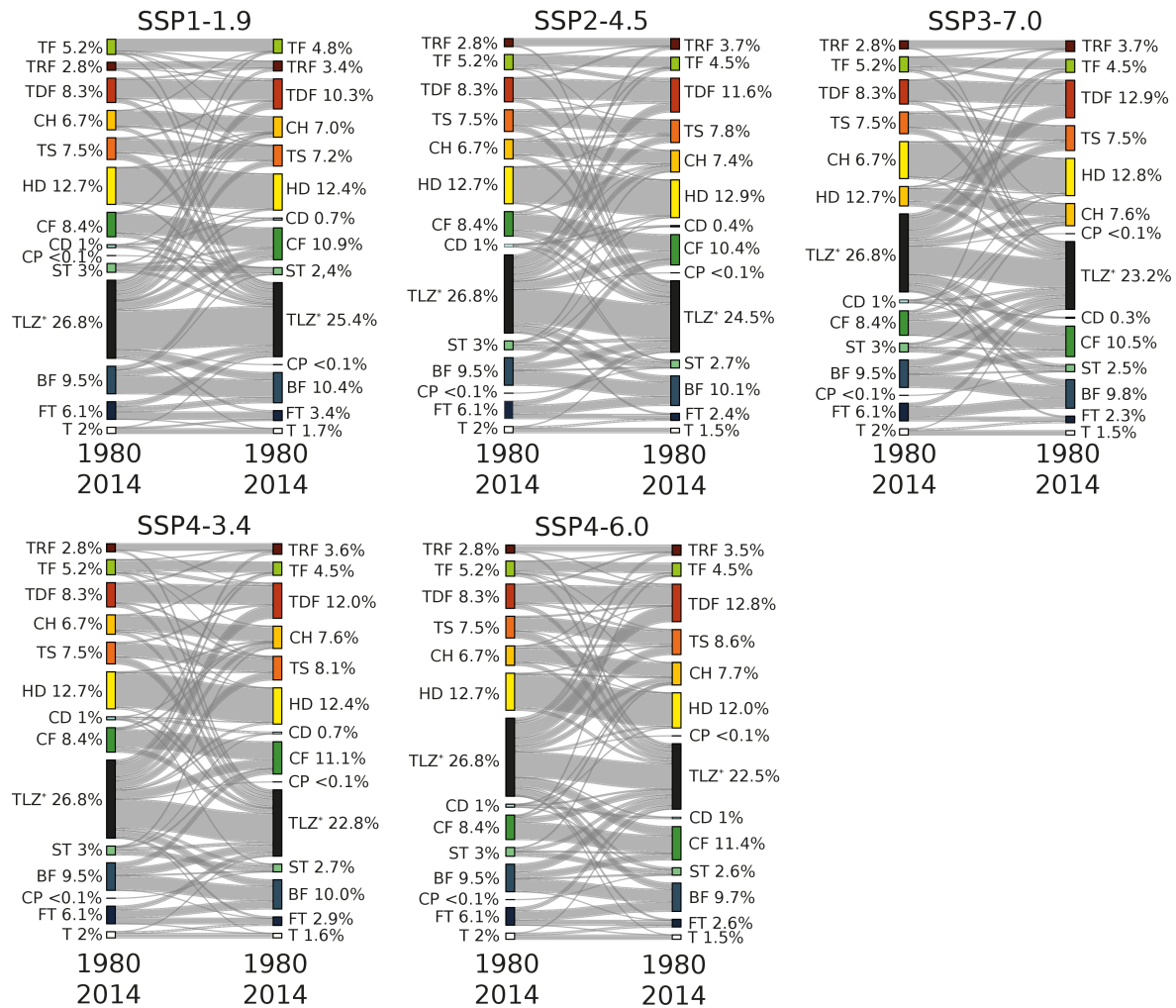
Supplementary Figure 26. Same as Supplementary Figure 22 but for SSP4-3.4.



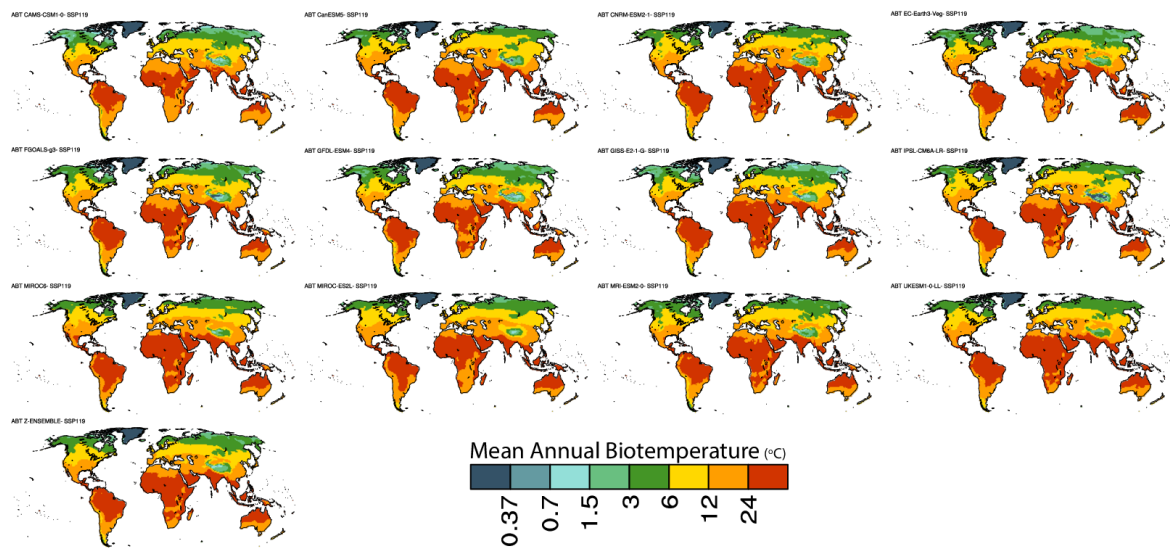
Supplementary Figure 27. Same as Supplementary Figure 22 but for SSP4-6.0.



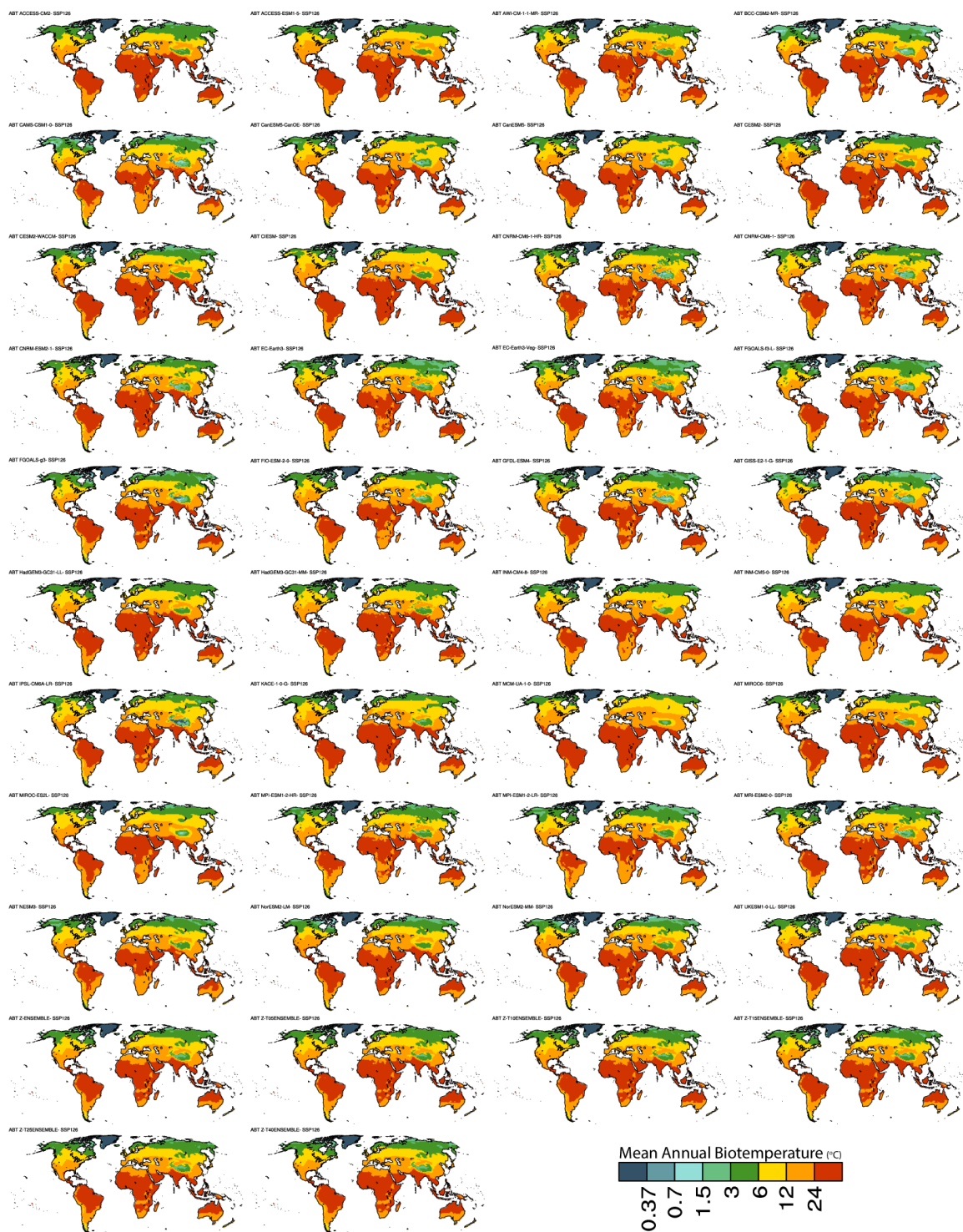
Supplementary Figure 28. Same as Supplementary Figure 22 but for SSP5-8.5.



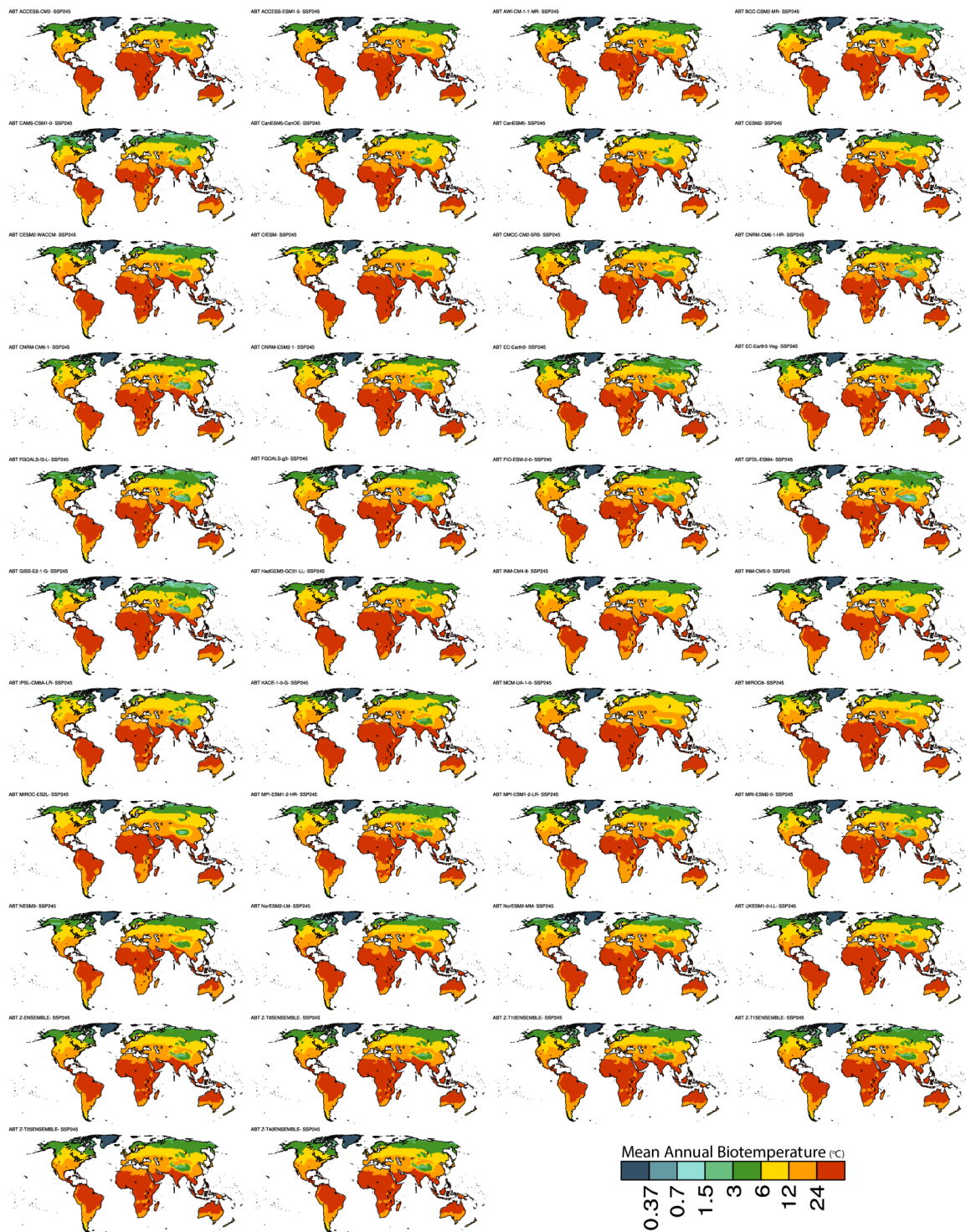
Supplementary Figure 29. Life Zone area changes from present climate (1980-2014) to future climate (2015-2100) under SSP1-1.9, SSP2-4.5, SSP3-7.0, SSP4-3.4, and SSP4-6.0. The 27 ecotones were aggregated into one category (TLZ*) for better visualization.



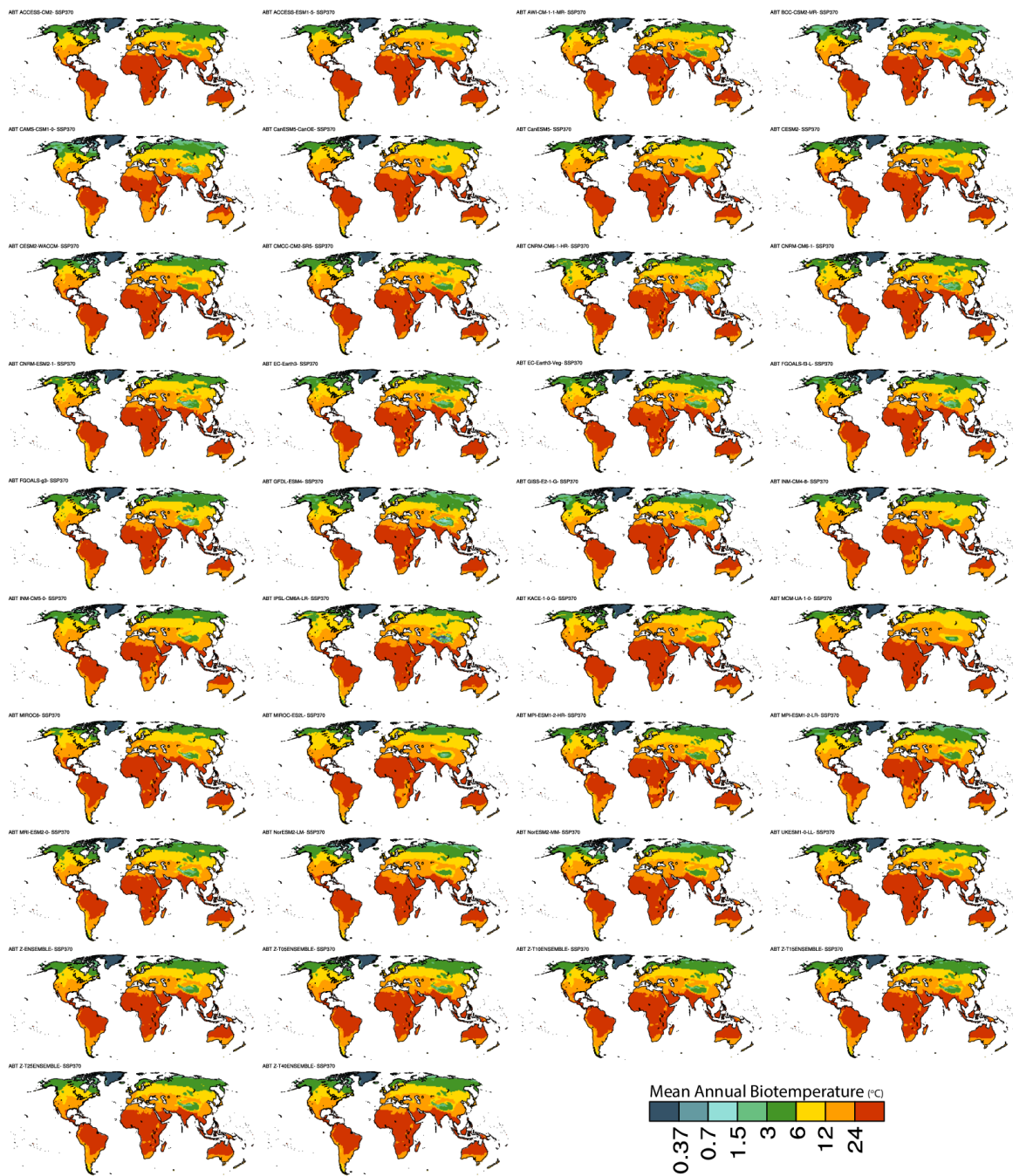
Supplementary Figure 30. Maps of mean annual biotemperature (MAB) of CMIP6 models under SSP1-1.9. Units are °C.



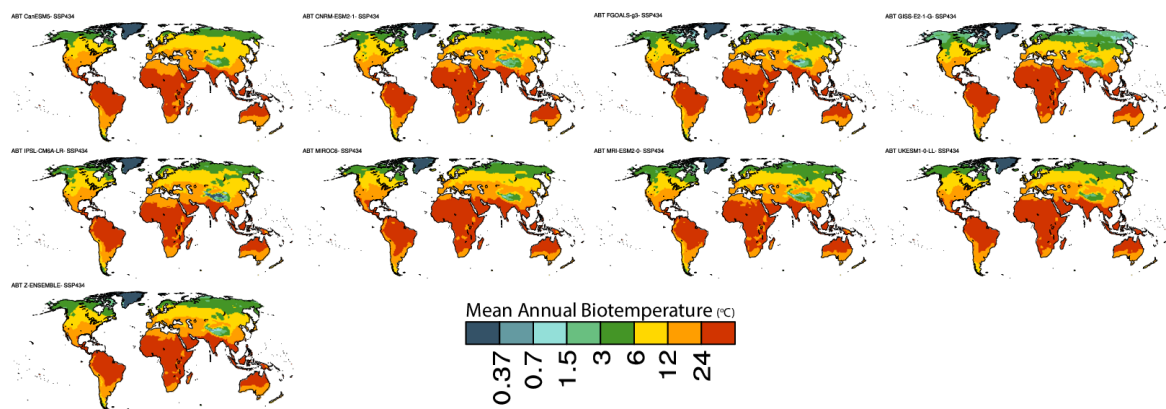
Supplementary Figure 31. Same as Supplementary Figure 30 but for SSP1-2.6.



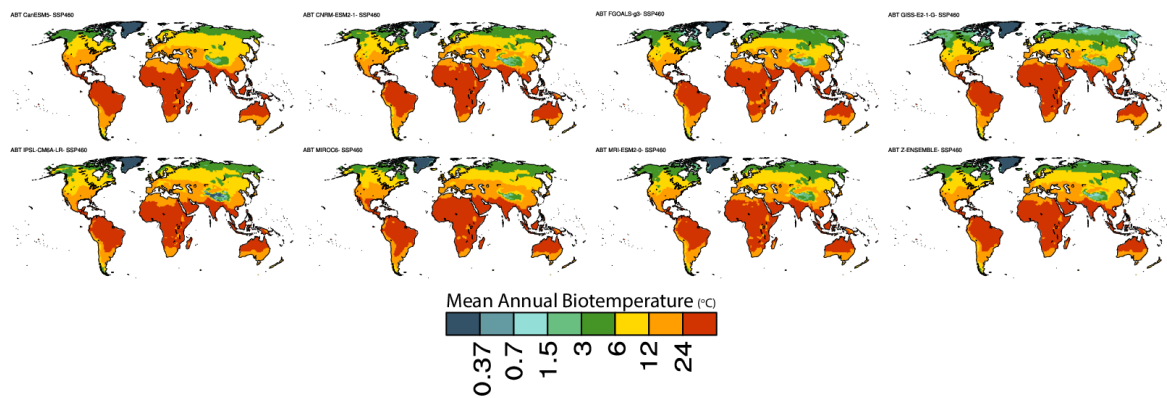
Supplementary Figure 32. Same as Supplementary Figure 30 but for SSP2-4.5.



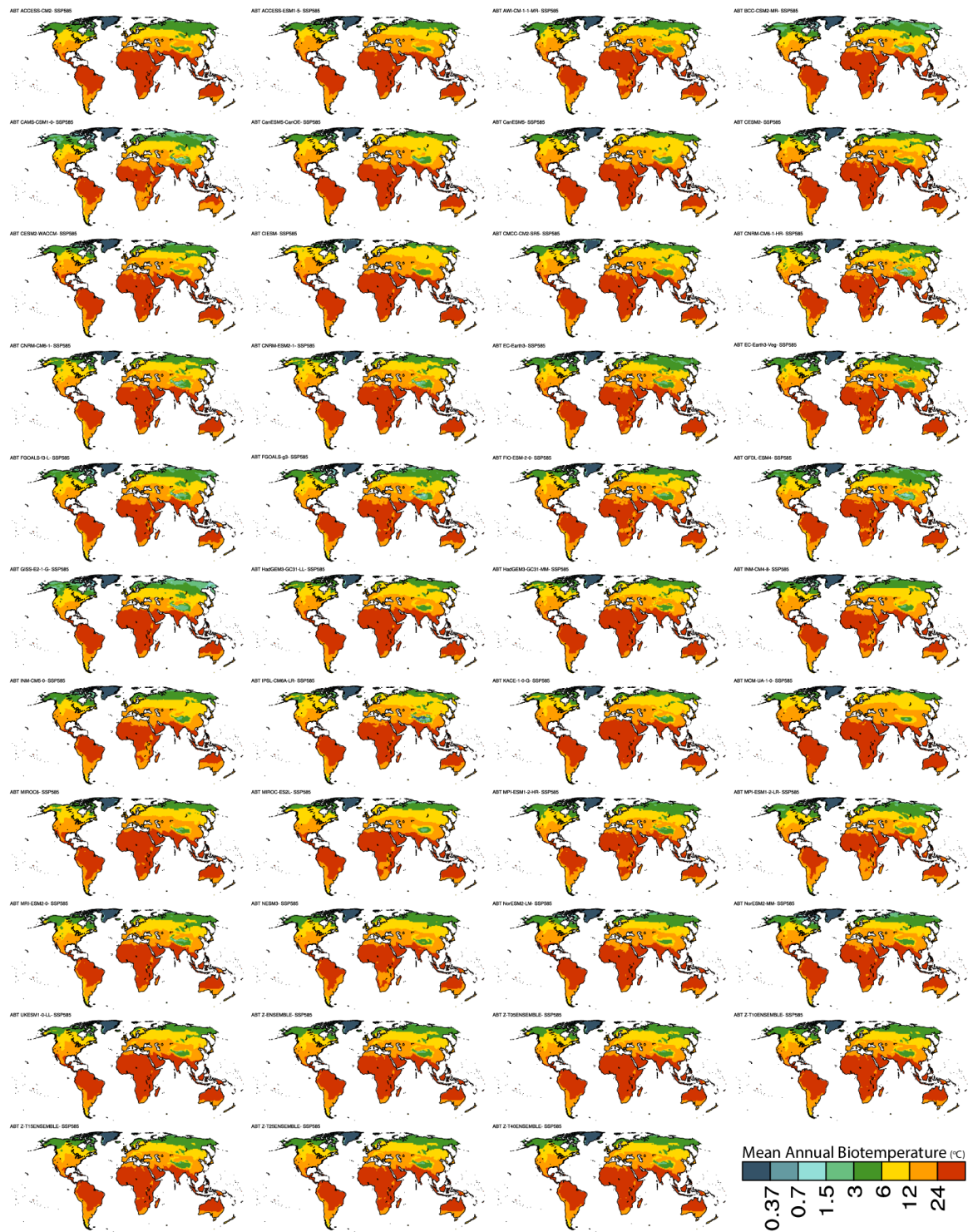
Supplementary Figure 33. Same as Supplementary Figure 30 but for SSP3-7.0.



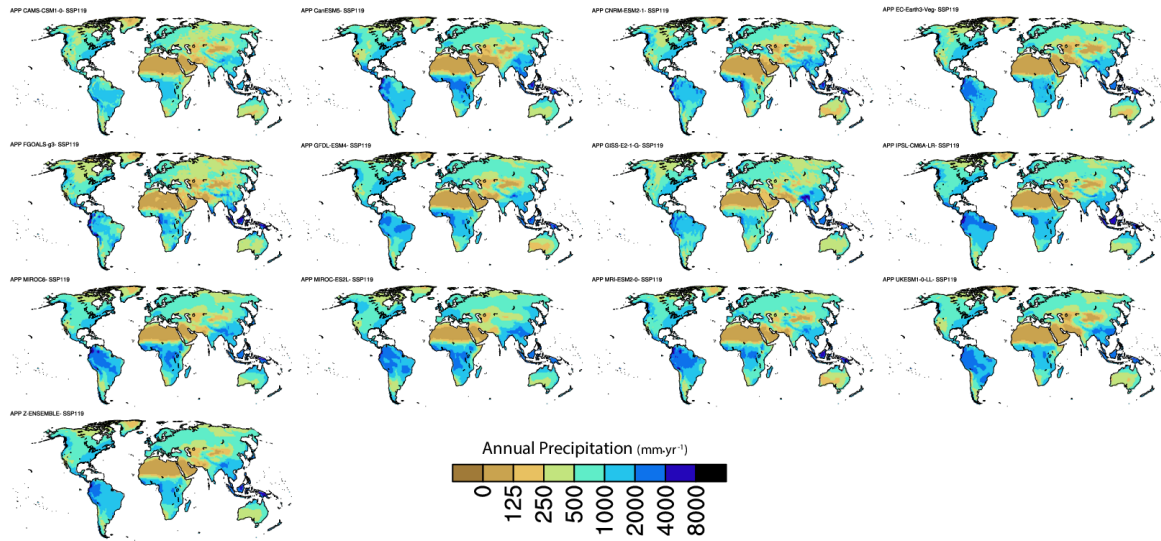
Supplementary Figure 34. Same as Supplementary Figure 30 but for SSP4-3.4.



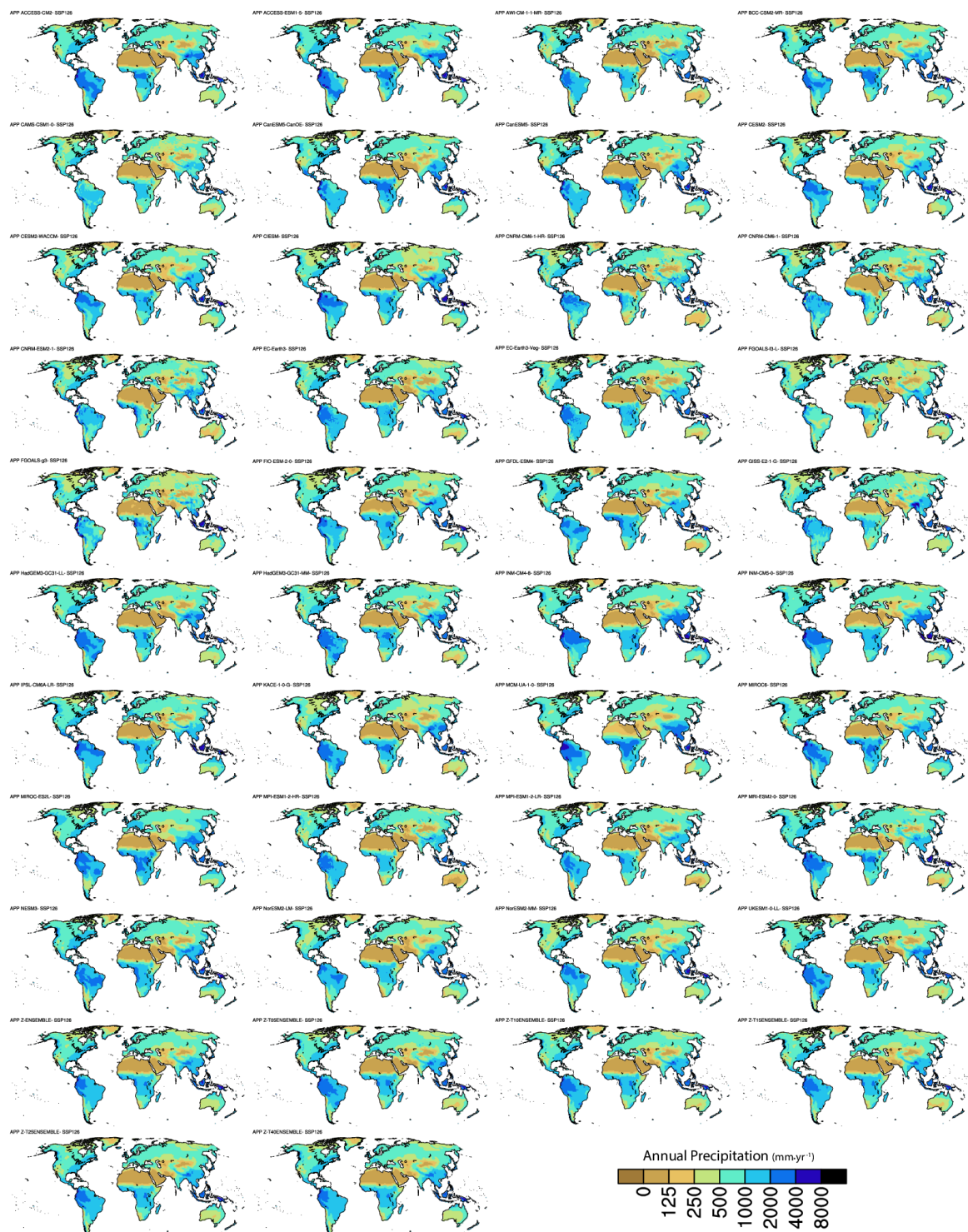
Supplementary Figure 35. Same as Supplementary Figure 30 but for SSP4-6.0.



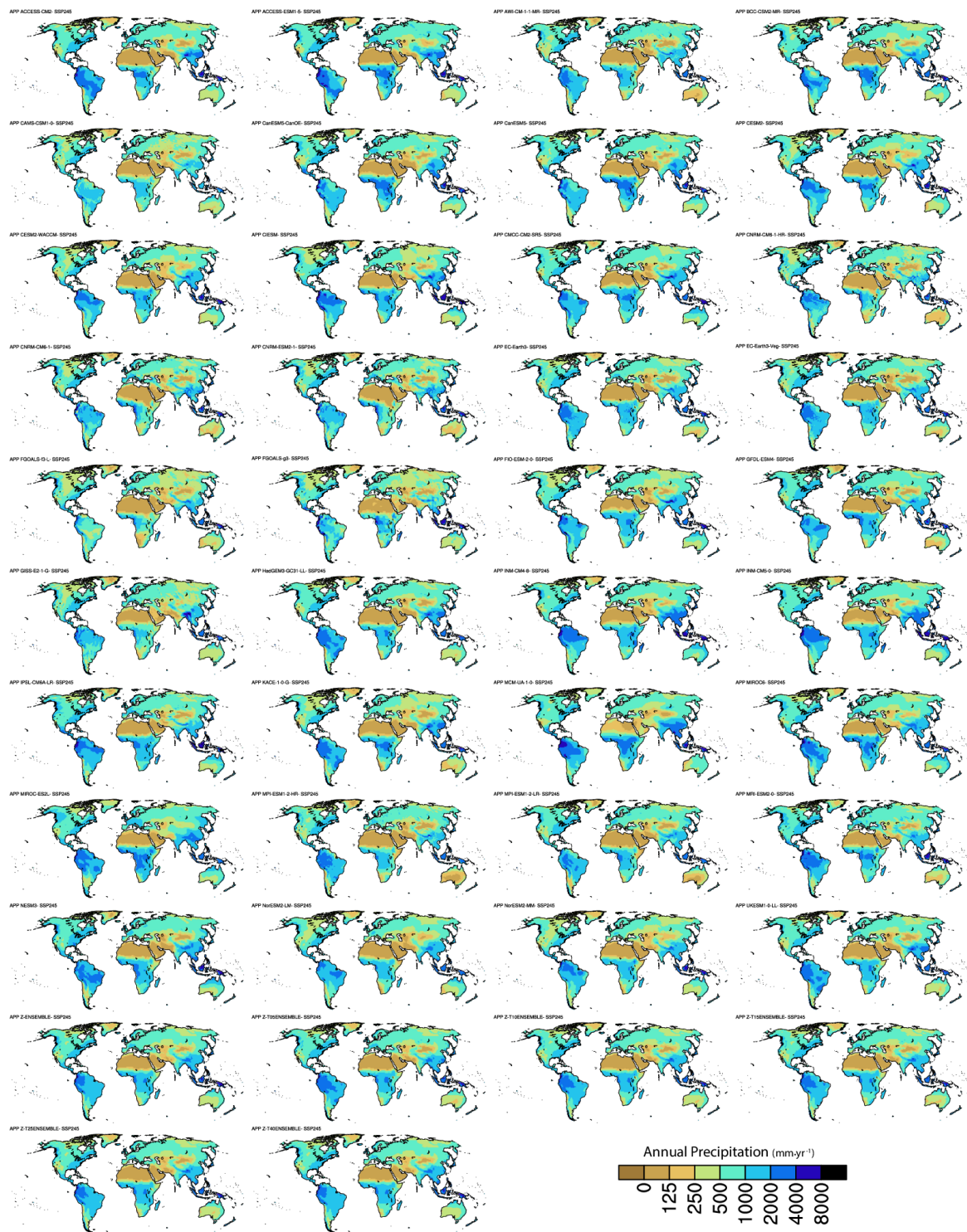
Supplementary Figure 36. Same as Supplementary Figure 30 but for SSP5-8.5.



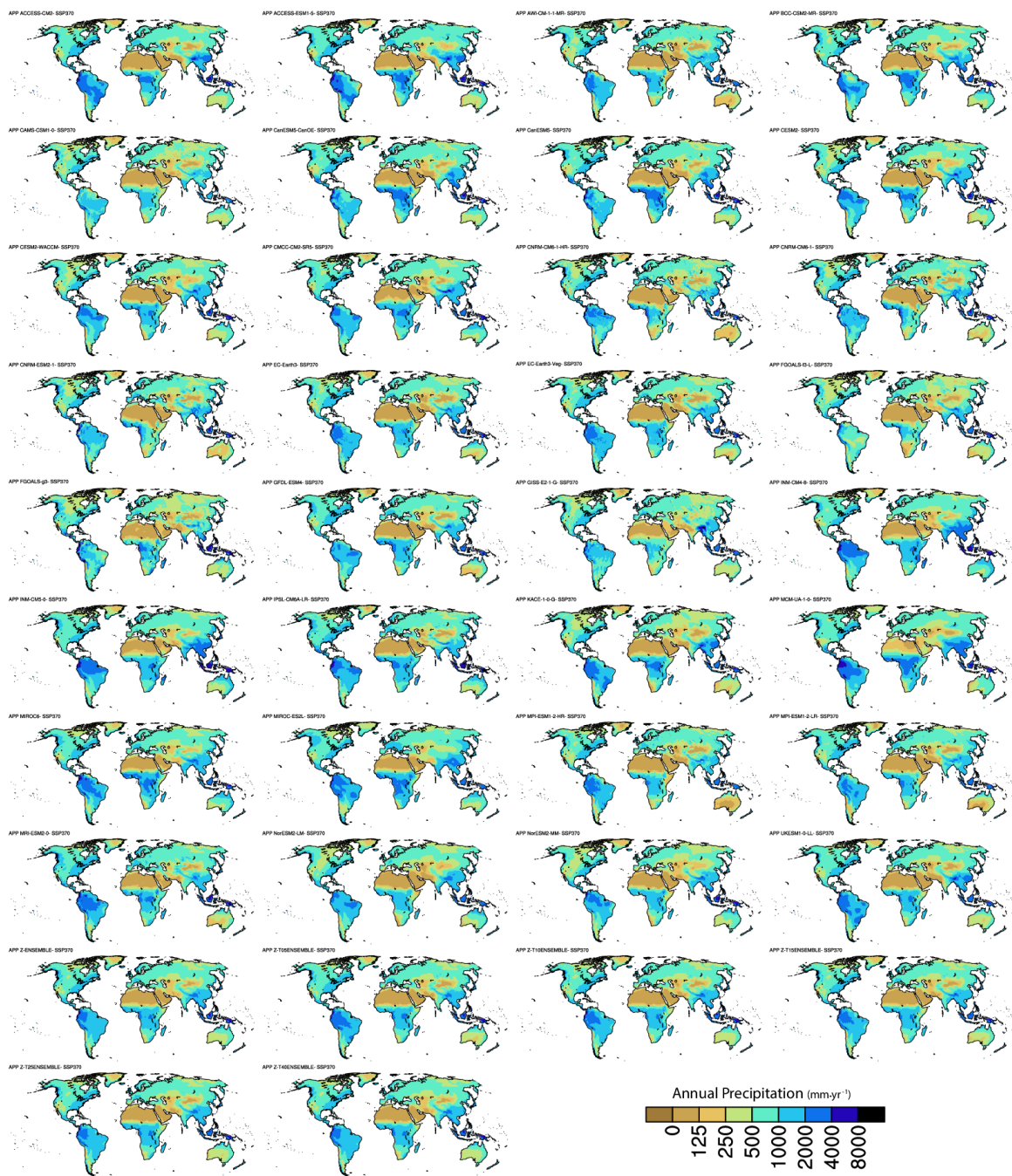
Supplementary Figure 37. Maps of annual precipitation (APR) of CMIP6 models under SSP1-1.9. Units are $\text{mm}\cdot\text{yr}^{-1}$.



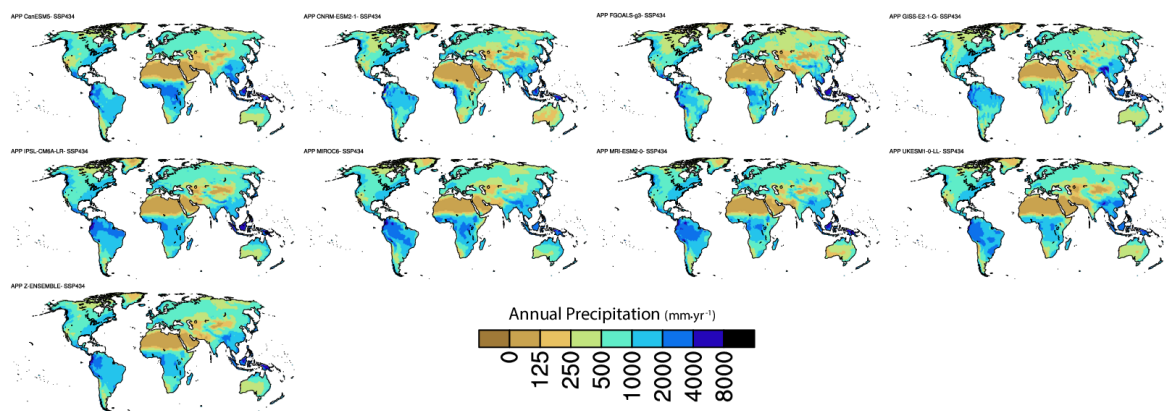
Supplementary Figure 38. Same as Supplementary Figure 37 but for SSP1-2.6.



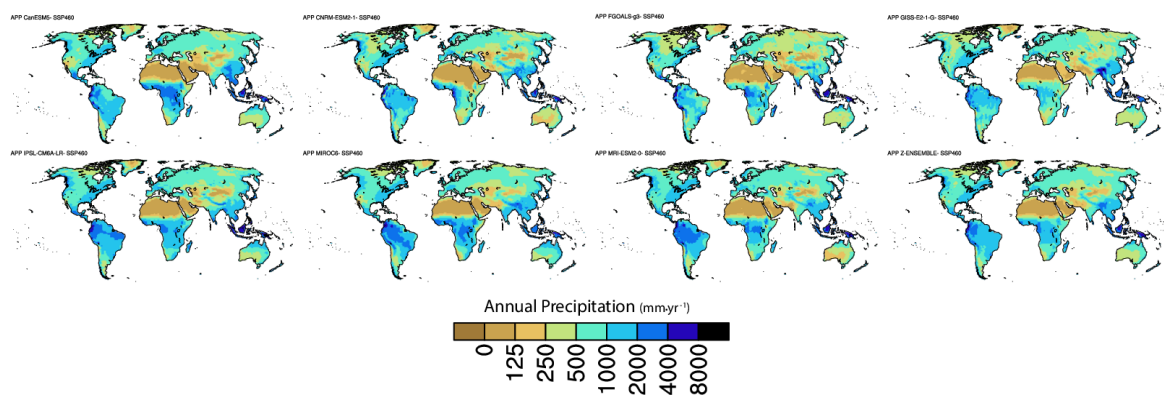
Supplementary Figure 39. Same as Supplementary Figure 37 but for SSP2-4.5.



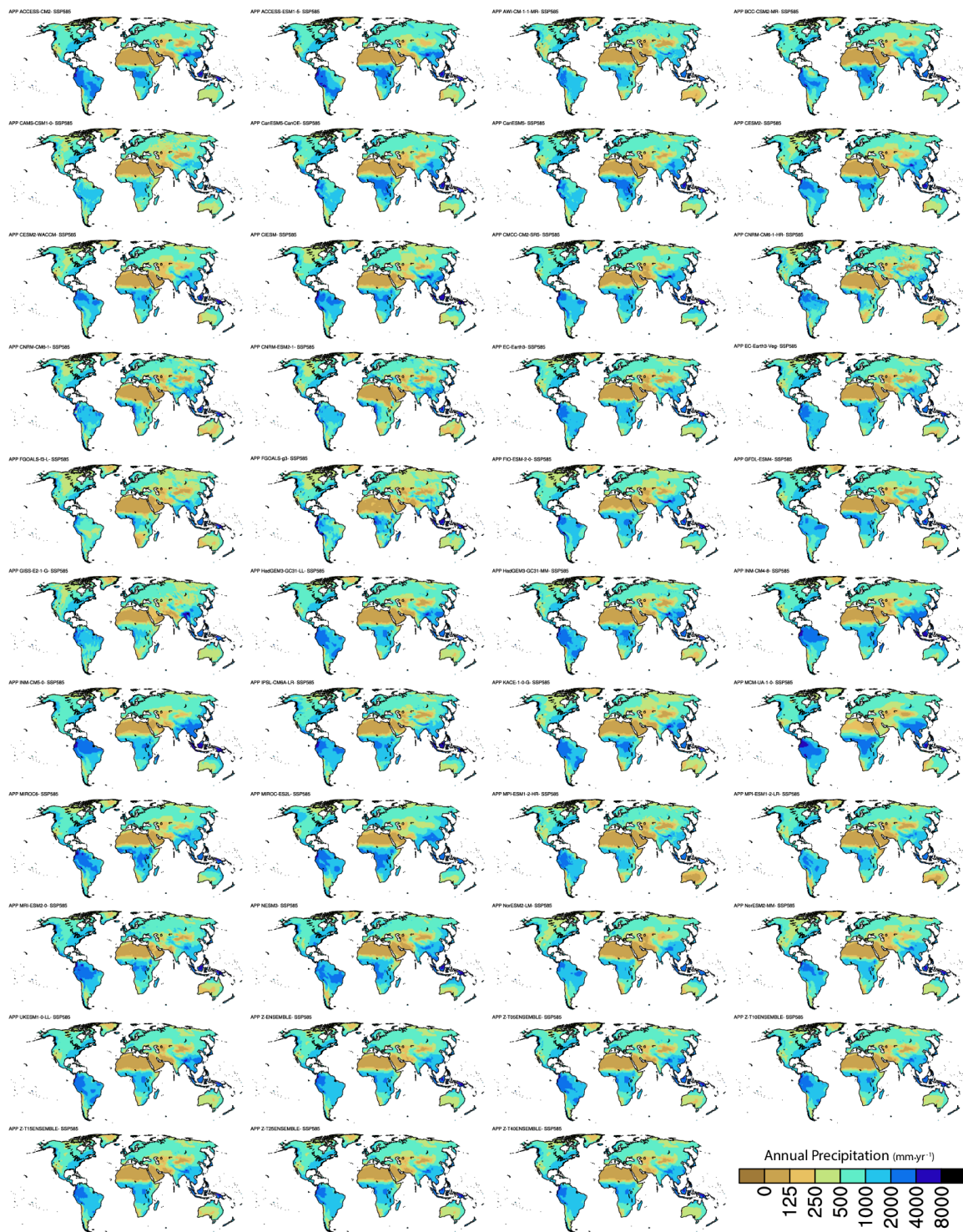
Supplementary Figure 40. Same as Supplementary Figure 37 but for SSP3-7.0.



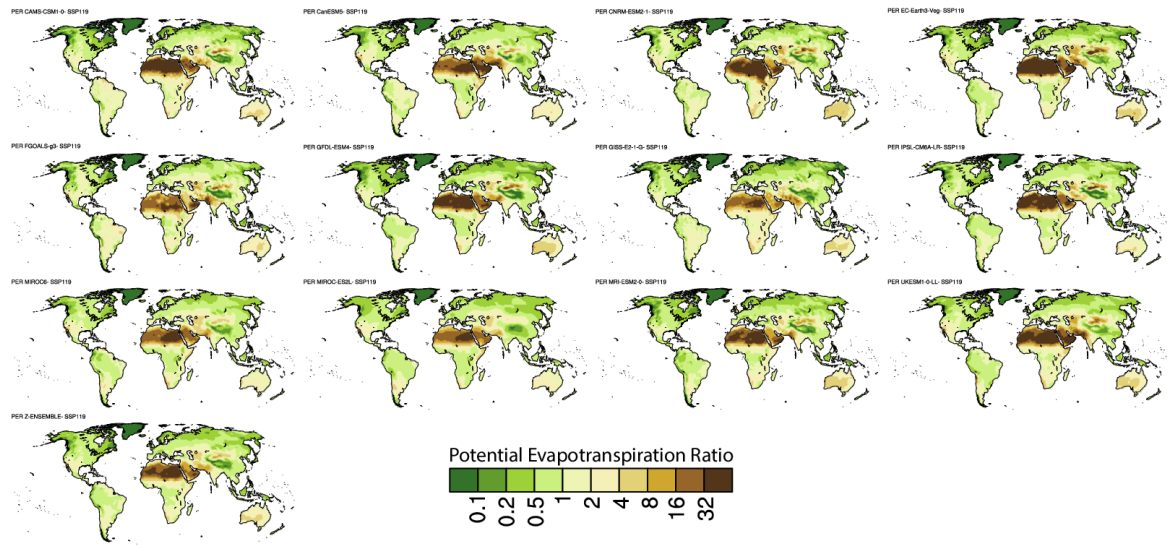
Supplementary Figure 41. Same as Supplementary Figure 37 but for SSP4-3.4.



Supplementary Figure 42. Same as Supplementary Figure 37 but for SSP4-6.0.



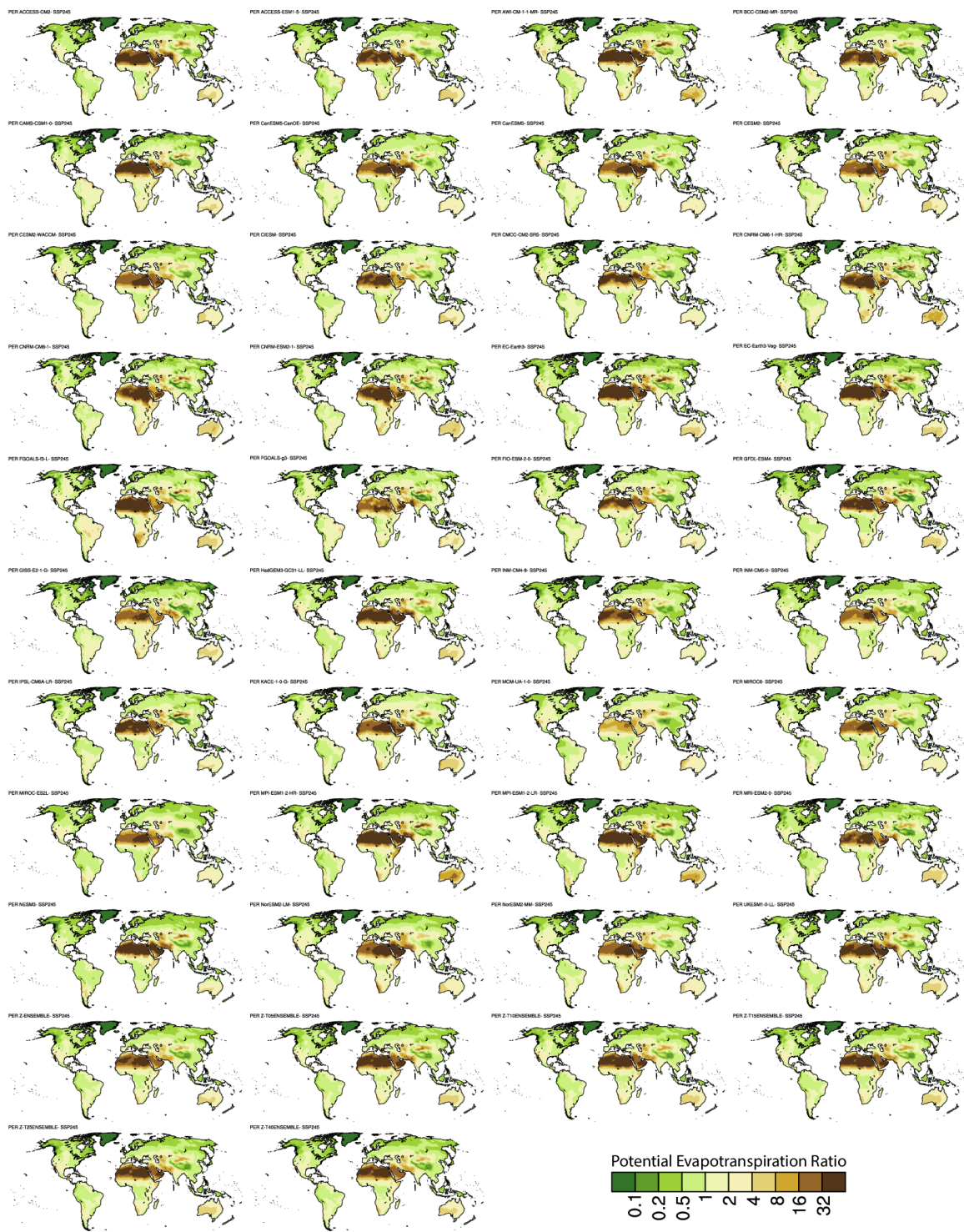
Supplementary Figure 43. Same as Supplementary Figure 37 but for SSP5-8.5.



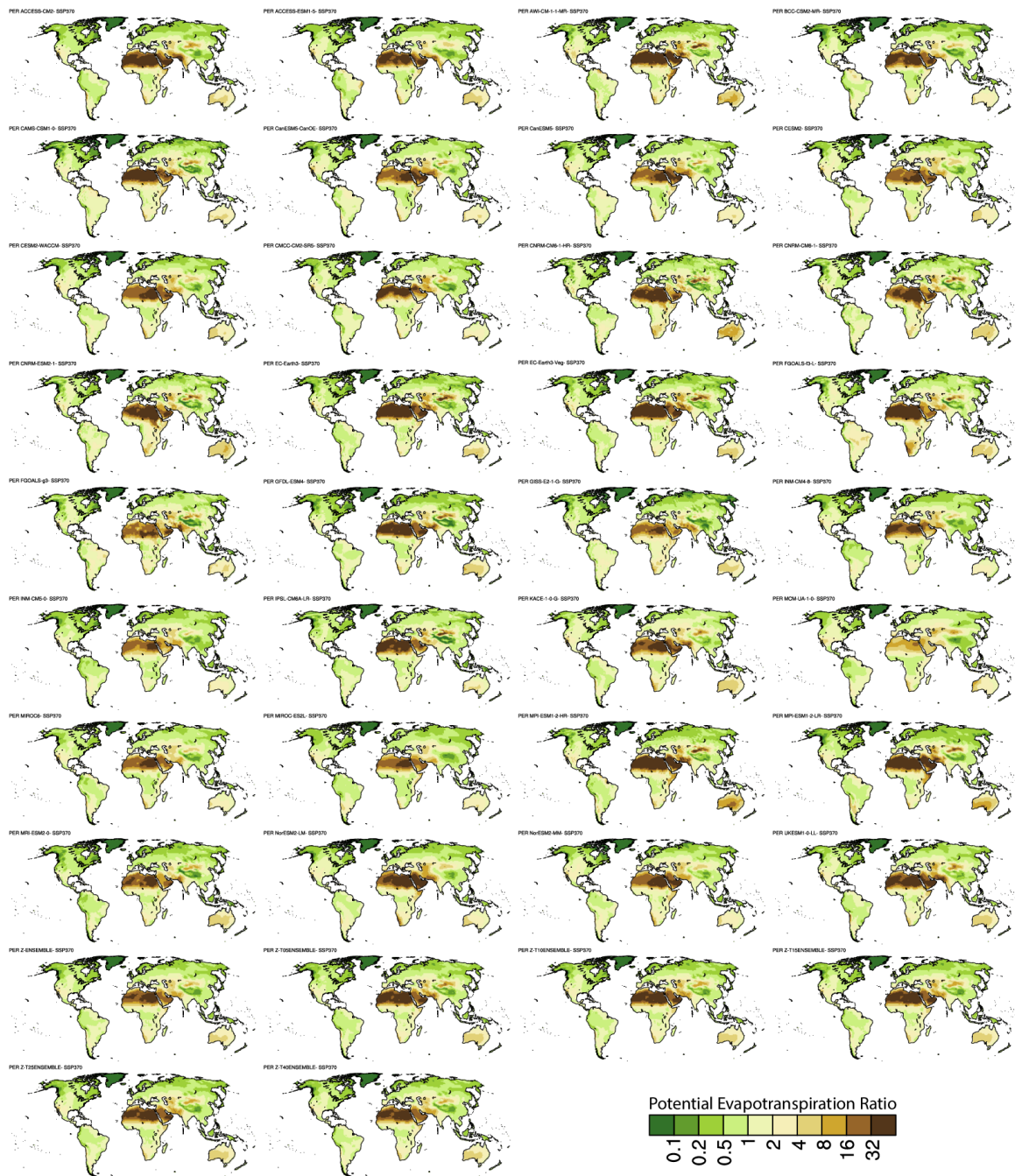
Supplementary Figure 44. Maps of potential evapotranspiration ratio (PER) of CMIP6 models under SSP1-1.9.



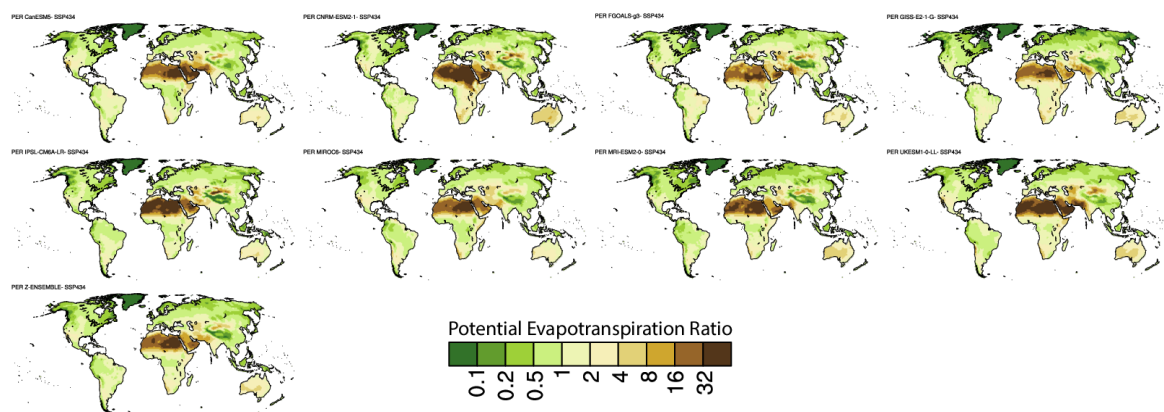
Supplementary Figure 45. Same as Supplementary Figure 44 but for SSP1-2.6.



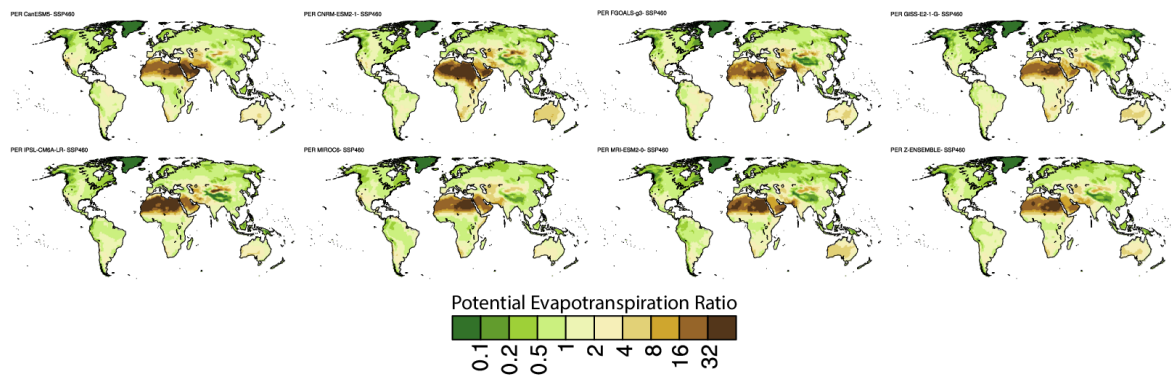
Supplementary Figure 46. Same as Supplementary Figure 44 but for SSP2-4.5.



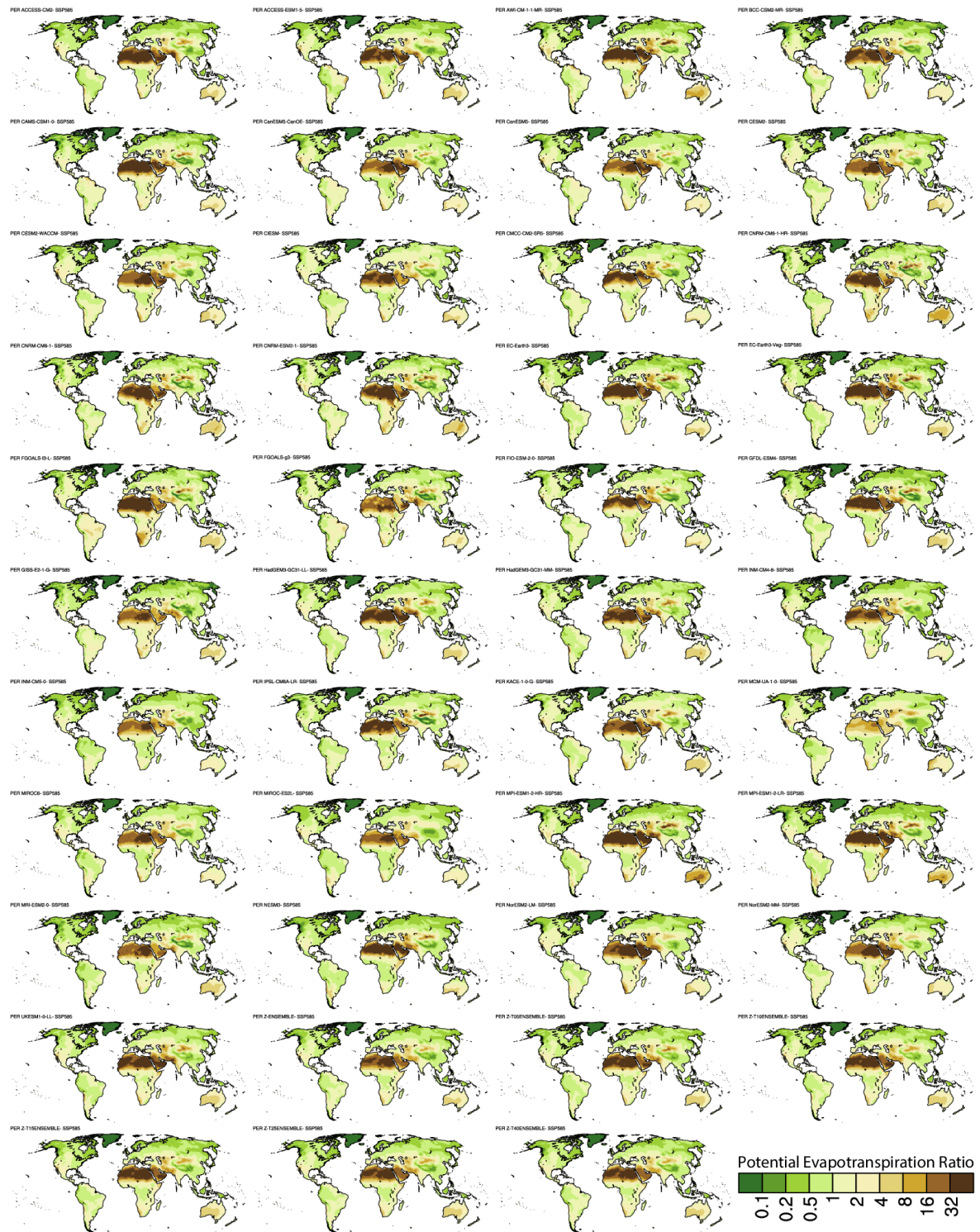
Supplementary Figure 47. Same as Supplementary Figure 44 but for SSP3-7.0.



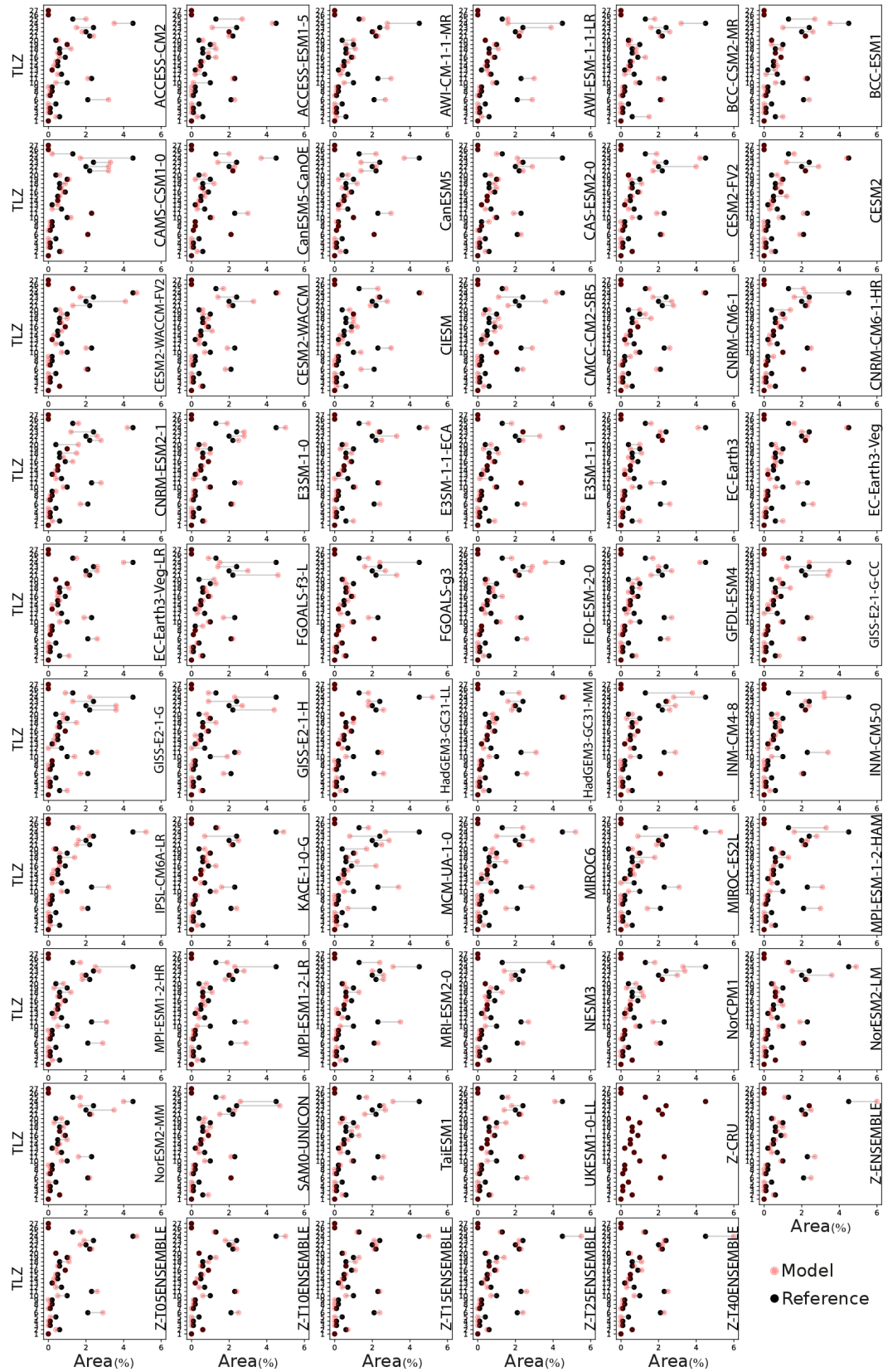
Supplementary Figure 48. Same as Supplementary Figure 44 but for SSP4-3.4.



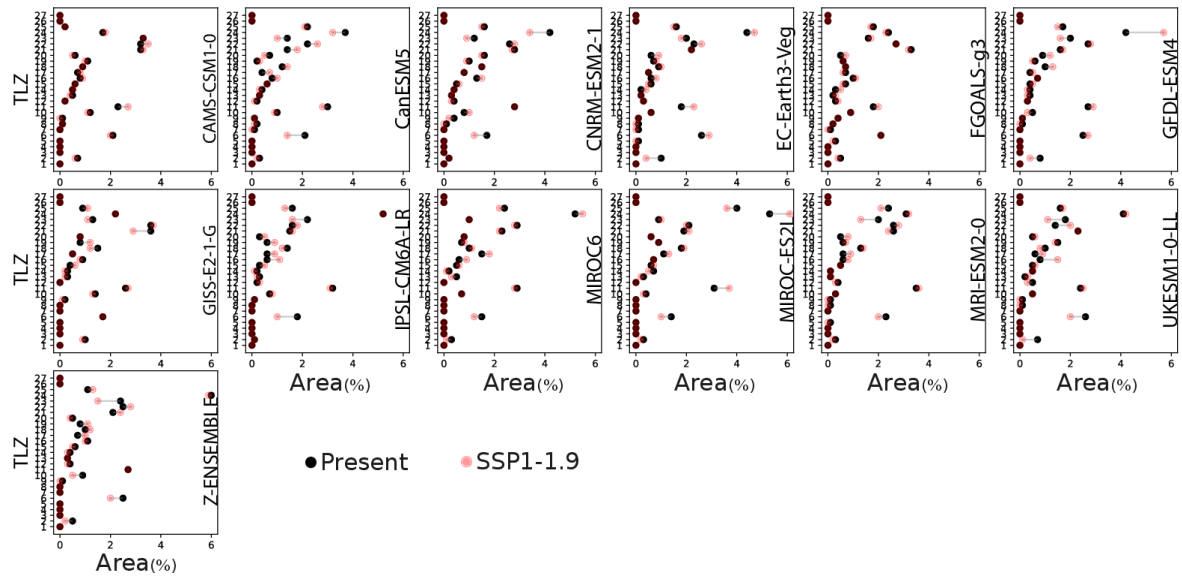
Supplementary Figure 49. Same as Supplementary Figure 44 but for SSP4-6.0.



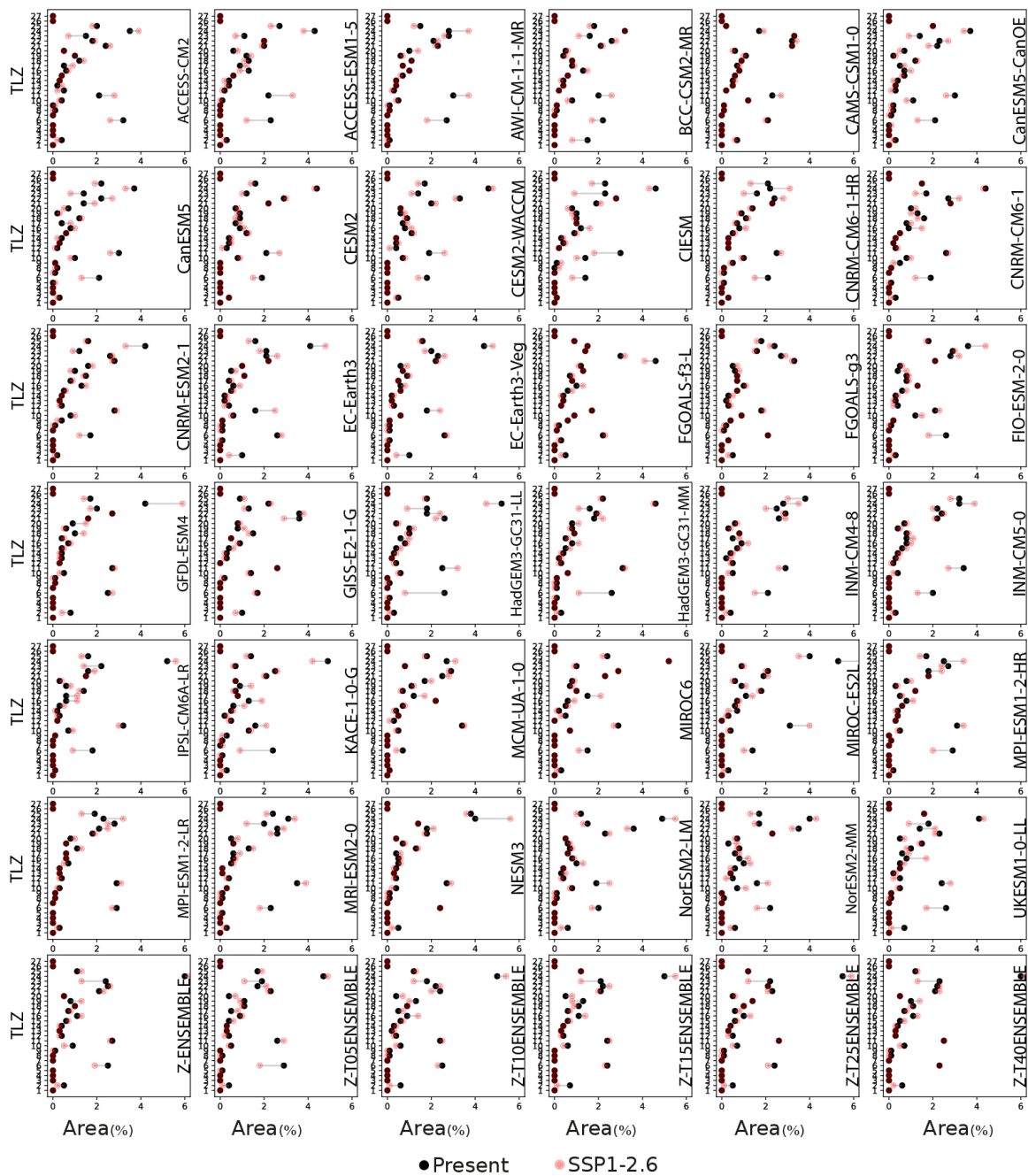
Supplementary Figure 50. Same as Supplementary Figure 44 but for SSP5-8.5.



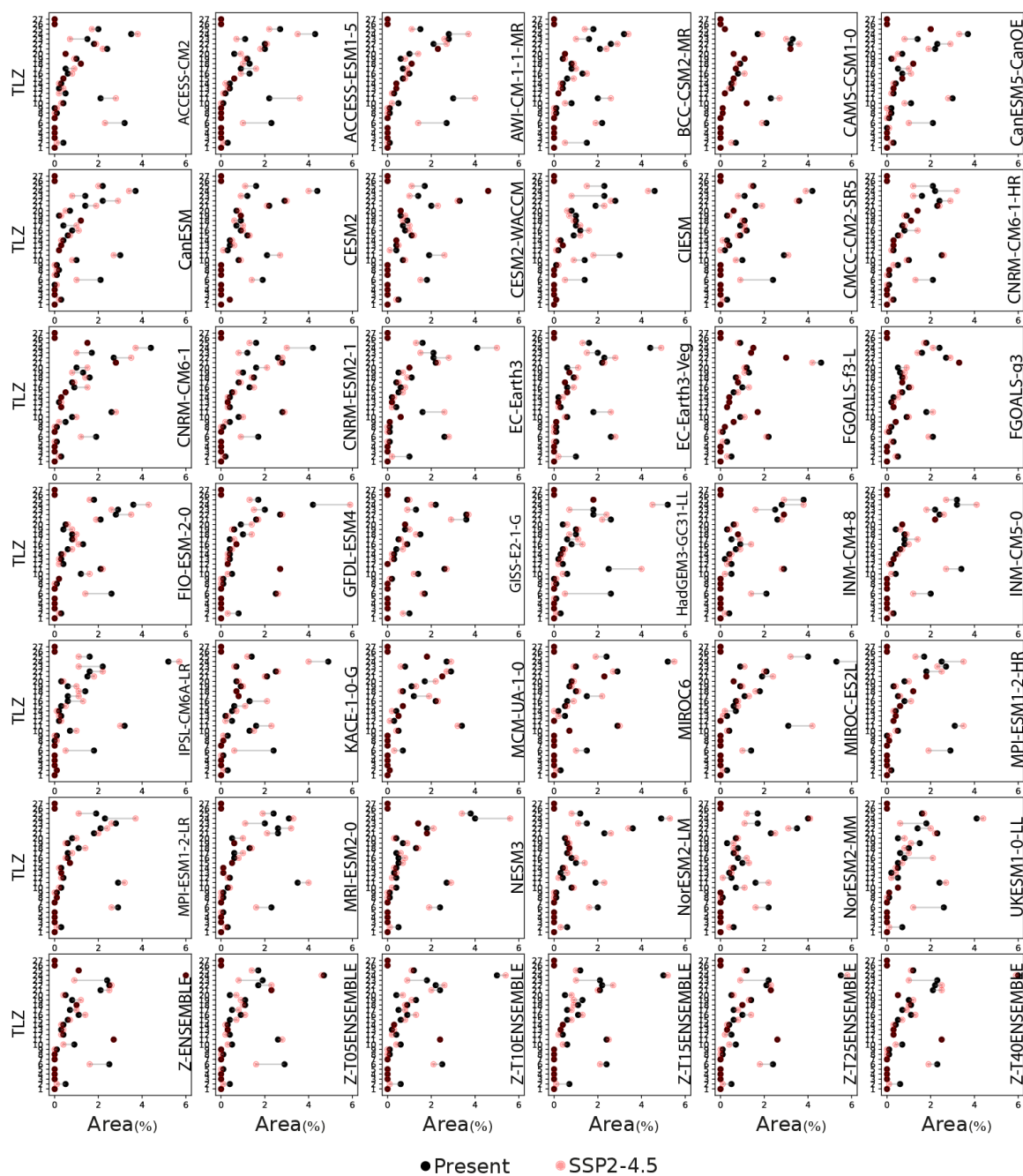
Supplementary Figure 51. Steam plots of observed (black) and modeled (red) area (%) that is covered by each one of the 27 ecotones (TLZs) under present climate (1980-2014).



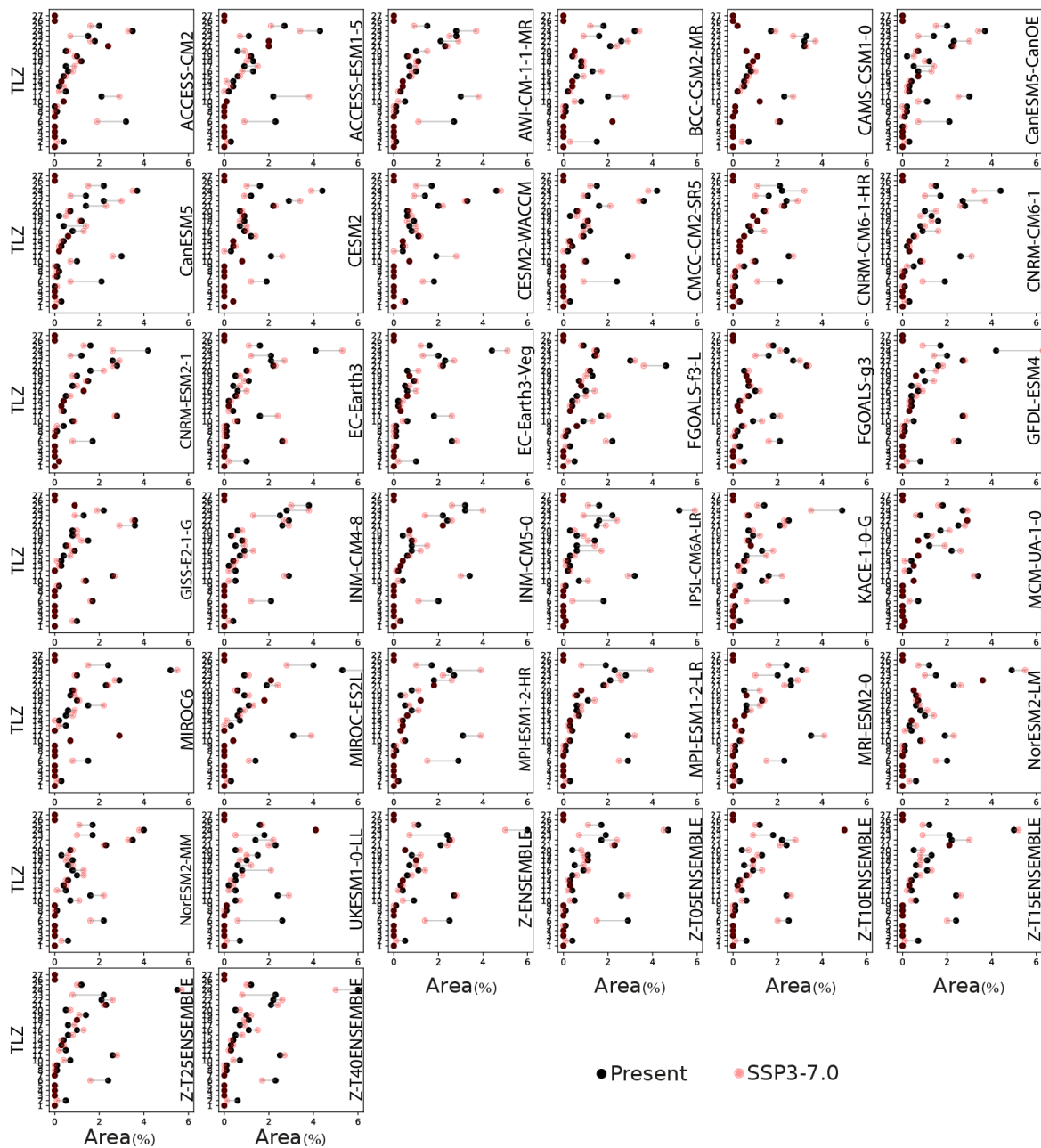
Supplementary Figure 52. Steam plots of future changes in the percentage of the total area covered by each one of the 27 ecotones (TLZs). Blacks are present (1980-2014) and reds are future estimates (SSP1-1.9).



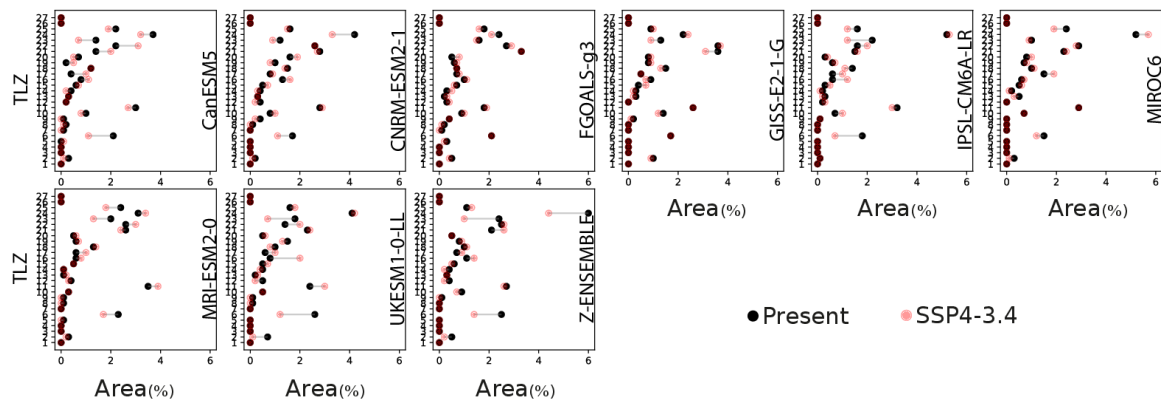
Supplementary Figure 53. Same as Supplementary Figure 52 but for SSP1-2.6.



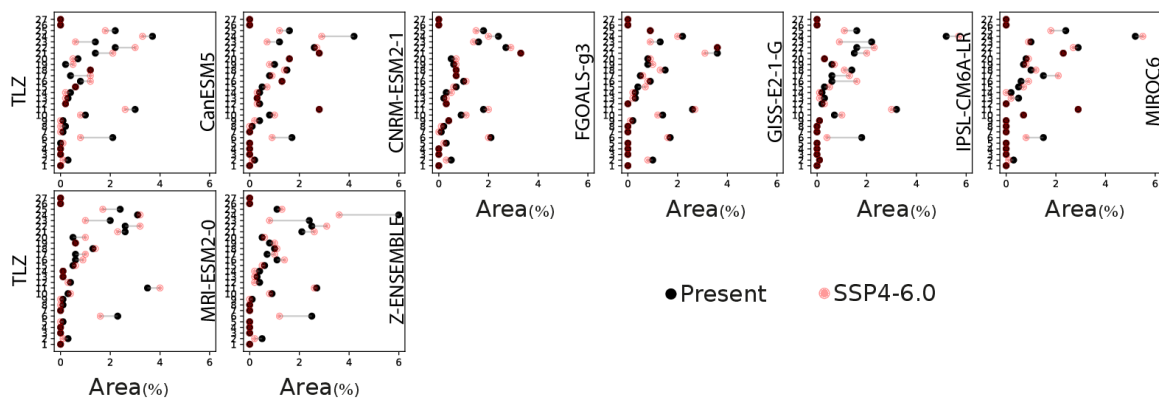
Supplementary Figure 54. Same as Supplementary Figure 52 but for SSP2-4.5.



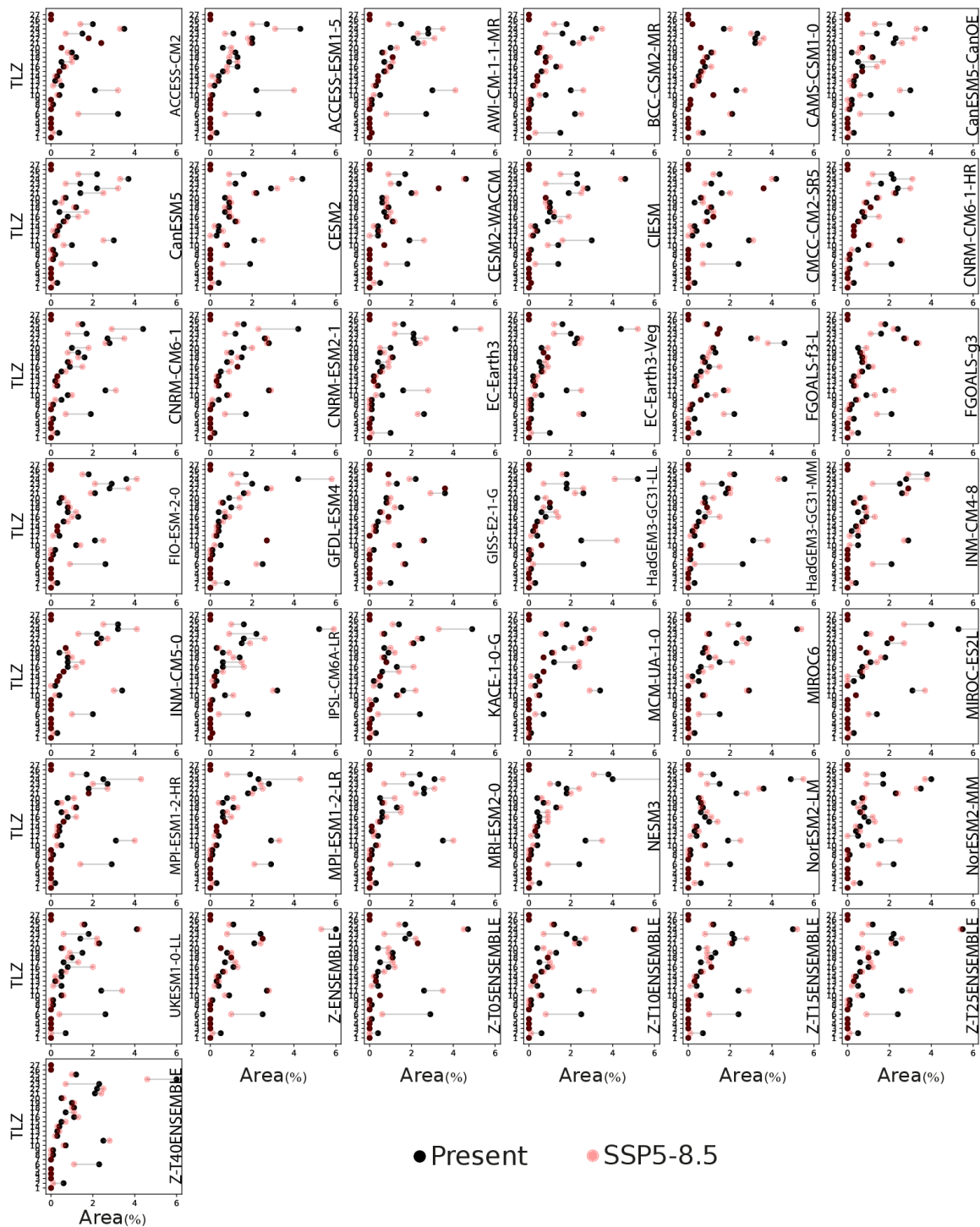
Supplementary Figure 55. Same as Supplementary Figure 52 but for SSP3-7.0.



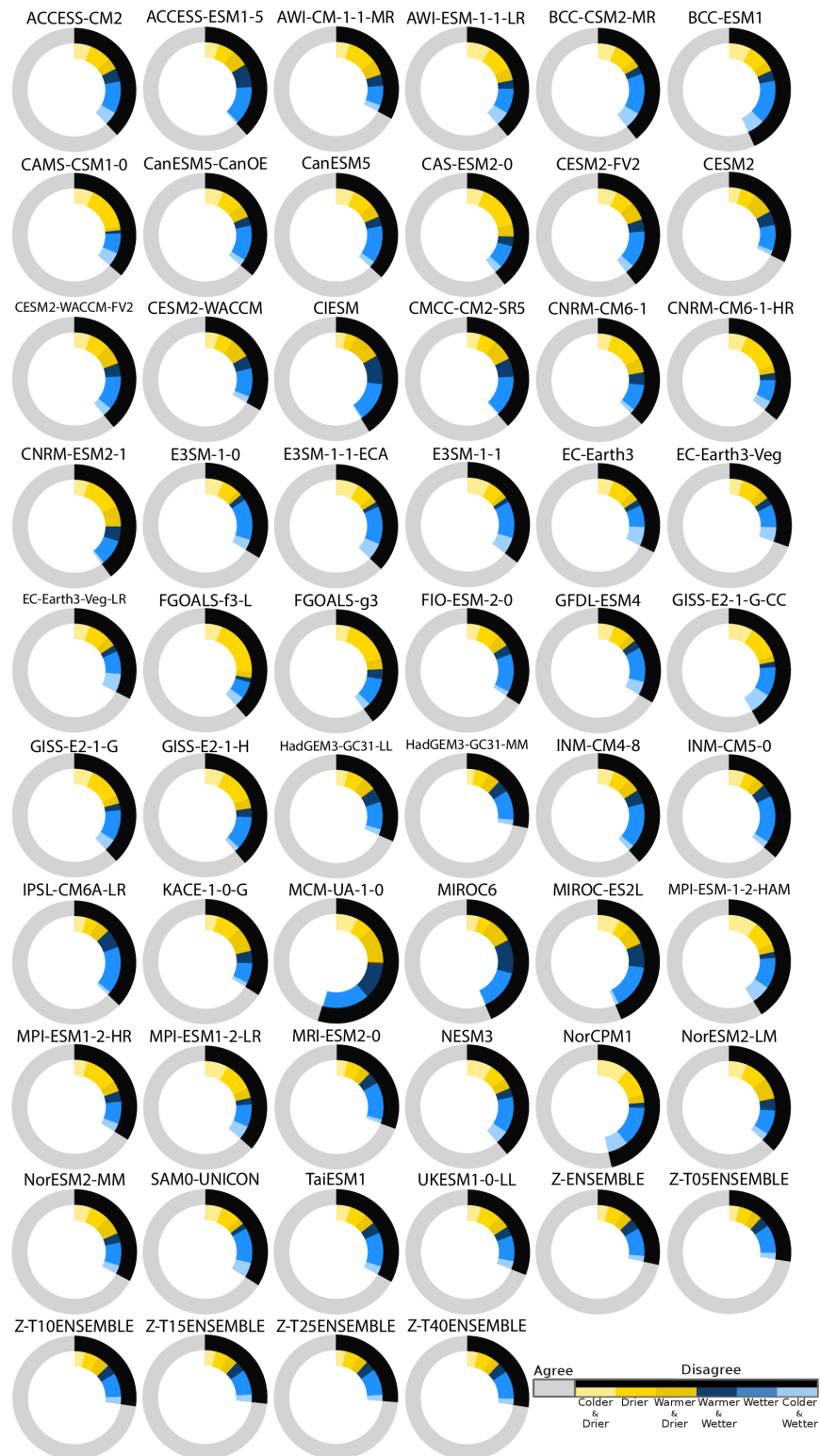
Supplementary Figure 56. Same as Supplementary Figure 52 but for SSP4-3.4.



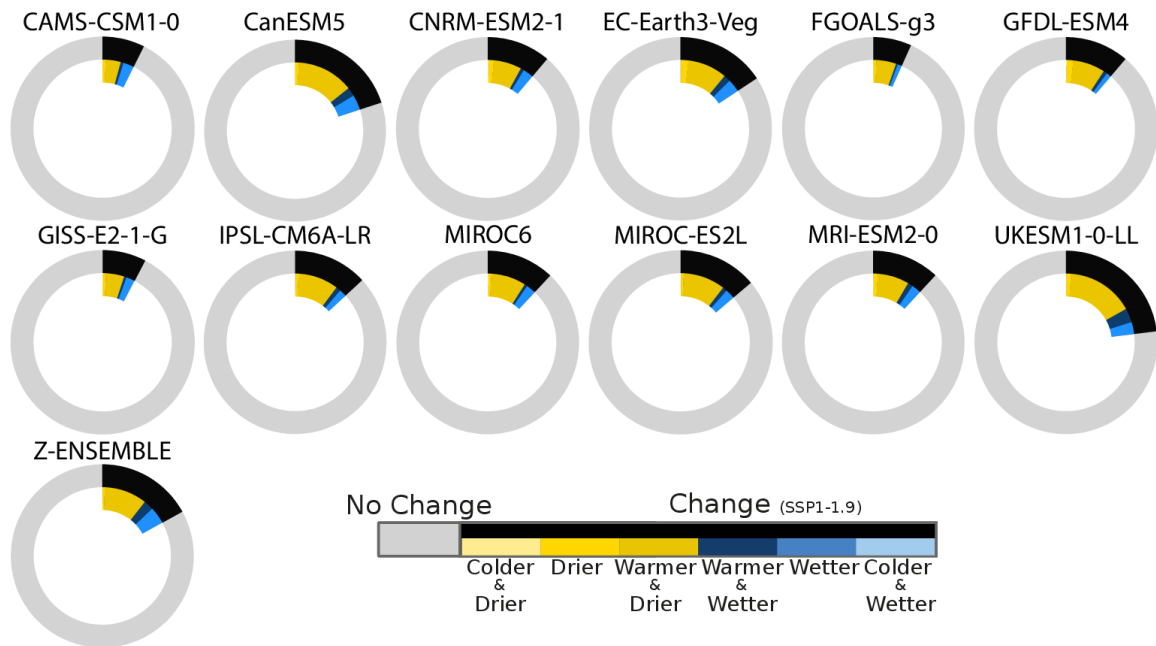
Supplementary Figure 57. Same as Supplementary Figure 52 but for SSP4-6.0.



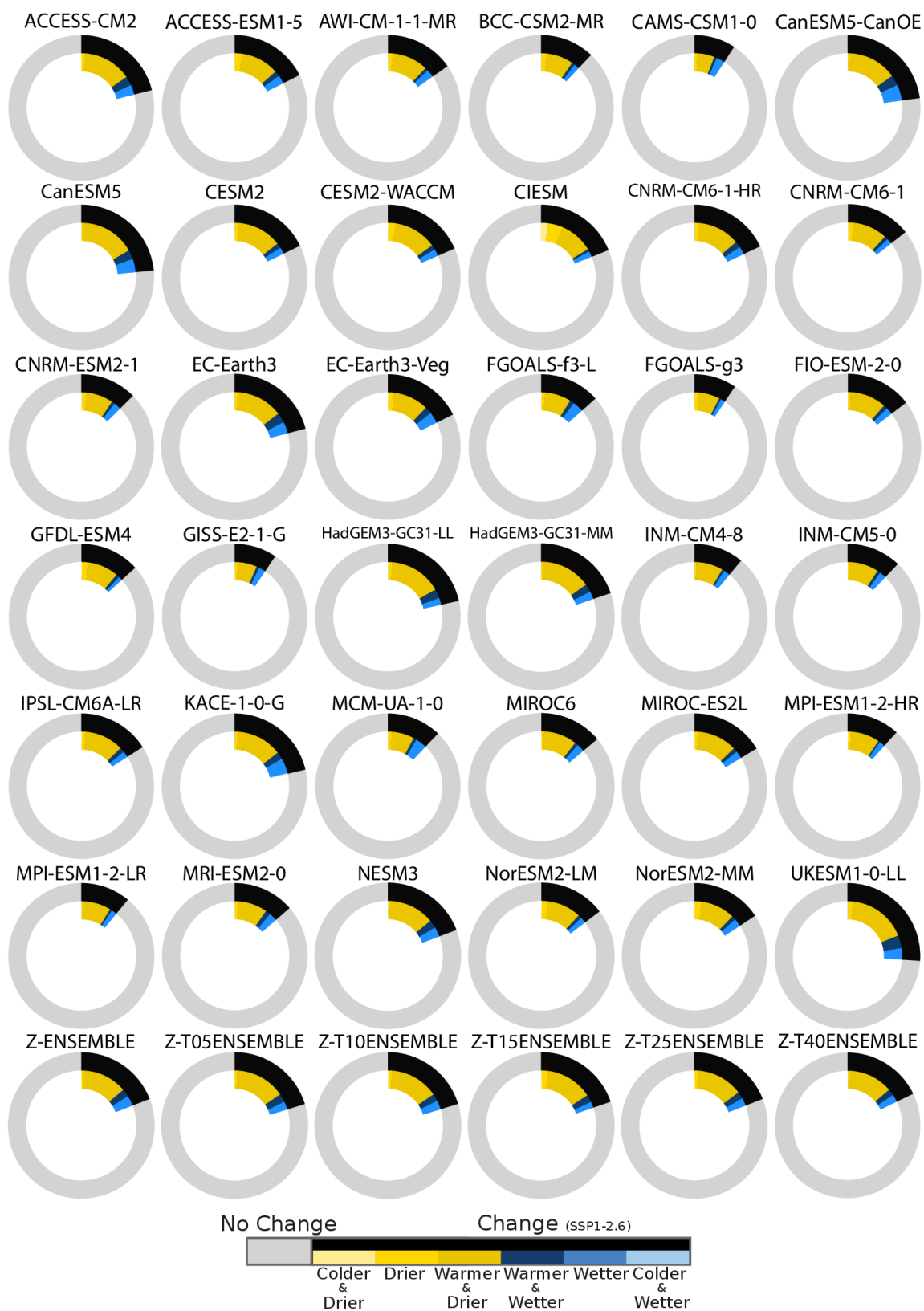
Supplementary Figure 58. Same as Supplementary Figure 52 but for SSP5-8.5.



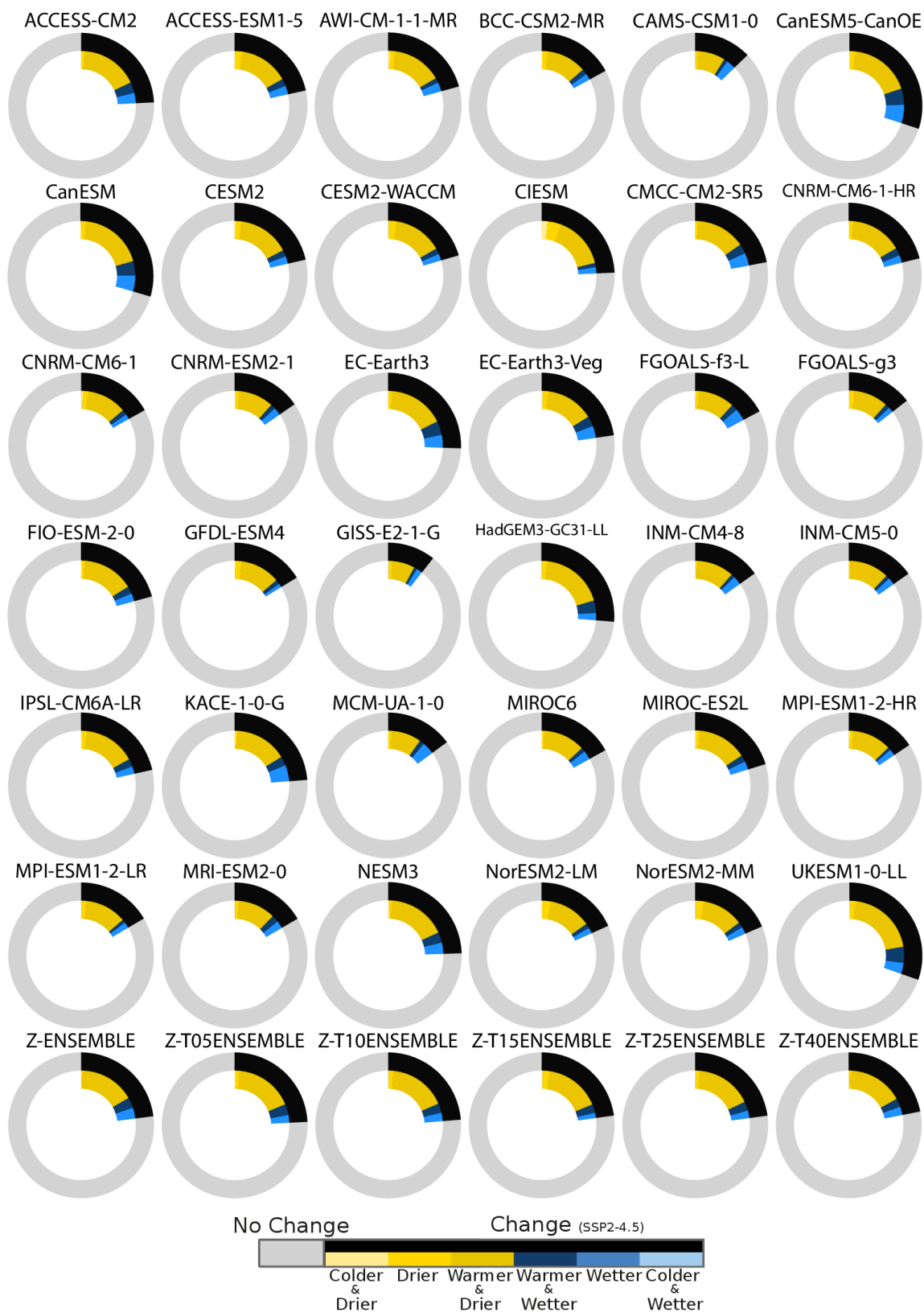
Supplementary Figure 59. Double donut plots showing the proportion of the agreement (% of the total area) between modeled and observed Life Zones for present climate (1980-2014). Yellow, light yellow and dark yellow are drier, colder & drier, and warmer & drier conditions than reference data. Blue, dark blue and light blue are wetter, warmer & wetter, and colder & wetter conditions. Gray shows agreement.



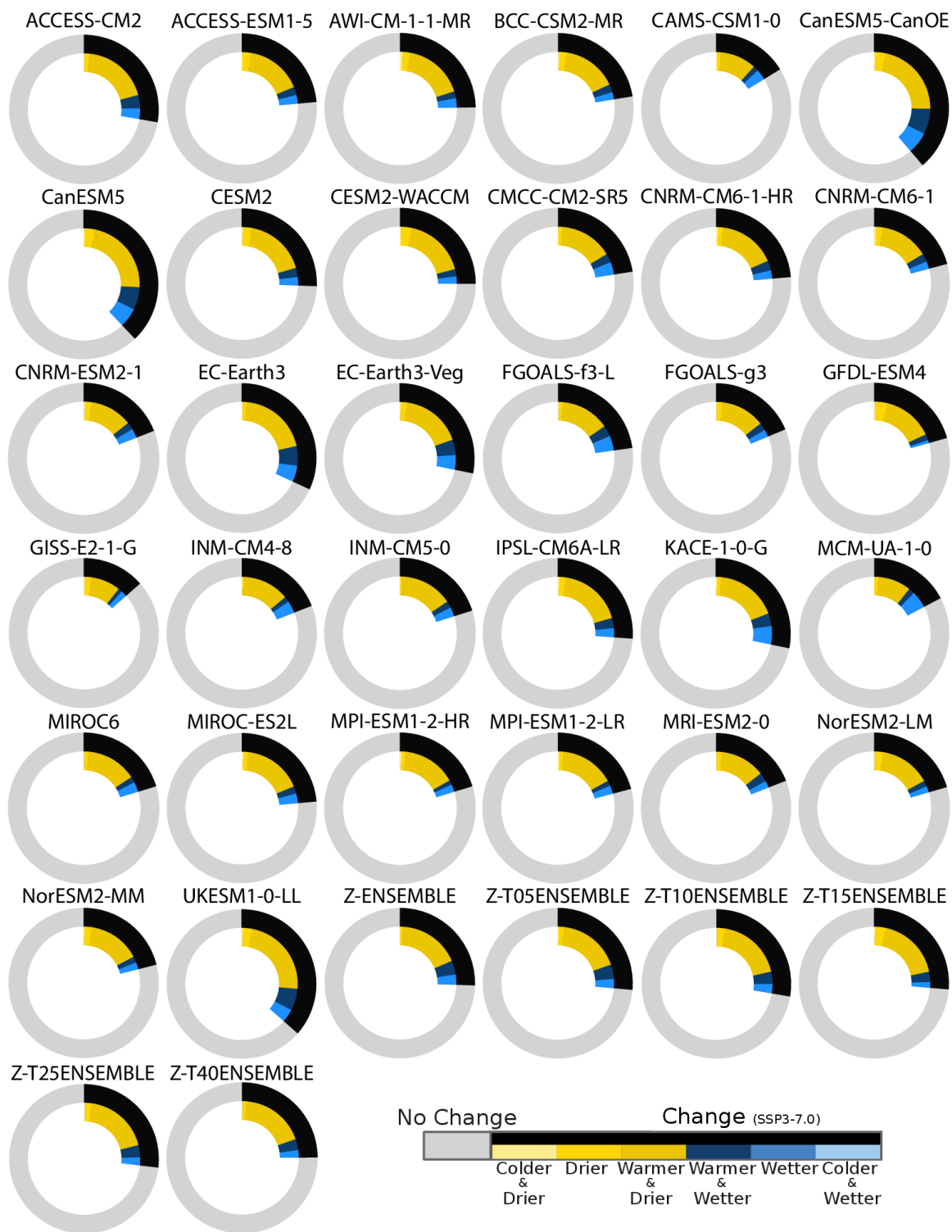
Supplementary Figure 60. Double donut plots of projected changes (% of the total area) in major biomes under SSP1-1.9 as compared to 1980-2014. Yellows are shifts to drier zones (yellow: drier; light yellow: colder & drier; dark yellow: warmer & drier), blues are shifts to wetter zones (blue: wetter; light blue: colder & wetter; dark blue: warmer & wetter), and grays stand for no changes.



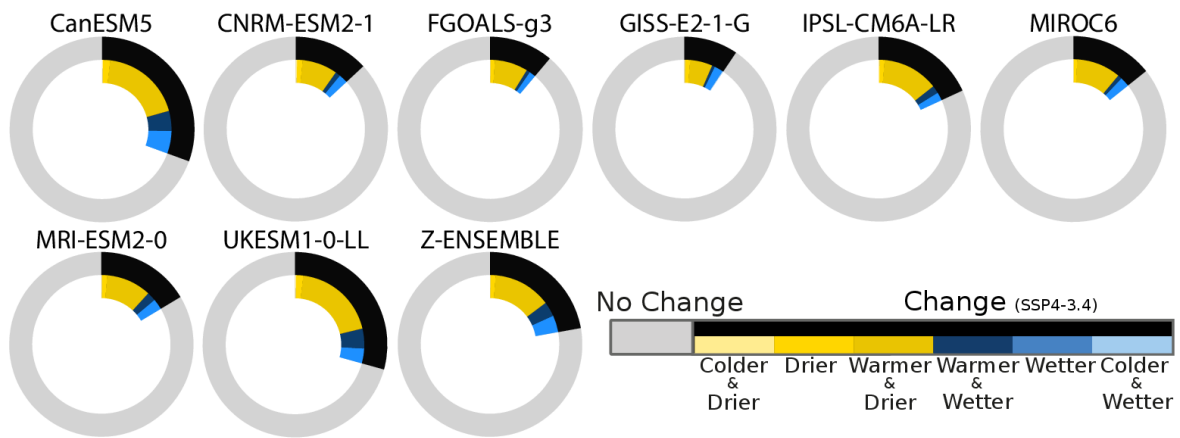
Supplementary Figure 61. Same as Supplementary Figure 60 but for SSP1-2.6.



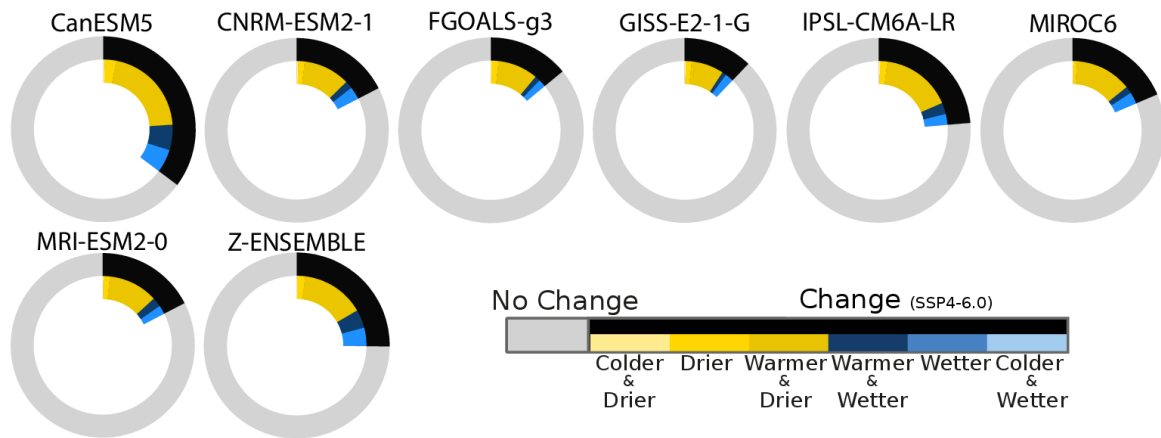
Supplementary Figure 62. Same as Supplementary Figure 60 but for SSP2-4.5.



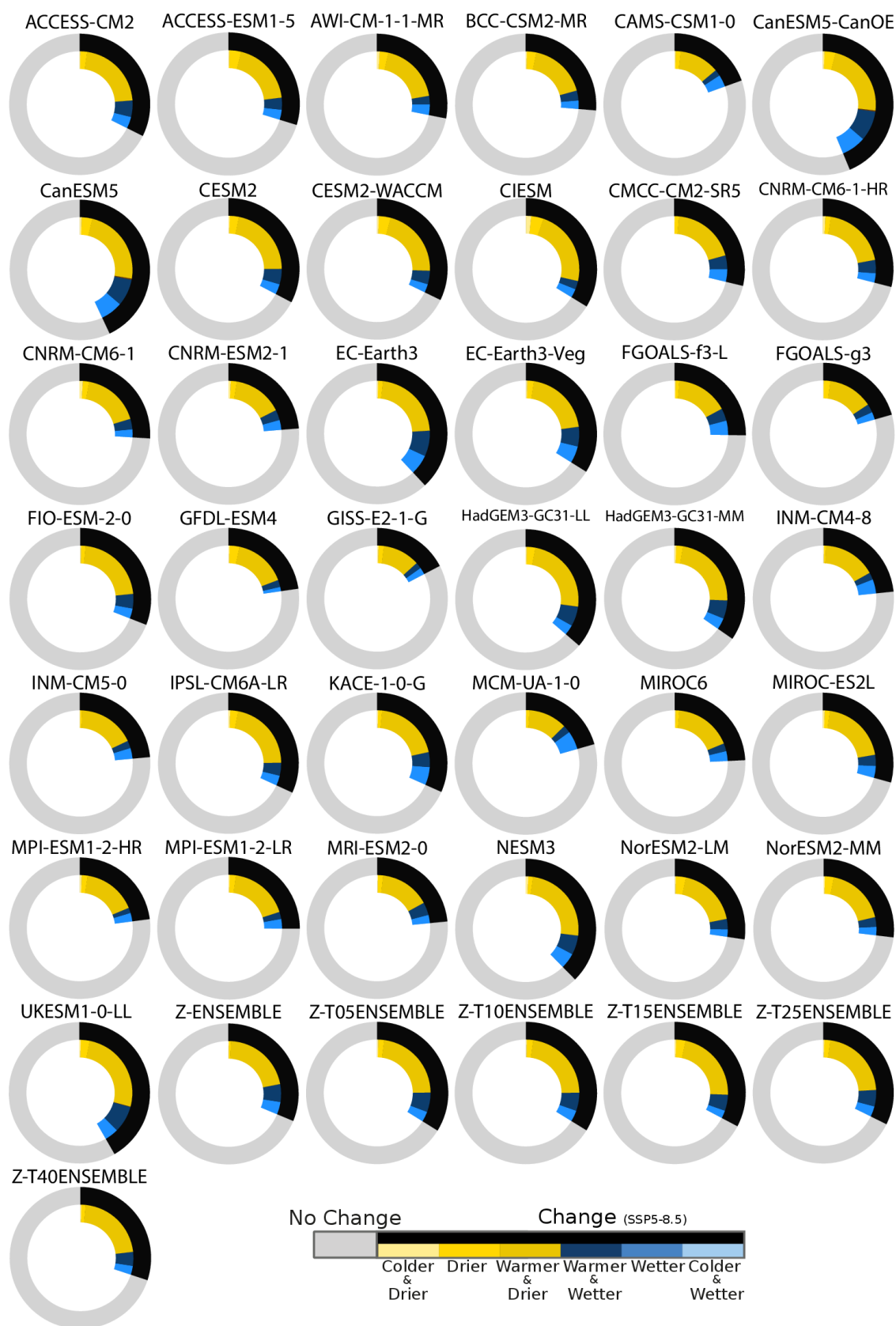
Supplementary Figure 63. Same as Supplementary Figure 60 but for SSP3-7.0.



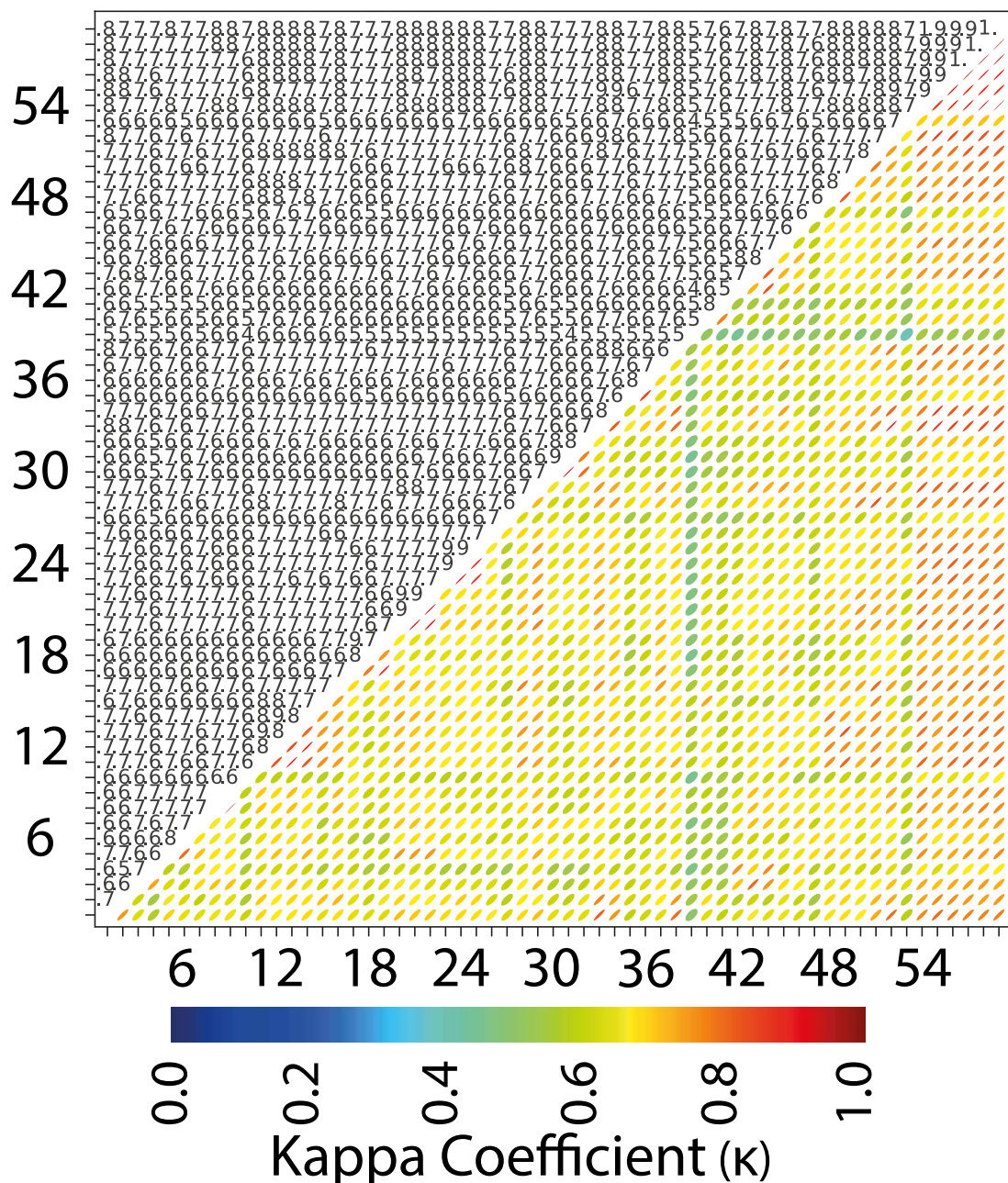
Supplementary Figure 64. Same as Supplementary Figure 60 but for SSP4-3.4.



Supplementary Figure 65. Same as Supplementary Figure 60 but for SSP4-6.0.



Supplementary Figure 66. Same as Supplementary Figure 60 but for SSP5-8.5.



1. ACCESS-CM2 2. ACCESS-ESM1-5 3. AWI-CM-1-1-MR 4. AWI-ESM-1-1-LR 5. BCC-CSM2-MR 6. BCC-ESM1
7. CAMS-CSM1-0 8. CanESM5 9. CanESM5-CanOE 10. CAS-ESM2-0 11. CESM2 12. CESM2-FV2 13.
CESM2-WACCM 14. CESM2-WACCM-FV2 15. CIESM 16. CMCC-CM2-SR5 17. CNRM-CM6-1 18.
CNRM-CM6-1-HR 19. CNRM-ESM2-1 20. E3SM-1-0 21. E3SM-1-1 22. E3SM-1-1-ECA 23. EC-Earth3 24.
EC-Earth3-Veg 25. EC-Earth3-Veg-LR 26. FGOALS-f3-L 27. FGOALS-g3 28. FIO-ESM-2-0 29. GFDL-ESM4
30. GISS-E2-1-G 31. GISS-E2-1-G-CC 32. GISS-E2-1-H 33. HadGEM3-GC31-LL 34. HadGEM3-GC31-MM 35.
INM-CM4-8 36. INM-CM5-0 37. IPSL-CM6A-LR 38. KACE-1-0-G 39. MCM-UA-1-0 40. MIROC6 41.
MIROC-ES2L 42. MPI-ESM-1-2-HAM 43. MPI-ESM1-2-LR 44. MPI-ESM1-2-LR 45. MRI-ESM2-0 46. NESM3
47. NorCPM1 48. NorESM2-LM 49. NorESM2-MM 50. SAMO-UNICON 51. TaiESM1 52. UKESM1-0-LL 53.
CRU 54. ENSEMBLE 55. ENSEMBLE T05 56. ENSEMBLE T10 57. ENSEMBLE T15 58. ENSEMBLE T25 59.
ENSEMBLE T40

Supplementary Figure 67. Extra-large version of Figure 1b designed to enhance clarity by providing a larger representation of the data.

SUPPLEMENTARY TABLES

Supplementary Table 1. List of CMIP6 models and reference dataset used in the present study.

Model Name	Institution	Reference
ACCESS-CM2	Commonwealth Scientific and Industrial Research Organisation; Australian Research Council Centre of Excellence for Climate System Science (CSIRO-ARCCSS)	(Bi et al 2020)
ACCESS-ESM1-5	Commonwealth Scientific and Industrial Research Organisation (CSIRO)	(Ziehn et al 2020)
AWI-CM-1-1-MR	Alfred Wegner Institute (AWI)	(Semmler et al. 2020)
AWI-ESM-1-1-LR		
BCC-CSM2-MR	Beijing Climate Center (BCC)	(Wu et al 2019)
BCC-ESM1		(Wu et al 2020)
CAMS-CSM1-0	Chinese Academy of Meteorological Sciences (CAMS)	(Rong et al 2019)
CanESM5	Canadian Centre for Climate Modelling and Analysis, Environment and Climate Change (CCCma)	(Swart et al 2019)
CanESM5-CanOE		
CAS-ESM2-0	Chinese Academy of Sciences (CAS)	(Zhou et al 2020)
CESM2	National Center for Atmospheric Research, Climate and Global Dynamics Laboratory (NCAR)	(Danabasoglu et al 2020)
CESM2-FV2		
CESM2-WACCM		
CESM2-WACCM-FV2		
CIESM	Tsinghua University. Department of Earth System Science. (TSU)	(Lin et al 2020)
CMCC-CM2-SR5	Fondazione Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC)	(Cherchi et al 2019)
CNRM-CM6-1	Centre National de Recherches Meteorologiques; Centre Européen de Recherche et de Formation Avancée en Calcul Scientifique (CNRM-CERFACS)	(Voldoire et al 2019)
CNRM-CM6-1-HR		(Séférian et al 2019)
CNRM-ESM2-1		
E3SM-1-0	E3SM-Project.	(Golaz et al 2019)
E3SM-1-1	Lawrence Livermore National Laboratory (LLNL); Argonne National Laboratory, Argonne (ANL); Brookhaven National Laboratory (BNL); Los Alamos National Laboratory (LANL); Lawrence Berkeley National Laboratory (LBNL); Oak Ridge National Laboratory (ORNL); Pacific Northwest National Laboratory (PNNL); Sandia National Laboratories (SNL).	
E3SM-1-1-ECA		
EC-Earth3	EC-Earth Consortium	(Döscher et al 2022; Wyser et al 2020)
EC-Earth3-Veg		
EC-Earth3-Veg-LR		
FGOALS-f3-L	Chinese Academy of Sciences (CAS)	(He et al 2019)
FGOALS-g3		(Li et al 2020)
FIO-ESM-2-0	First Institute of Oceanography; Qingdao National Laboratory for Marine Science and Technology (FIO-QNLM)	(Bao et al 2020)
GFDL-ESM4	National Oceanic and Atmospheric Administration; Geophysical Fluid Dynamics Laboratory (NOAA-GFDL)	(Dunne et al 2020)
GISS-E2-1-G	Goddard Institute for Space Studies (NASA-GISS).	(Kelley et al 2020)
GISS-E2-1-CC		
GISS-E2-1-H		
HadGEM3-GC31-LL	Met Office Hadley Centre (MOHC)	(Kuhlbrodt et al 2018)

HadGEM3-GC31-MM		(Andrews et al 2020)
INM-CM4-8	Institute for Numerical Mathematics (INM)	(Volodin et al 2018)
INM-CM5-0		(Volodin and Gritsun 2018)
IPSL-CM6A-LR	Institut Pierre Simon Laplace (IPSL)	(Boucher et al 2020)
KACE-1-0-G	National Institute of Meteorological Sciences/Korea Meteorological Administration (NIMS-KMA)	(J. Lee et al 2020)
MCM-UA-1-0	Department of Geosciences, University of Arizona (UA)	(Delworth et al 2002)
MIROC6	Japan Agency for Marine-Earth Science and Technology (JAMSTEC); Atmosphere and Ocean Research Institute (AORI); National Institute for Environmental Studies (NIES); RIKEN Center for Computational Science (R-CCS)	(Tatebe et al 2019)
MIROC-ES2L		(Hajima et al 2020)
MPI-ESM-1-2-HAM	HAMMOZ-Consortium	(Neubauer et al 2019)
MPI-ESM1-2-HR	Max Planck Institute for Meteorology (MPI-M)	(Müller et al 2018)
MPI-ESM1-2-LR		(Mauritsen et al 2019)
MRI-ESM2-0	Meteorological Research Institute (MRI)	(Yukimoto et al 2019)
NESM3	Nanjing University of Information Science and Technology (NUIST)	(Cao et al 2018)
NorCPM1	NorESM Climate modeling Consortium (NCC)	(Bethke et al 2021)
NorESM2-LM		(Seland et al 2020)
NorESM2-MM		
SAM0-UNICON	Seoul National University (SNU)	(Park et al 2019)
TaiESM1	Research Center for Environmental Changes, Academia Sinica (AS-RCEC)	(W.-L. Lee et al 2020)
UKESM1-0-LL	Natural Environment Research Council; Met Office Hadley Centre (NERC-MOHC)	(Sellar et al 2019)
CRU-TS 4.04*	Climate Research Unit (CRU at East Anglia); UK National Centre for Atmospheric Science (NCAS)	(Harris et al., 2014)

*Reference dataset.

Supplementary Table 2. Holdridge life zones and their geometric centroids as distributed in 13 major biomes. Adapted from Sisneros et al. (2011).

Biome	Holdridge Life Zone (HLZ)	Geometric centroids		
		Precipitation (mm yr ⁻¹)	Biotemperature (°C)	PET ratio
Tundra	1 Polar Desert	88.39	0.0	0.71
	2 Polar Desert	176.78	0.0	0.35
	3 Polar Desert	353.55	0.0	0.18
Cold Parklands	4 Dry Tundra	88.39	2.12	1.41
	8 Boreal Desert	88.39	4.24	2.83
	9 Dry Scrub	176.78	4.24	1.41
Forest Tundra	5 Moist Tundra	176.78	2.12	0.71
	6 Wet Tundra	353.55	2.12	0.35
	7 Rain Tundra	707.11	2.12	0.18
Boreal Forest	10 Moist Forest	353.55	4.24	0.71
	11 Wet Forest	707.11	4.24	0.35
	12 Rain Forest	1414.21	4.24	0.18
Cool Desert	13 Montane Desert	88.39	8.49	5.66
	14 Desert Scrub	176.78	8.49	2.83
Steppe	15 Steppe	353.55	8.49	1.41
Cool Forest	16 Moist Forest	707.11	8.49	0.71
	17 Wet Forest	1414.21	8.49	0.35
	18 Rain Forest	2828.43	8.49	0.18
Hot Desert	19 Subtropical Desert	88.39	16.97	11.31
	20 Desert Scrub	176.78	16.97	5.66
	26 Tropical Desert	88.39	26.83	22.63
	27 Desert Scrub	176.78	26.83	11.31
Chaparral	21 Thorn Steppe/Woodland	353.55	16.97	2.83
	22 Dry Forest	707.11	16.97	1.41
Temperate Forest	23 Moist Forest	1414.21	16.97	0.71
	24 Wet Forest	2828.43	16.97	0.35
	25 Rain Forest	5656.85	16.97	0.18
Tropical Semi-arid	28 Thorn Woodland	353.55	26.83	5.66
	29 Very Dry Forest	707.11	26.83	2.83
Tropical Dry Forest	30 Dry Forest	1414.21	26.83	1.41
Tropical Rain Forest	31 Moist Forest	2828.43	26.83	0.71
	32 Wet Forest	5656.85	26.83	0.35
	33 Rain Forest	11313.71	26.83	0.18

Supplementary Table 3. Transitional Life Zones and their defining criteria.

Transient Life Zone	Neighboring Biomes	Criteria*
1. T-CP	Tundra-Cold Parklands	MAB < 1.5 & APR > 62.5 & PER > 1.00
2. T-FT	Tundra-Forest Tundra	MAB < 1.5 & APR > 250 & PER > 0.25 MAB < 1.5 & APR > 500 & PER > 0.125 MAB ≥ 1.5 & APR ≤ 250 & PER ≤ 0.50 MAB ≥ 1.5 & APR ≤ 500 & PER ≤ 0.25
3. T-CP-FT	Tundra-Cold Parklands-Forest Tundra	MAB ≥ 1.5 & APR ≤ 125 & PER ≤ 1.00
4. CP-FT	Cold Parklands-Forest Tundra	MAB < 3.0 & APR > 125 & PER > 1.00
5. CP-FT-BF	Cold Parklands-Forest Tundra-Boreal Forest	MAB ≥ 3.0 & APR ≤ 250 & PER ≤ 1.00
6. FT-BF	Forest Tundra-Boreal Forest	MAB < 3.0 & APR > 250 & PER > 0.50 MAB < 3.0 & APR > 500 & PER > 0.25 MAB < 3.0 & APR > 1000 & PER > 0.125 MAB ≥ 3.0 & APR ≤ 500 & PER ≤ 0.50 MAB > 3.0 & APR ≤ 1000 & PER ≤ 0.25
7. CP-CD	Cold Parklands-Cool Desert	MAB < 6.0 & APR > 62.5 & PER > 4.00 MAB < 6.0 & APR > 125 & PER > 2.00 MAB ≥ 6.0 & APR ≤ 125 & PER ≤ 4.00
8. CP-CD-ST	Cold Parklands-Cool Desert-Steppe	MAB ≥ 6.0 & APR ≤ 250 & PER ≤ 2.00
9. CP-BF-ST	Cold Parklands-Boreal Forest-Steppe	MAB < 6.0 & APR > 250 & PER > 1.00
10. BF-ST-CF	Boreal Forest-Steppe-Cool Forest	MAB ≥ 6.0 & APR ≤ 500 & PER ≤ 1.00
11. BF-CF	Boreal Forest-Cool Forest	MAB < 6.0 & APR > 500 & PER > 0.50 MAB < 6.0 & APR > 1000 & PER > 0.25 MAB < 6.0 & APR > 2000 & PER > 0.125 MAB ≥ 6.0 & APR ≤ 1000 & PER ≤ 0.50 MAB ≥ 6.0 & APR ≤ 2000 & PER ≤ 0.25
12. CD-HD	Cool Desert-Hot Desert	MAB < 12.0 & APR > 62.5 & PER > 8.00 MAB < 12.0 & APR > 125 & PER > 4.00 MAB ≥ 12.0 & APR ≤ 125 & PER ≤ 8.00
13. CD-HD-CH	Cool Desert-Hot Desert-Chaparral	MAB ≥ 12.0 & APR ≤ 250 & PER ≤ 4.00
14. CD-ST-CH	Cool Desert-Steppe-Chaparral	MAB < 12.0 & APR > 250 & PER > 2.00
15. ST-CH	Steppe-Chaparral	MAB ≥ 12.0 & APR ≤ 500 & PER ≤ 2.00
16. ST-CF-CH	Steppe-Cool Forest-Chaparral	MAB < 12.0 & APR > 500 & PER > 1.00
17. CF-CH-TF	Cool Forest-Chaparral-Temperate Forest	MAB ≥ 12.0 & APR ≤ 1000 & PER ≤ 1.00
18. CF-TF	Cool Forest-Temperate Forest	MAB < 12.0 & APR > 1000 & PER > 0.50 MAB < 12.0 & APR > 2000 & PER > 0.25 MAB < 12.0 & APR > 4000 & PER > 0.125 MAB ≥ 12.0 & APR ≤ 2000 & PER ≤ 0.50 MAB ≥ 12.0 & APR ≤ 4000 & PER ≤ 0.25

19. HD-CH-TS	Hot Desert-Chaparral-Tropical Semiarid	$MAB < 24.0$ & $APR > 250$ & $PER > 4.00$
20. HD-TS	Hot Desert-Tropical Semiarid	$MAB \geq 24.0$ & $APR \leq 250$ & $PER \leq 8.00$ $MAB \geq 24.0$ & $APR > 250$ & $PER > 8.00$
21. CH-TS	Chaparral-Tropical Semiarid	$MAB \geq 24.0$ & $APR \leq 500$ & $PER \leq 4.00$ $MAB < 24.0$ & $APR > 500$ & $PER > 2.00$
22. CH-TS-TDF	Chaparral-Tropical Semiarid-Tropical Dry Forest	$MAB \geq 24.0$ & $APR \leq 1000$ & $PER \leq 2.00$
23. CH-TF-TDF	Chaparral-Temperate Forest-Tropical Dry Forest	$MAB < 24.0$ & $APR > 1000$ & $PER > 1.00$
24. TF-TDF-TRF	Temperate Forest-Tropical Dry Forest-Tropical Rain Forest	$MAB \geq 24.0$ & $APR \leq 2000$ & $PER \leq 1.00$
25. TF-TRF	Temperate Forest-Tropical Rain Forest	$MAB < 24.0$ & $APR > 2000$ & $PER > 0.50$ $MAB < 24.0$ & $APR > 4000$ & $PER > 0.25$ $MAB < 24.0$ & $APR > 8000$ & $PER > 0.125$ $MAB \geq 24.0$ & $APR \leq 4000$ & $PER \leq 0.50$ $MAB \geq 24.0$ & $APR \leq 8000$ & $PER \leq 0.25$
26. TS-TDF	Tropical Semiarid-Tropical Dry Forest	$MAB \geq 24.0$ & $APR > 1000$ & $PER > 2.00$
27. TDF-TRF	Tropical Dry Forest-Tropical Rain Forest	$MAB \geq 24.0$ & $APR > 2000$ & $PER > 1.00$

(MAB) mean annual biotemperature. Units: degrees Celsius; (APR) annual precipitation. Units: mm·yr⁻¹; (PER) potential evapotranspiration ratio.

* Some TLZs have multiple connections at several points in the Holdridge' scheme and, consequently, have several defining criteria (e.g.: TF-TRF).

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