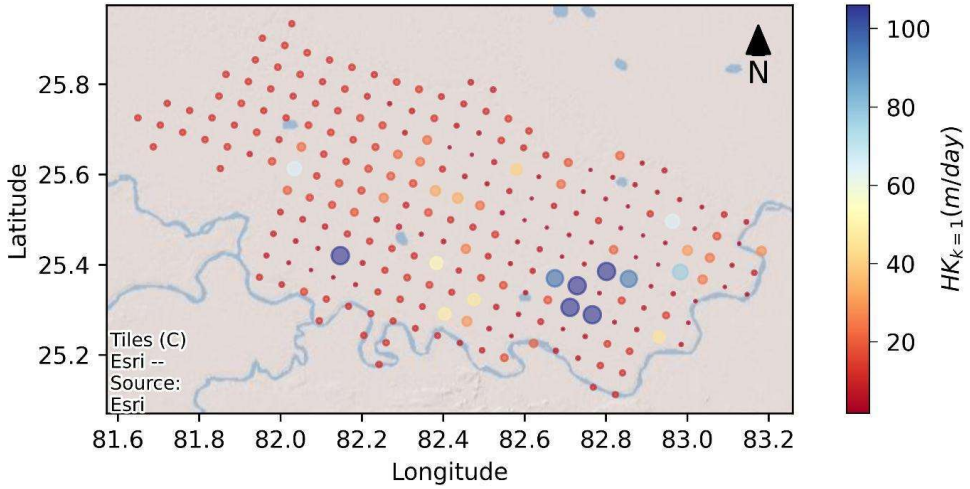
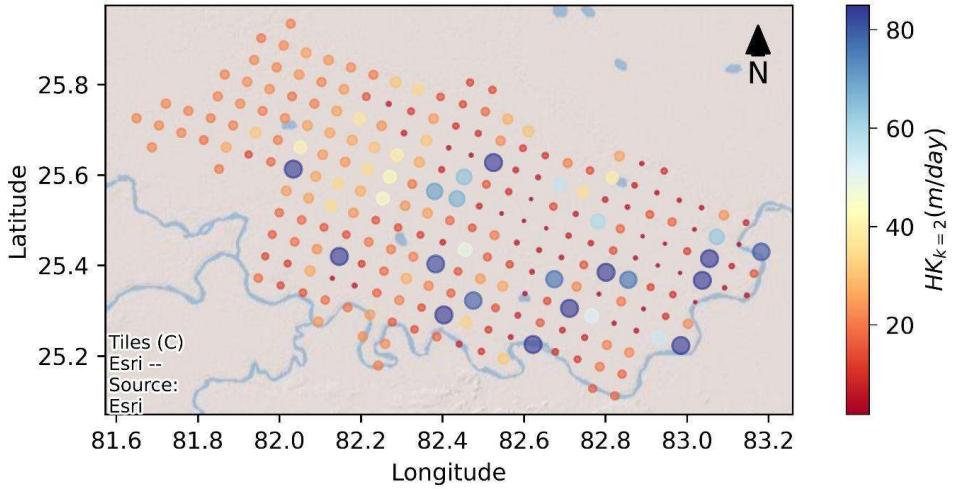
Appendix A: Annual Average Water Budget of Blocks in the Study Area

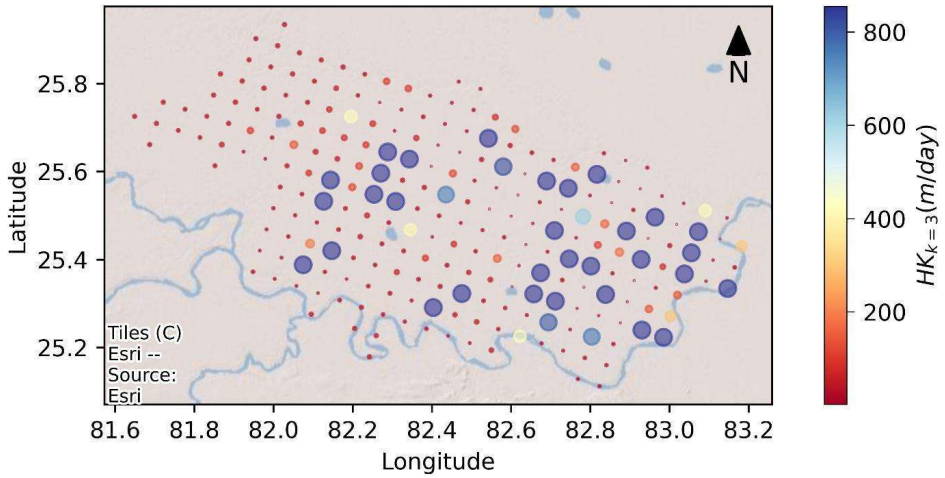
Appendix B: Fitted aquifer parameters after pilot point calibration



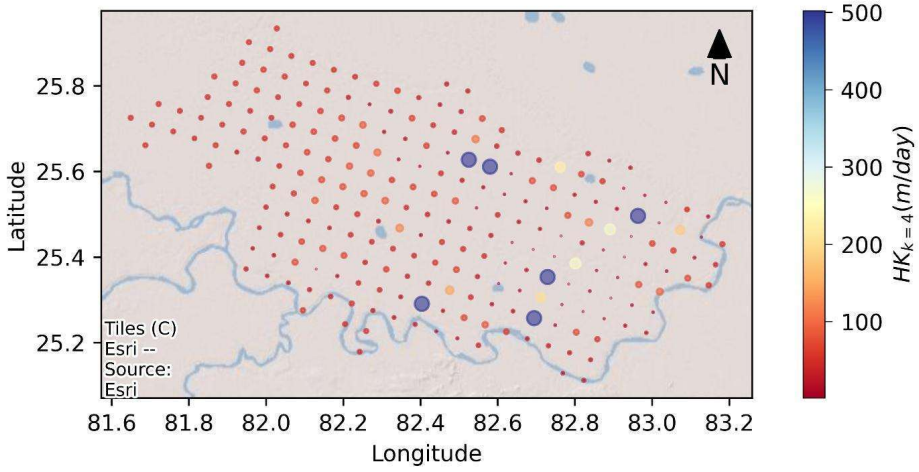
B 1. Calibrated Hk for Layer 1



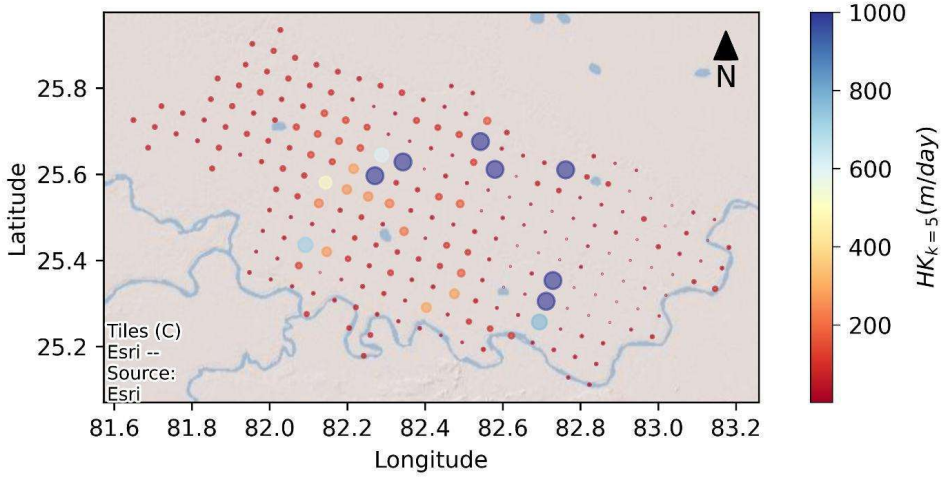
B 2. Calibrated Hk for layer 2



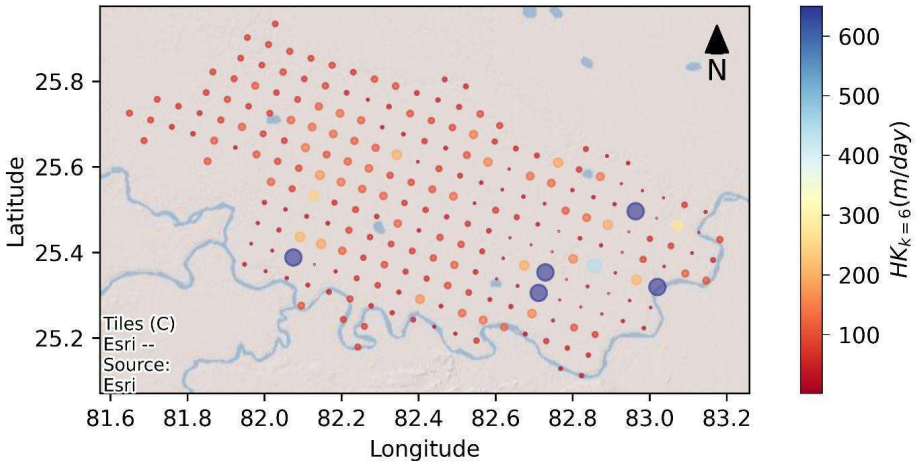
B 3. Calibrated Hk for layer 3



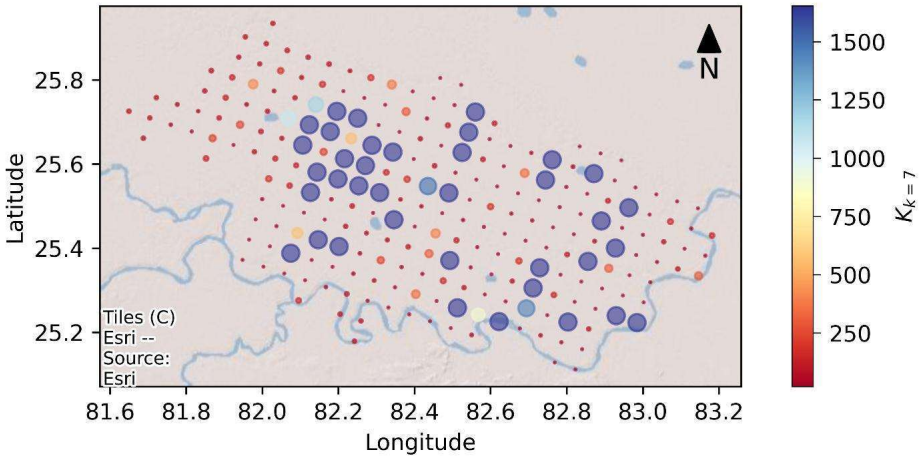
B 4. Calibrated Hk for layer 4



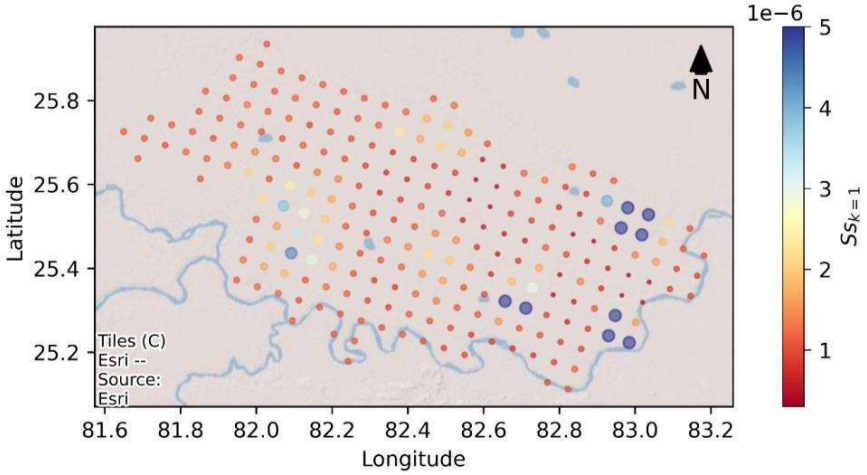
B 5. Calibrated Hk for layer 5



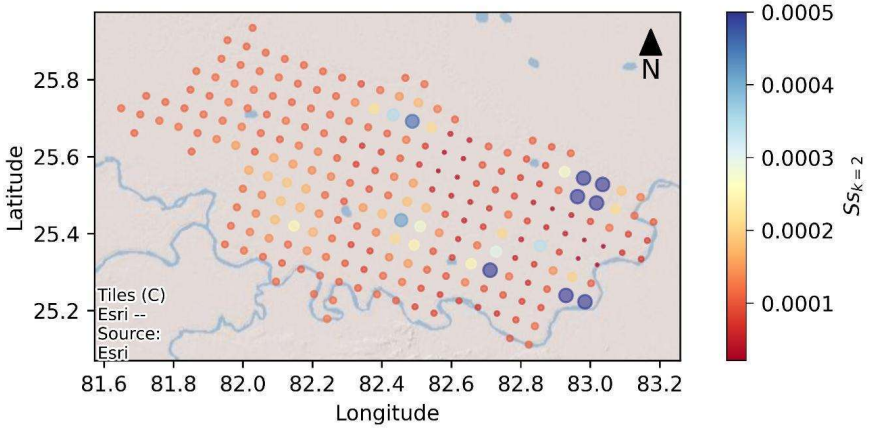
B 6. Calibrated Hk for layer 6



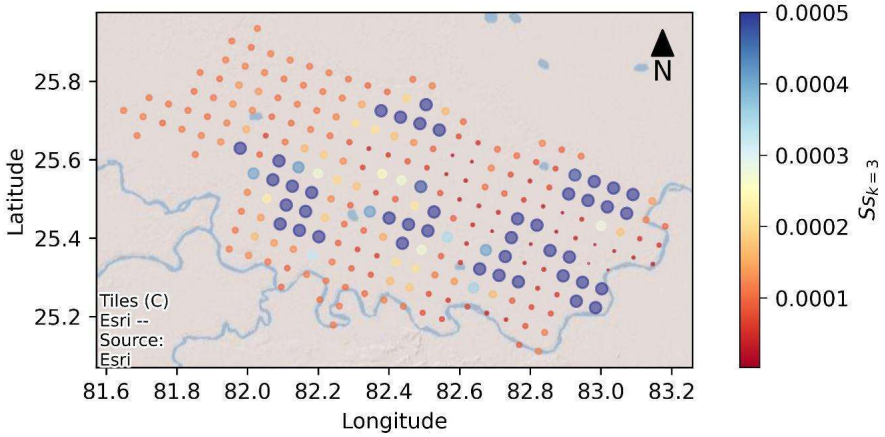
B 7. Calibrated Hk for layer 7



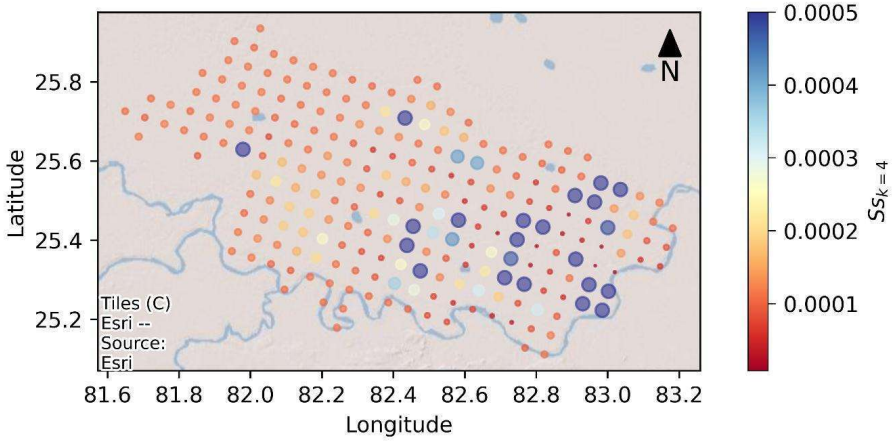
B 8. Calibrated Ss for layer 1



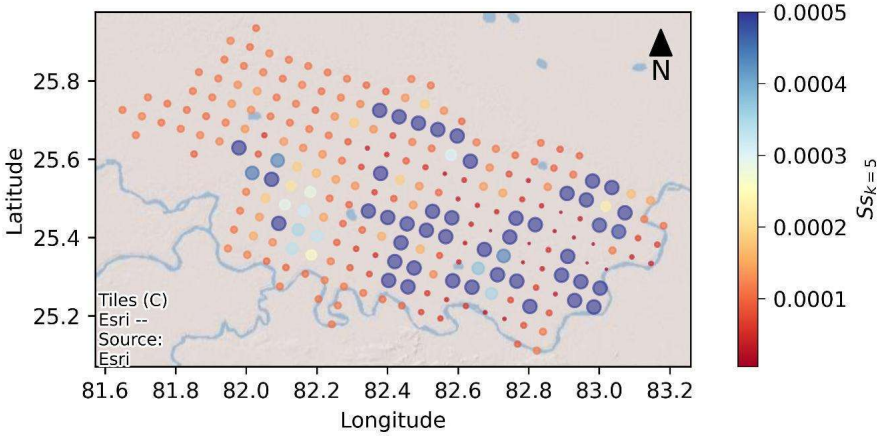
B 9. Calibrated Ss for layer 2



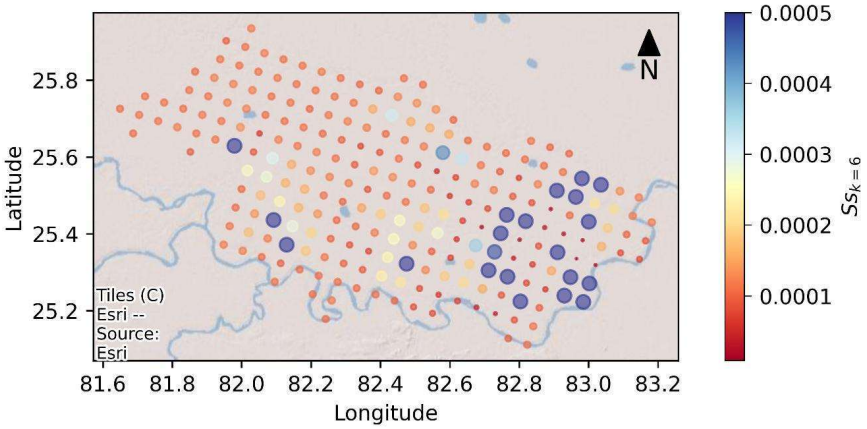
B 10. Calibrated Ss for layer 3



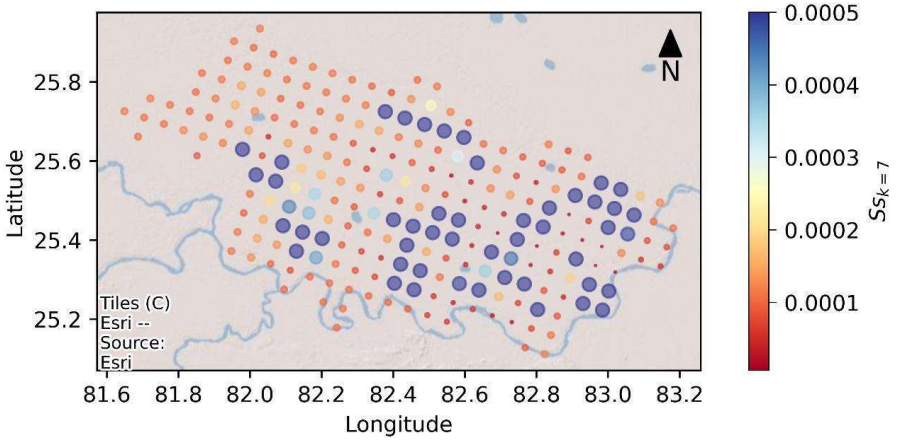
B 11. Calibrated Ss for layer 4



B 12. Calibrated Ss for layer 5

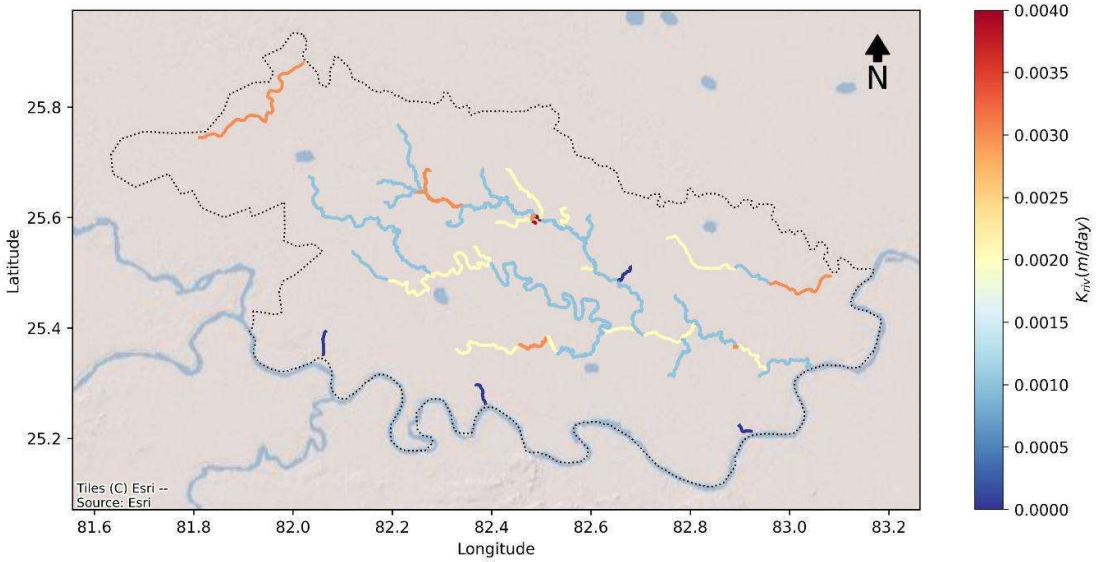


B 13. Calibrated Ss for layer 6



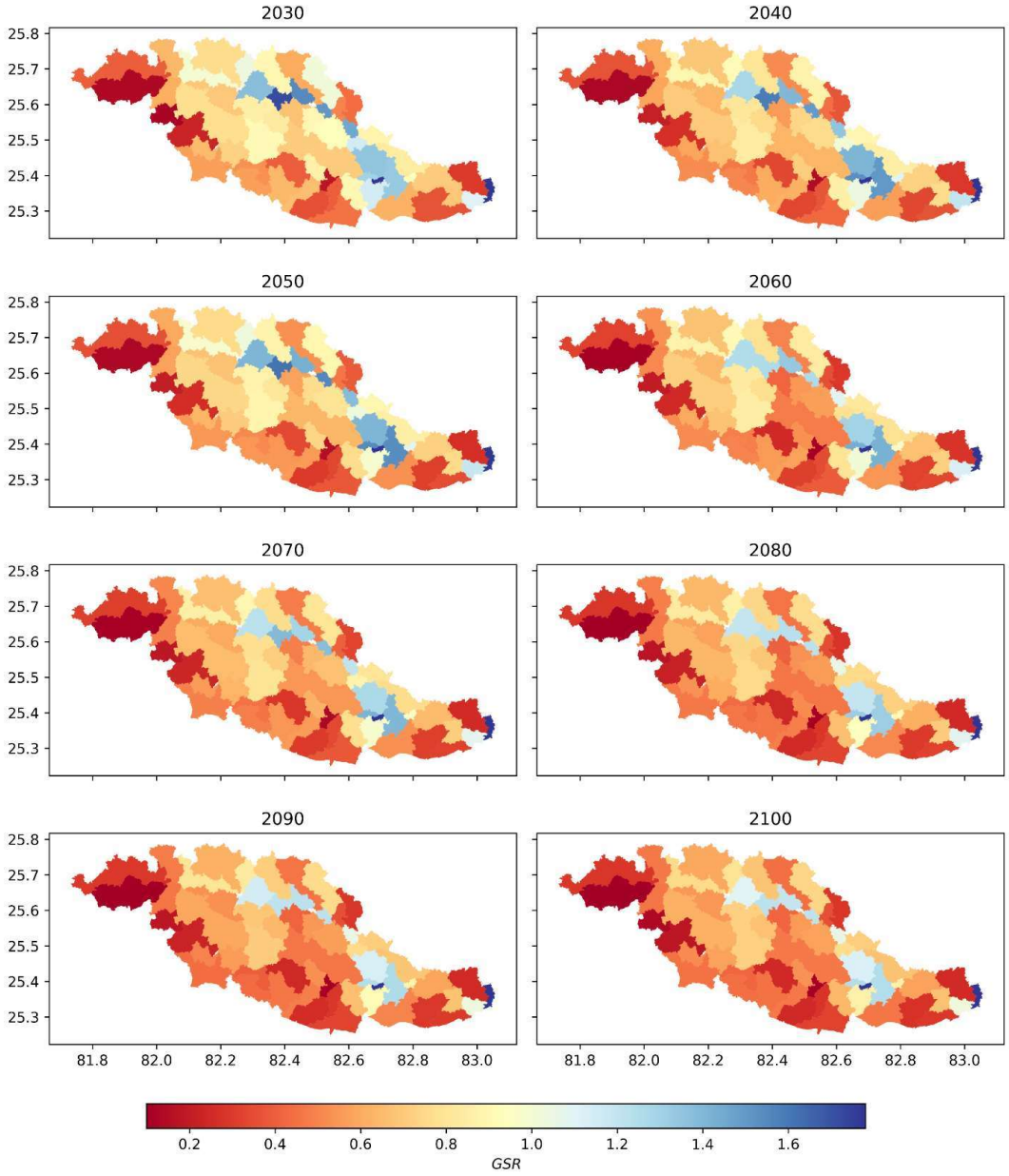
B 14. Calibrated Ss for layer 7

Appendix C: Calibrated river bed conductivities with PSO

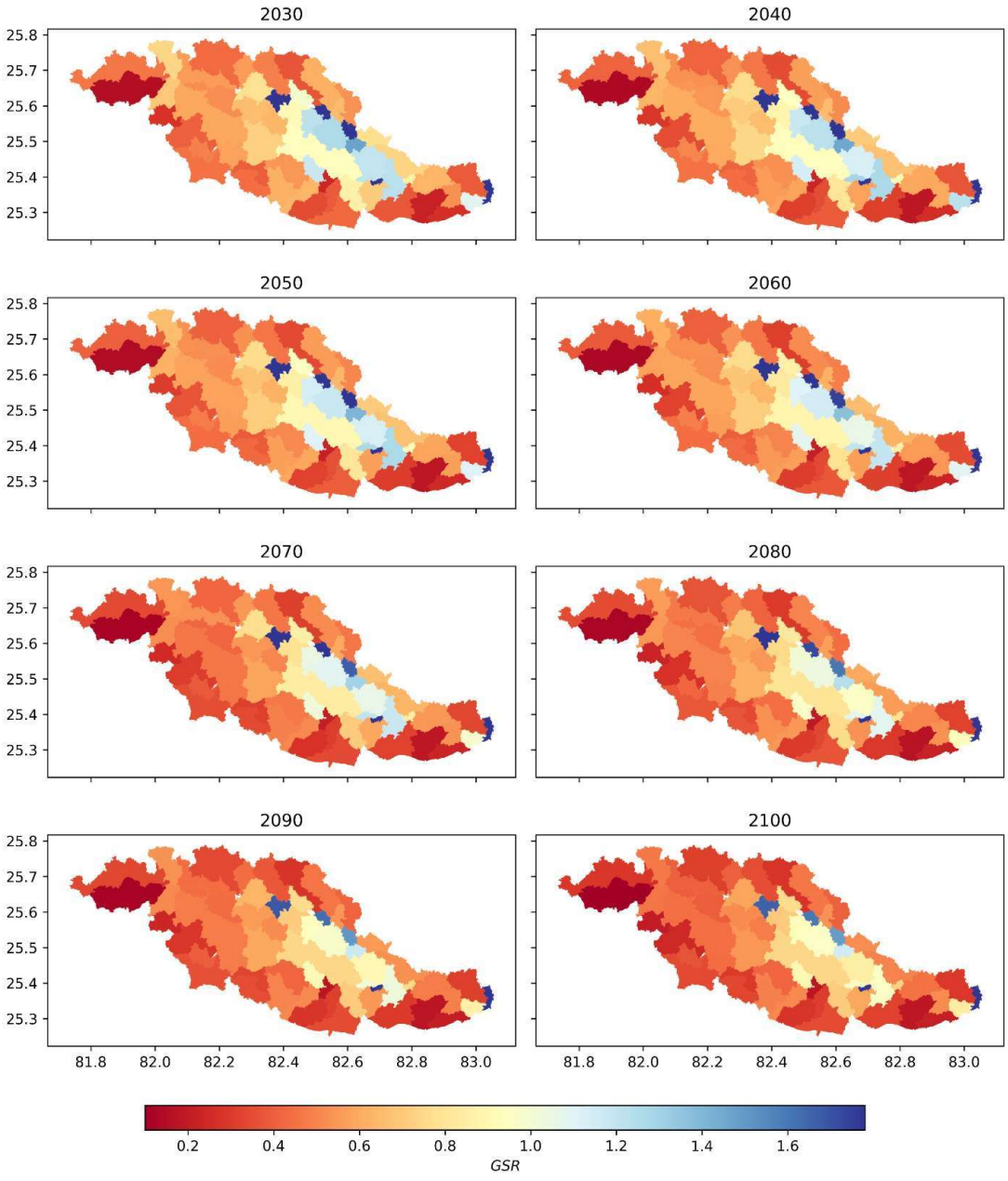


C 1. Calibrated river bed conductivities of Varuna River

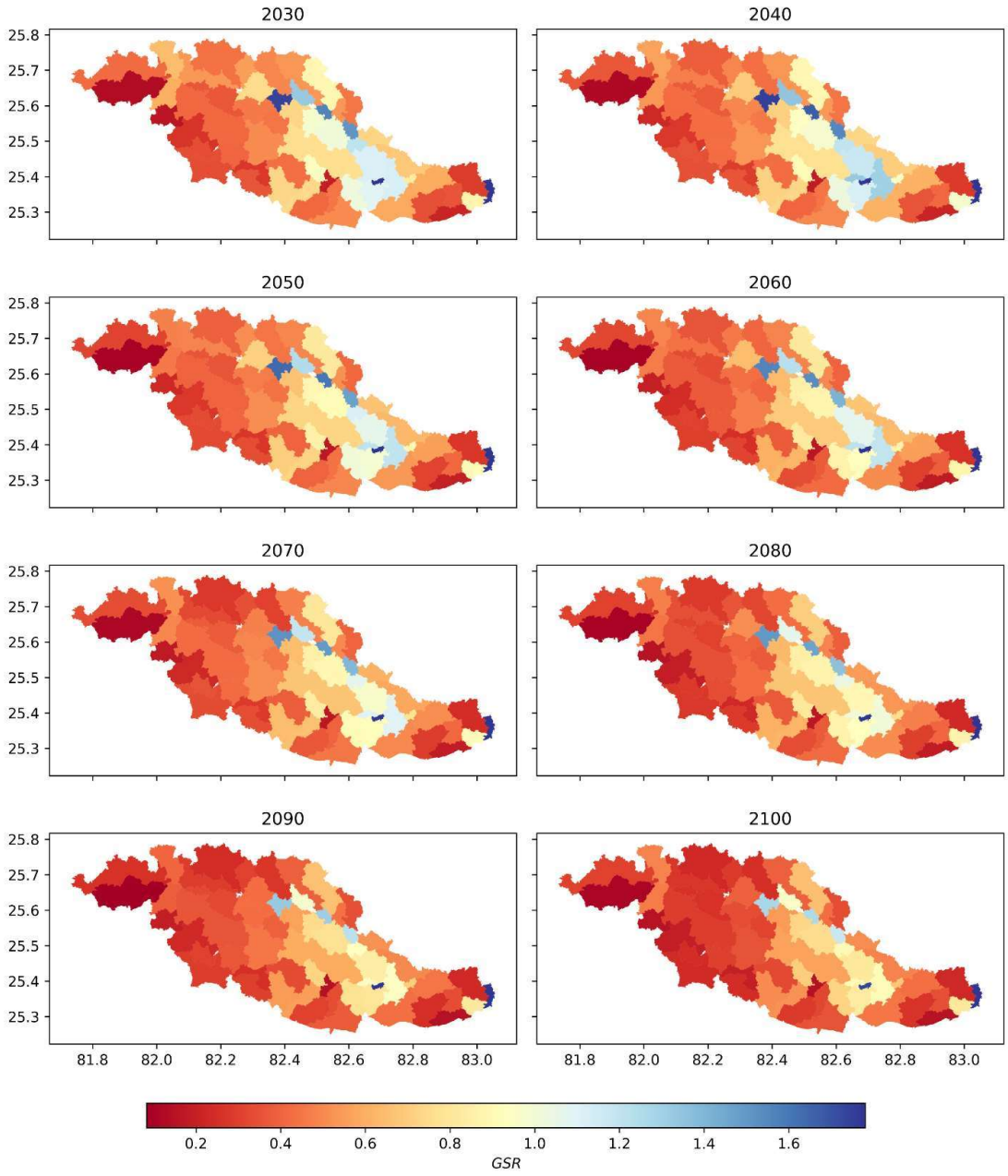
Appendix D: Decadal variations of GSR for VRB



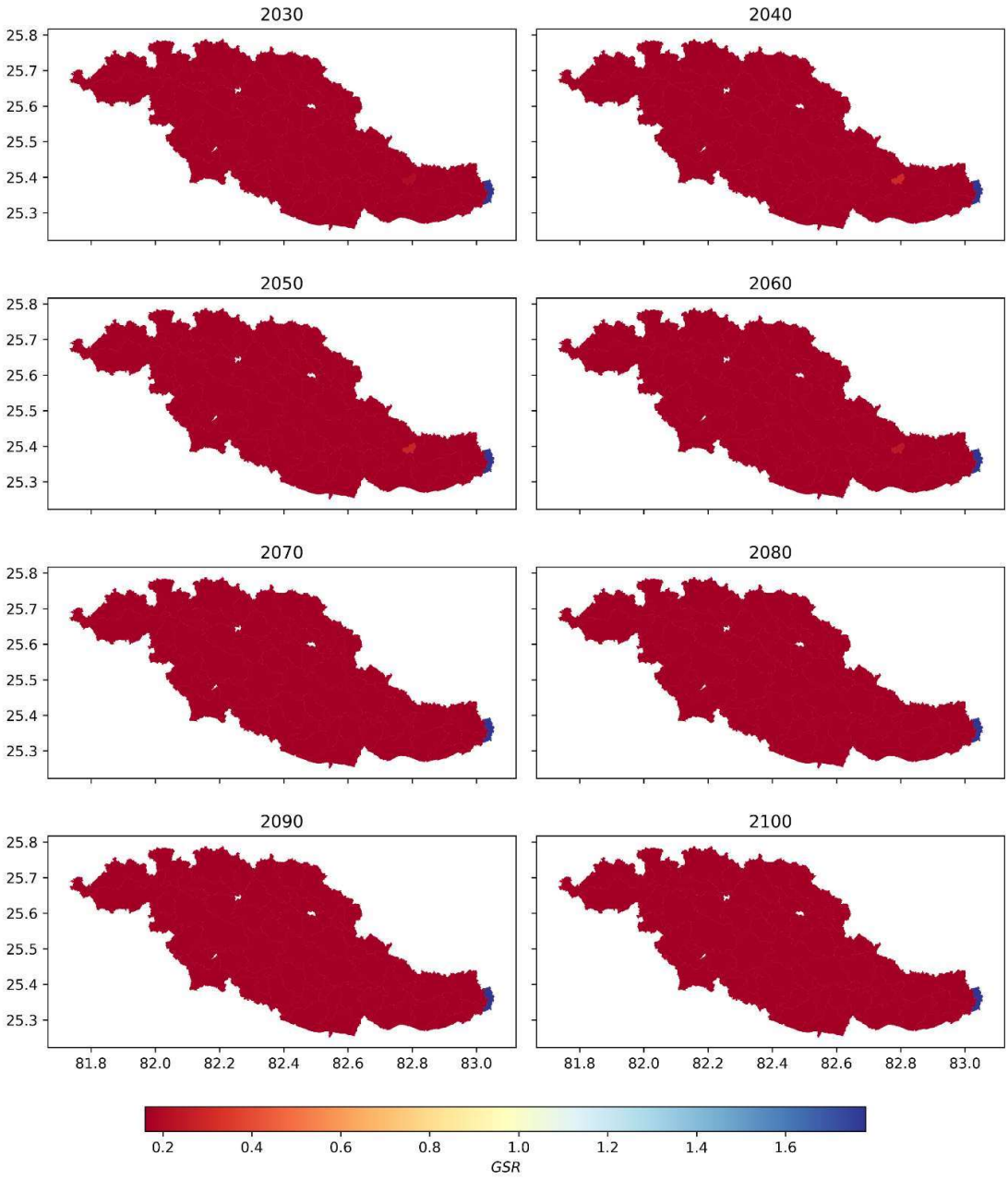
D 1.Decadal variation of GSR in VRB for SSP126



D. 2.Decadal variation of GSR in VRB for SSP245



D. 3.Decadal variation of GSR in VRB for SSP370



D. 4. Decadal GSR variation in VRB for SSP585

Appendix E: Comparison of GW demand vs the surplus runoff volume (runoff volume above 25% exceedance limit)

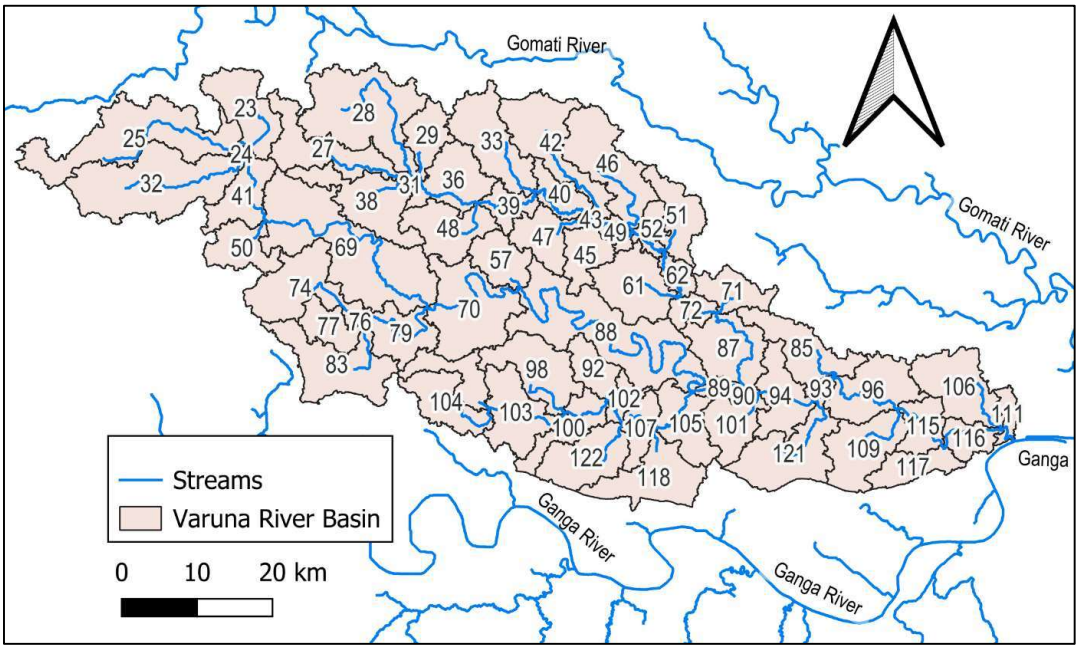
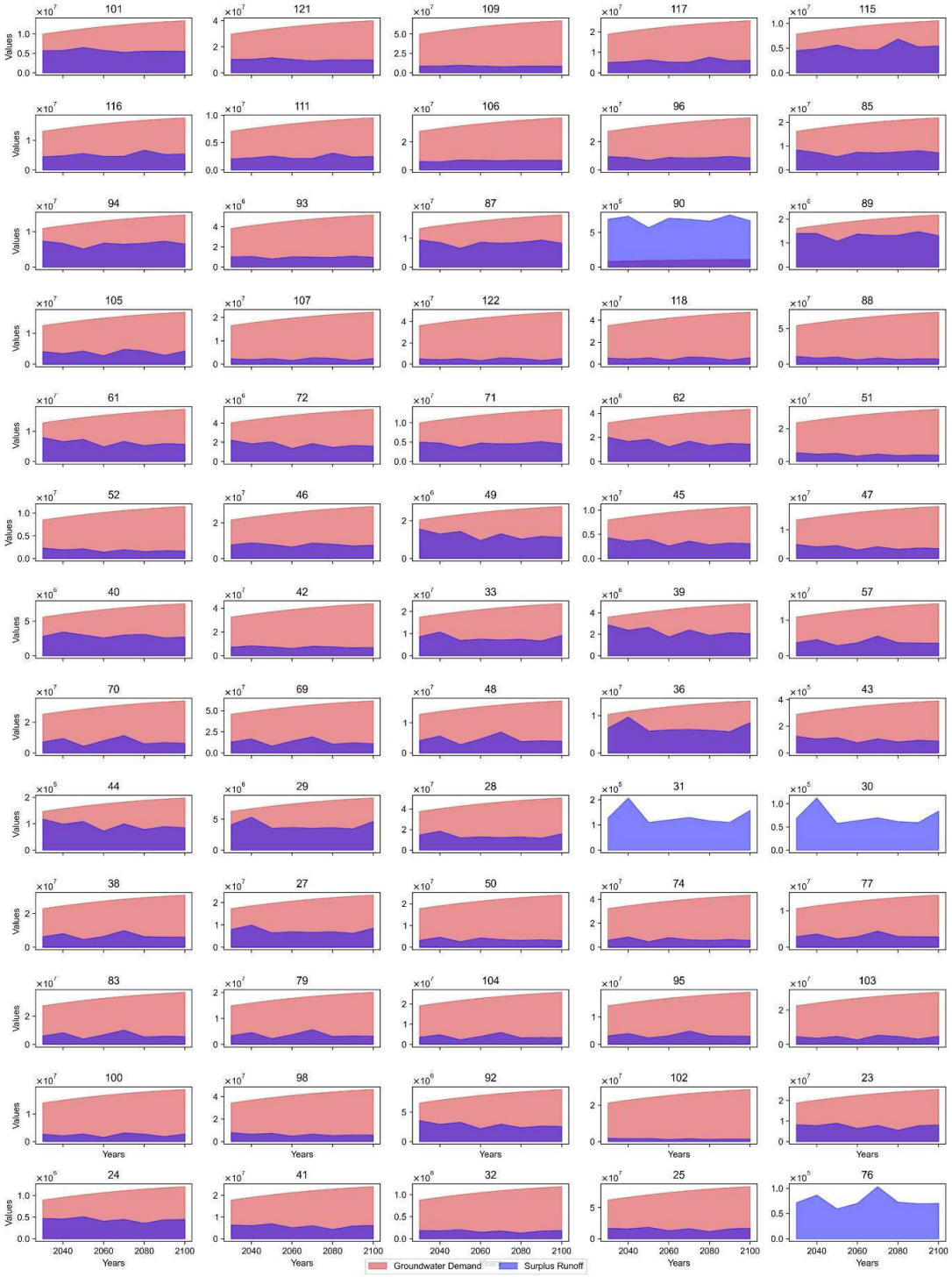
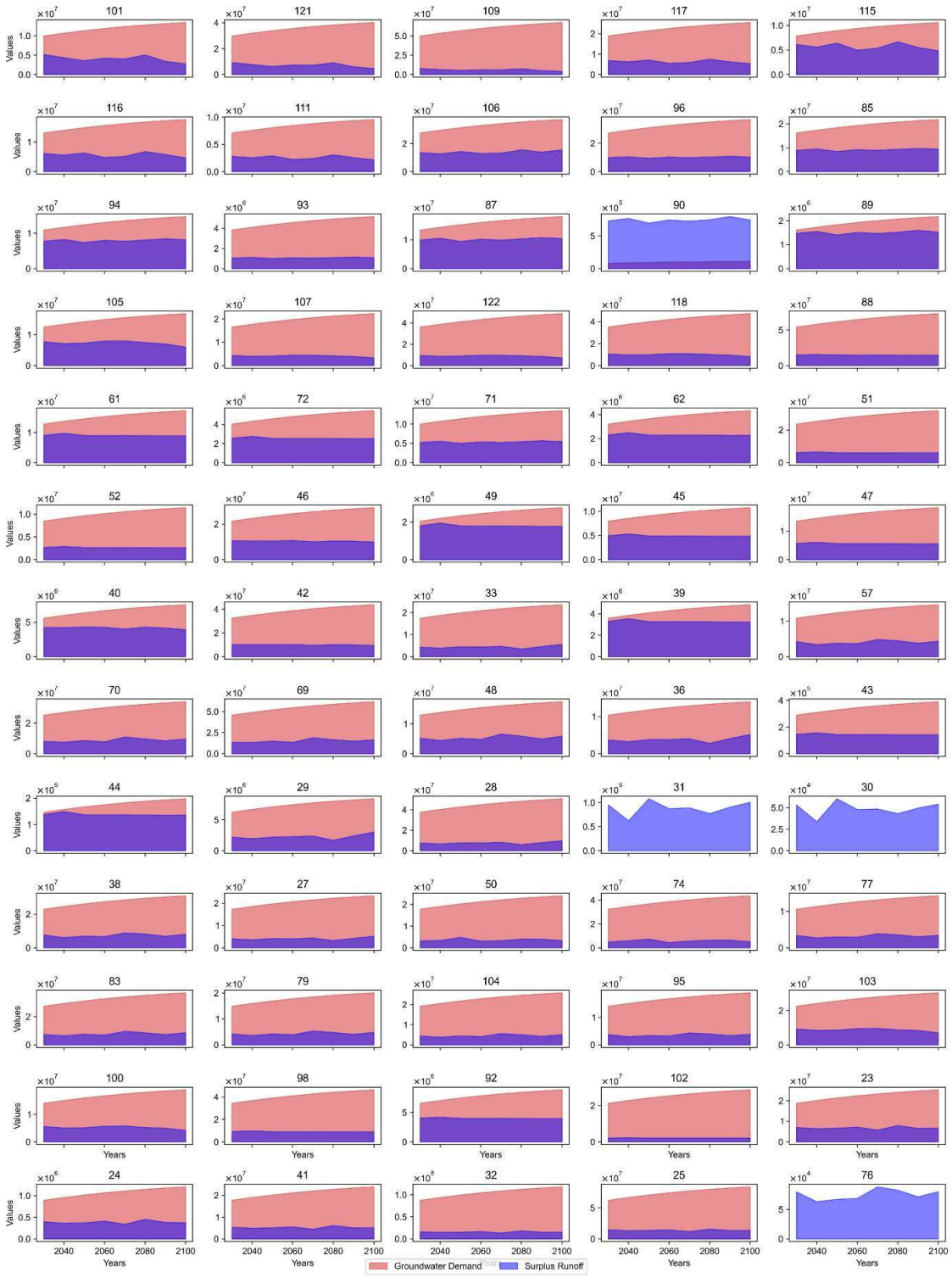


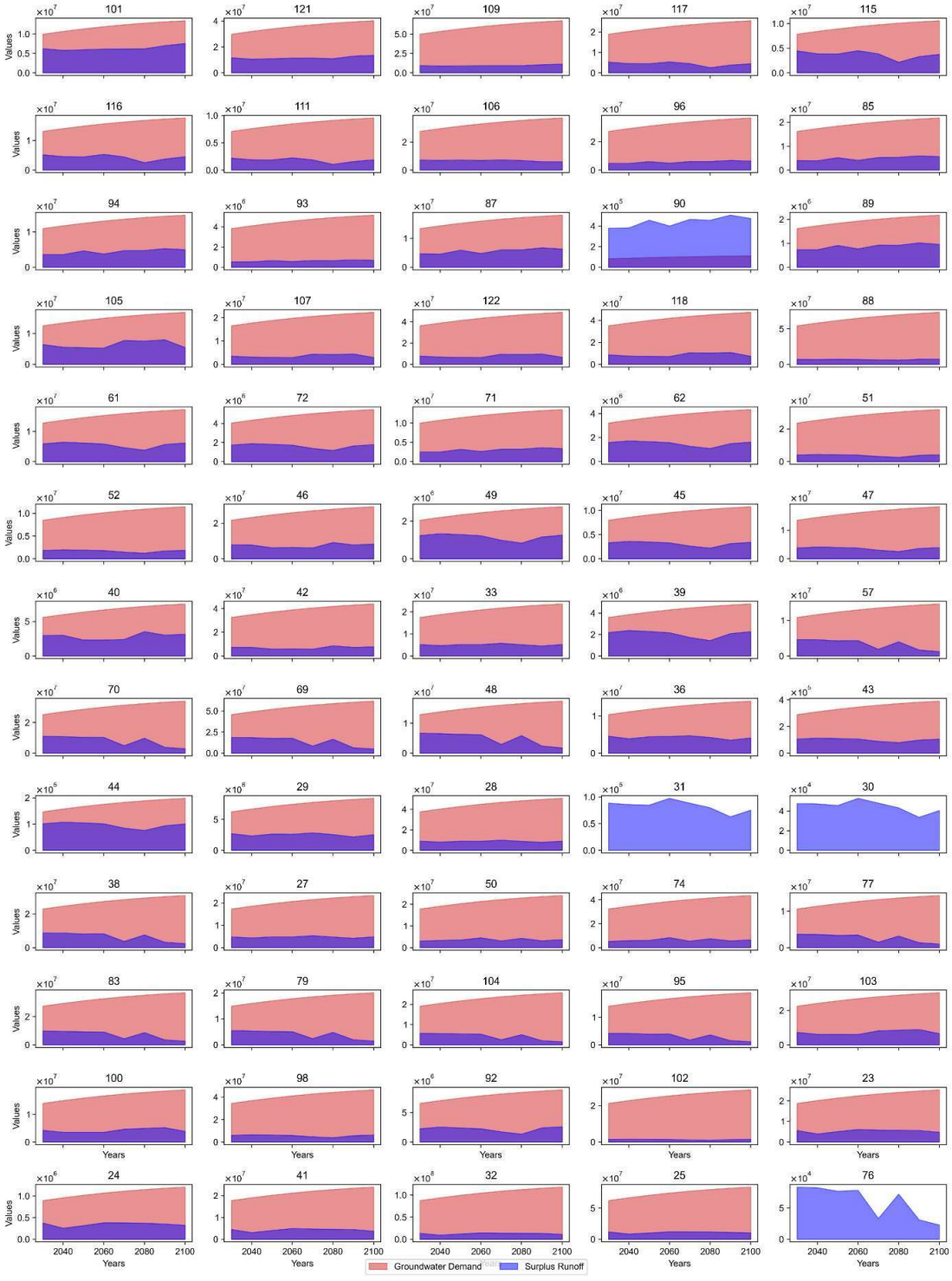
Figure E. 1. Subbasins numbers in VRB



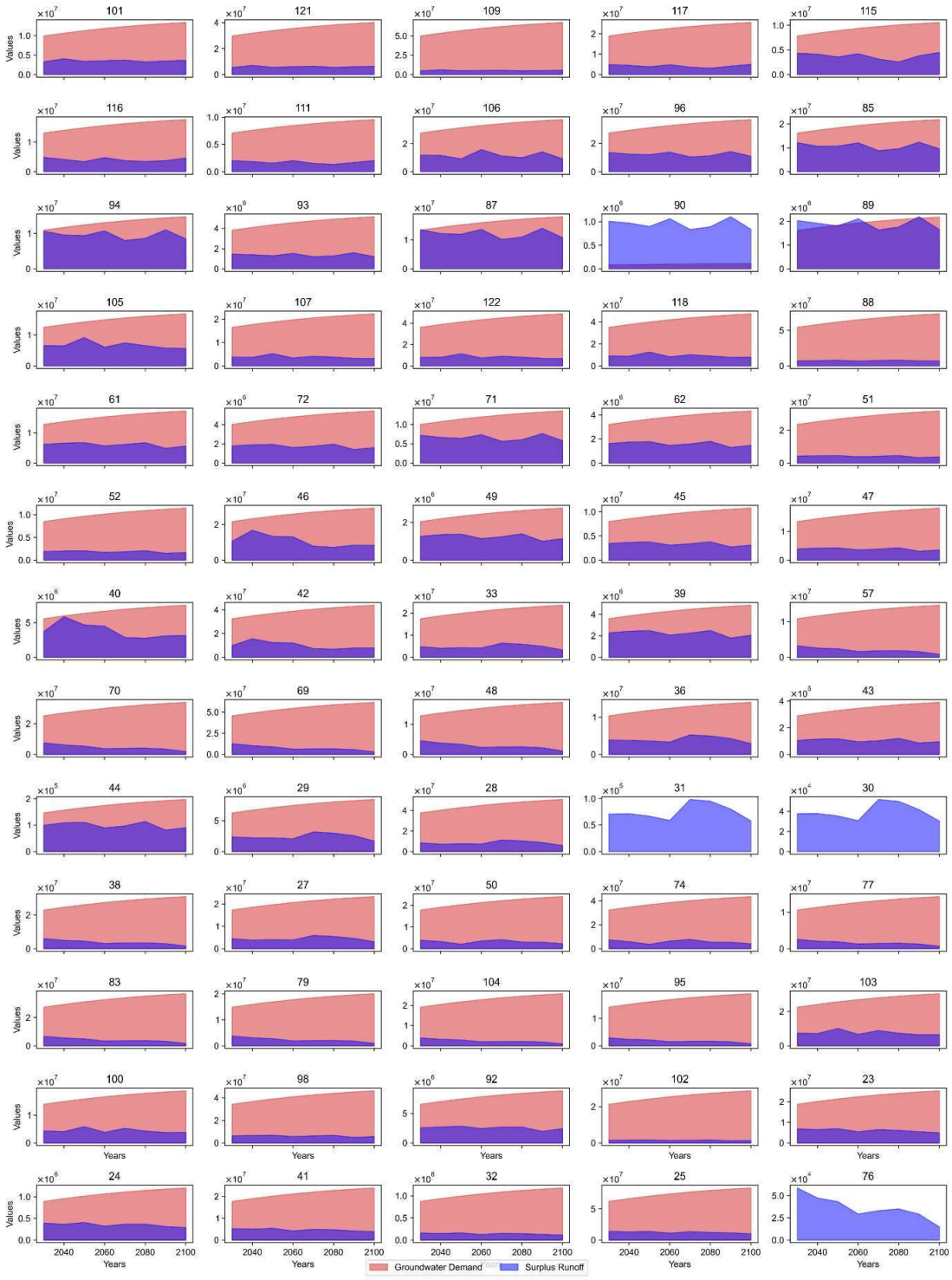
E 2. Area plot of GW demand with surplus runoff for each subbasin in VRB under SSP126



E 3.Area plot of GW demand with surplus runoff for each subbasin in VRB under SSP245

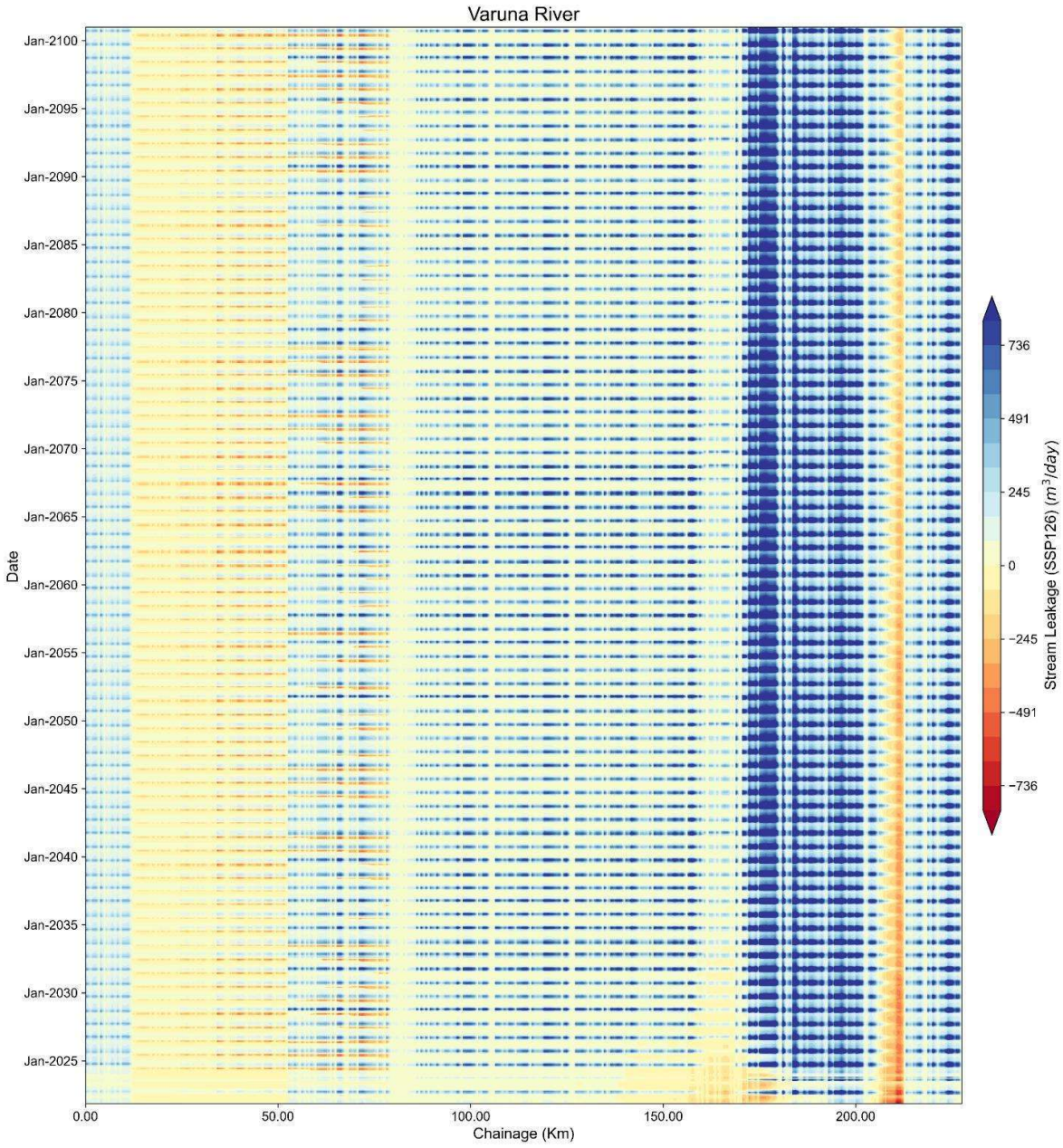


E 4.Area plot of GW demand with surplus runoff for each subbasin in VRB under SSP370

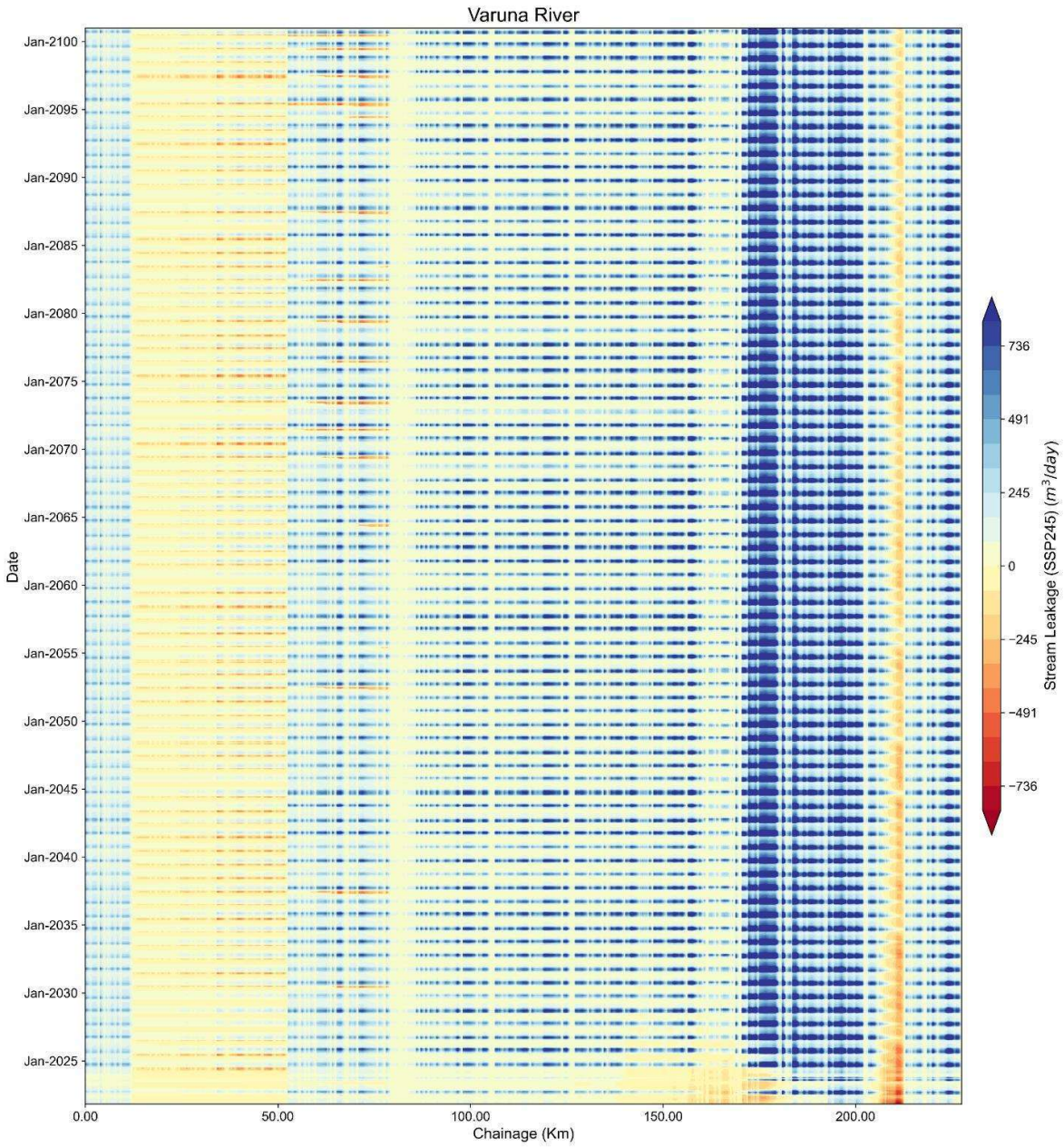


E 5. Area plot of GW demand with surplus runoff for each subbasin in VRB under SSP585

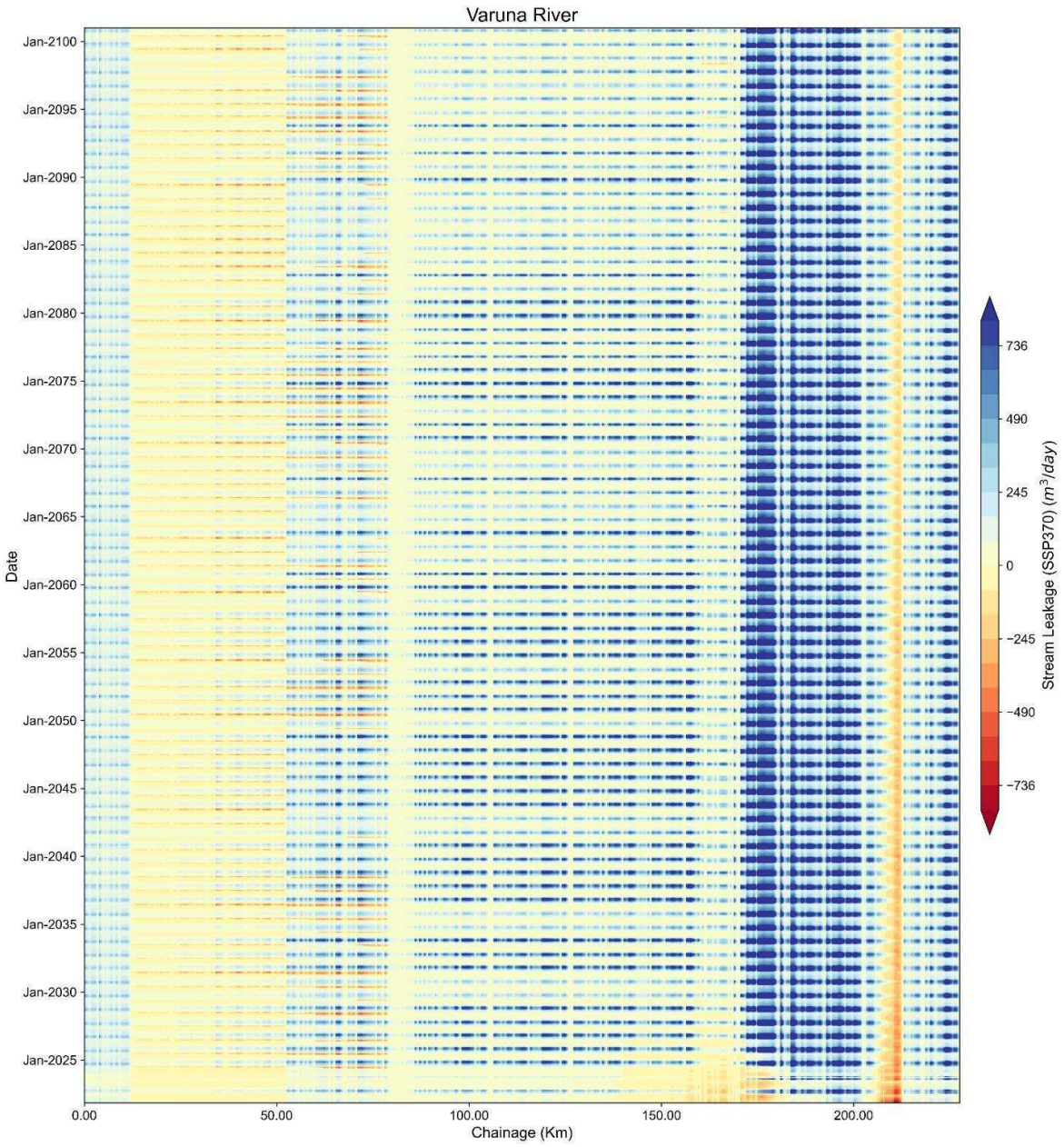
Appendix F: Forecasted Monthly RAE Fluxes



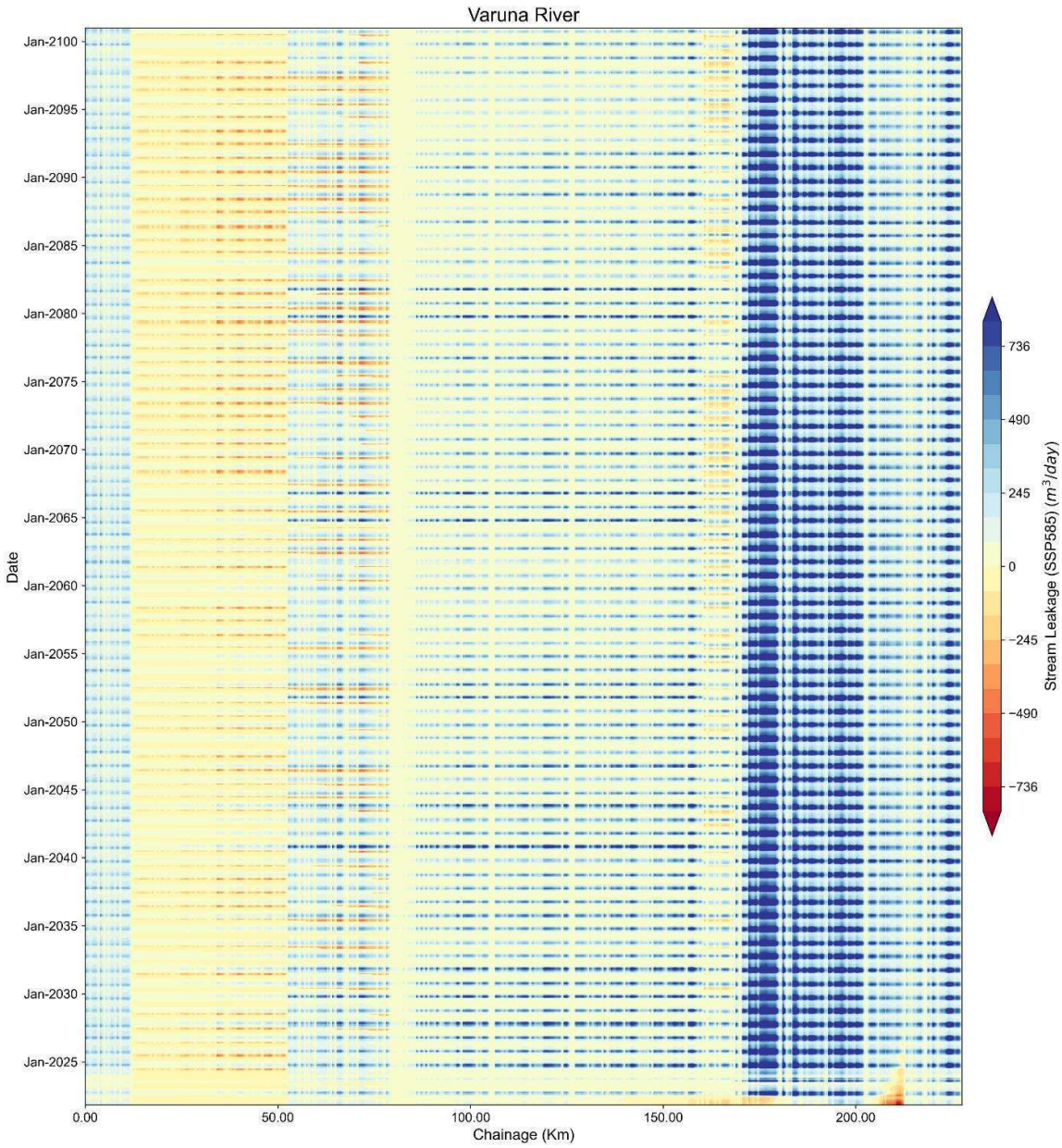
F 1. Contour plot of RAE with time and space for scenario SSP126 of Varuna river



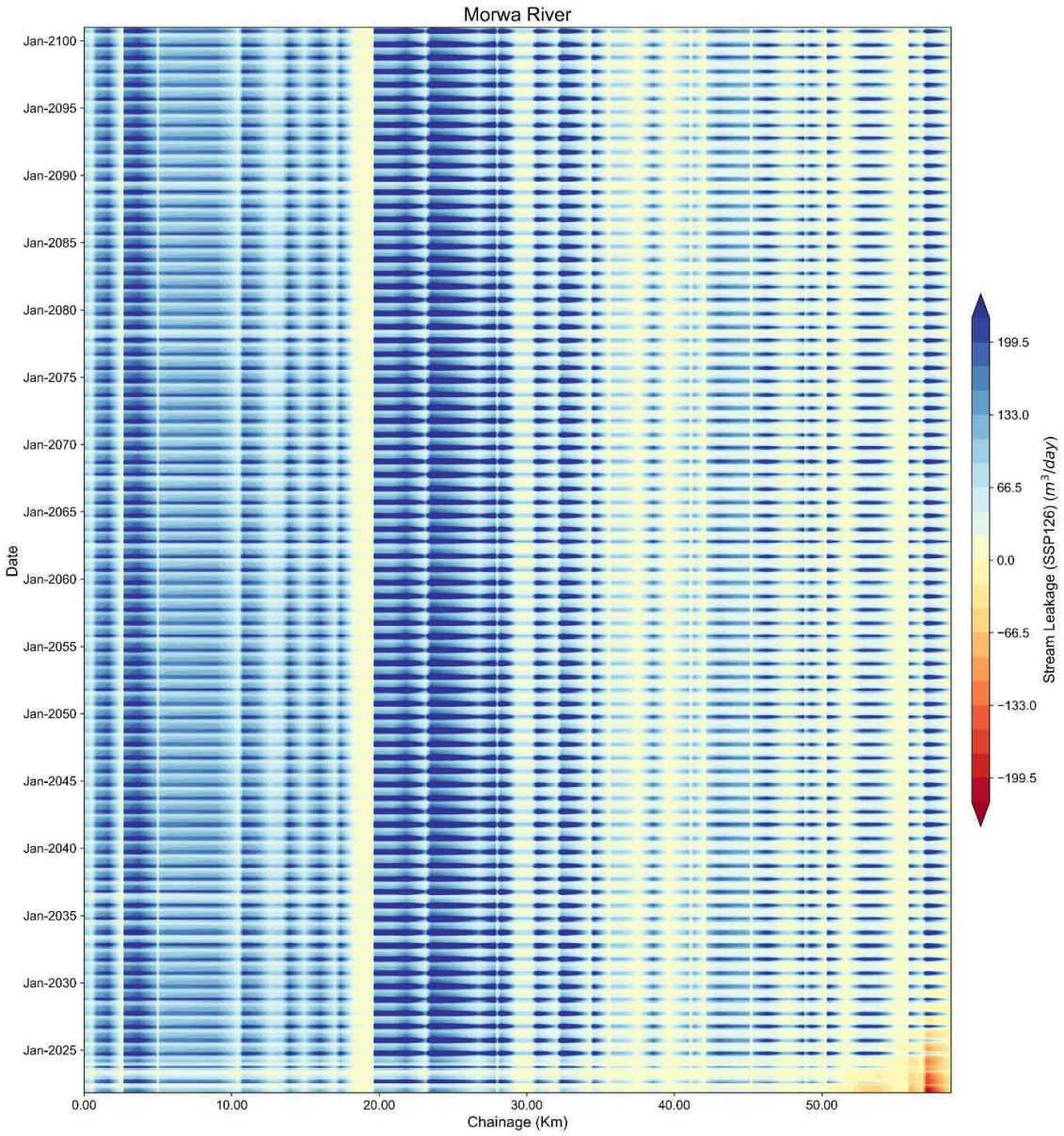
F 2.Contour plot of RAE with time and space for scenario SSP245 of Varuna river



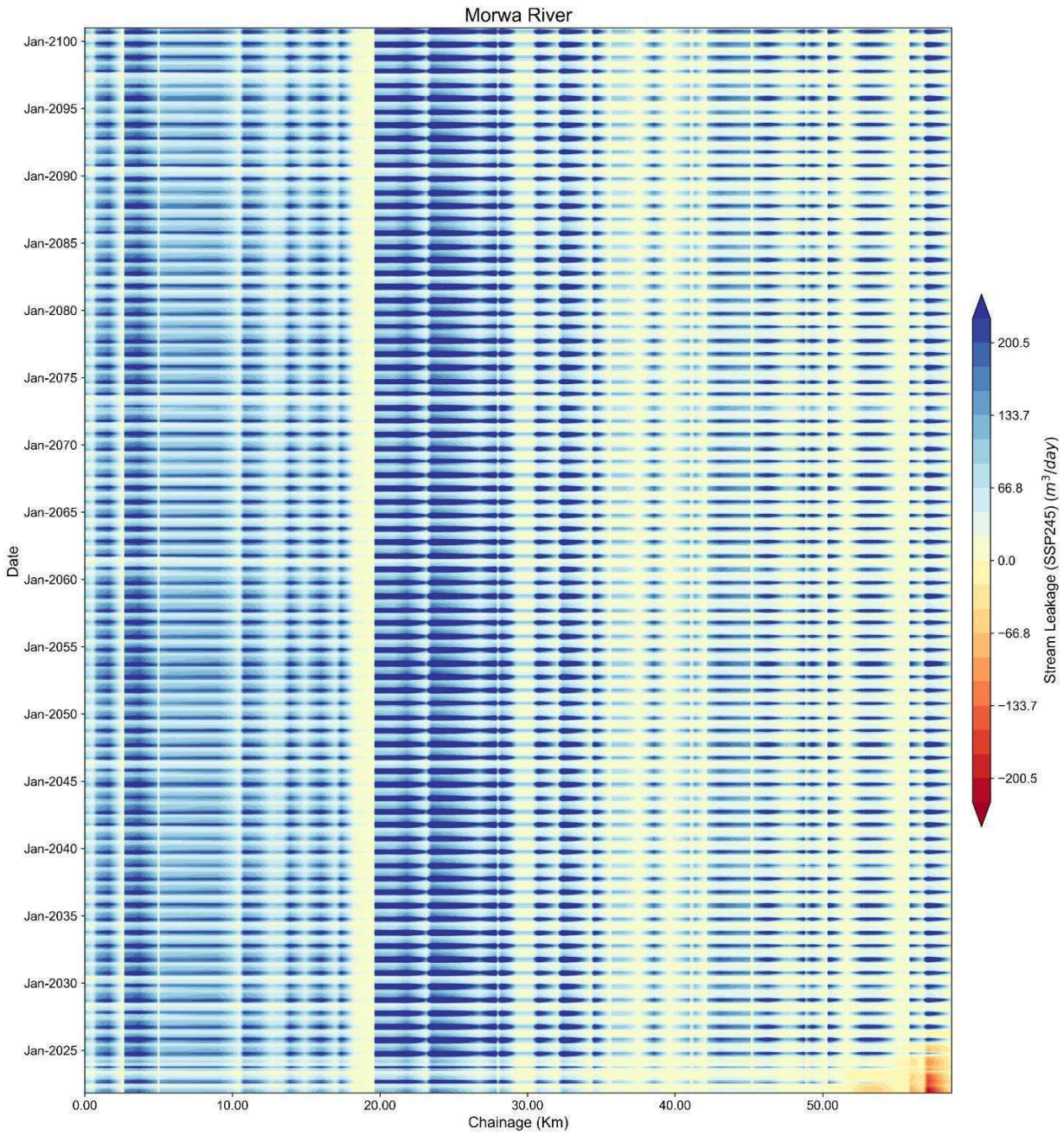
F 3.Contour plot of RAE with time and space for scenario SSP370 of Varuna river



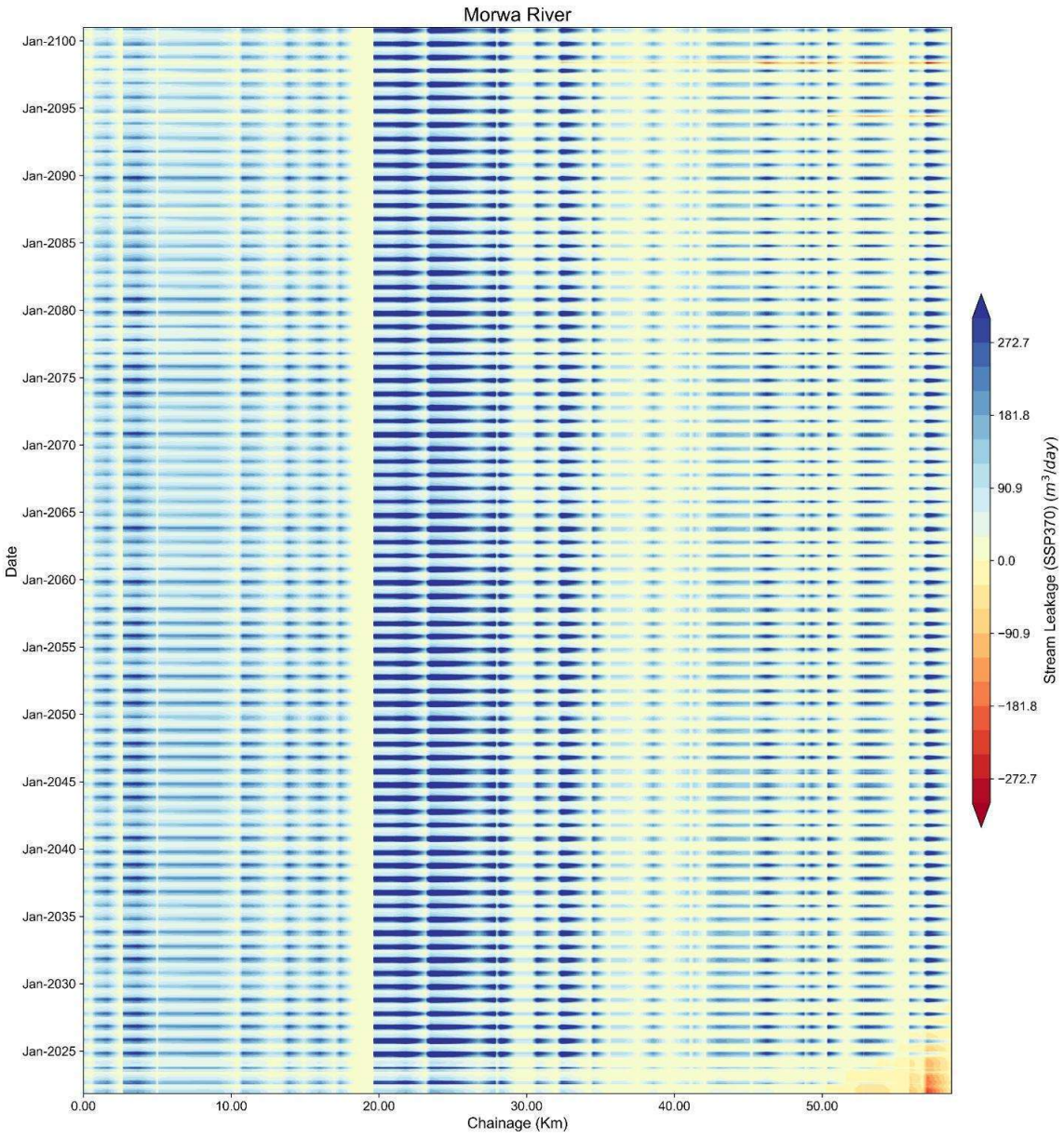
F 4.Contour plot of RAE with time and space for scenario SSP585 of Varuna river



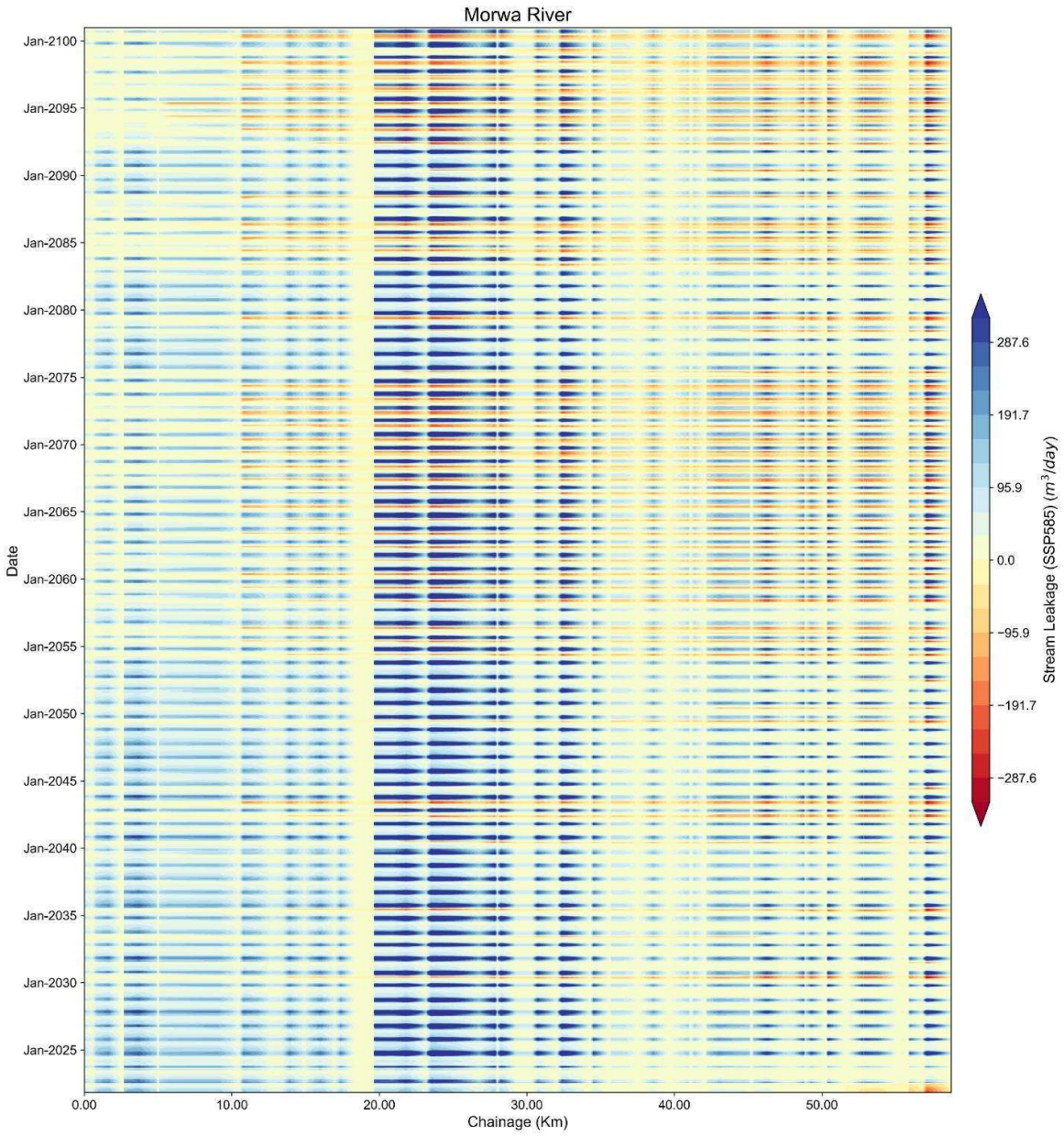
F 5.Contour plot of RAE with time and space for scenario SSP126 of Morwa river



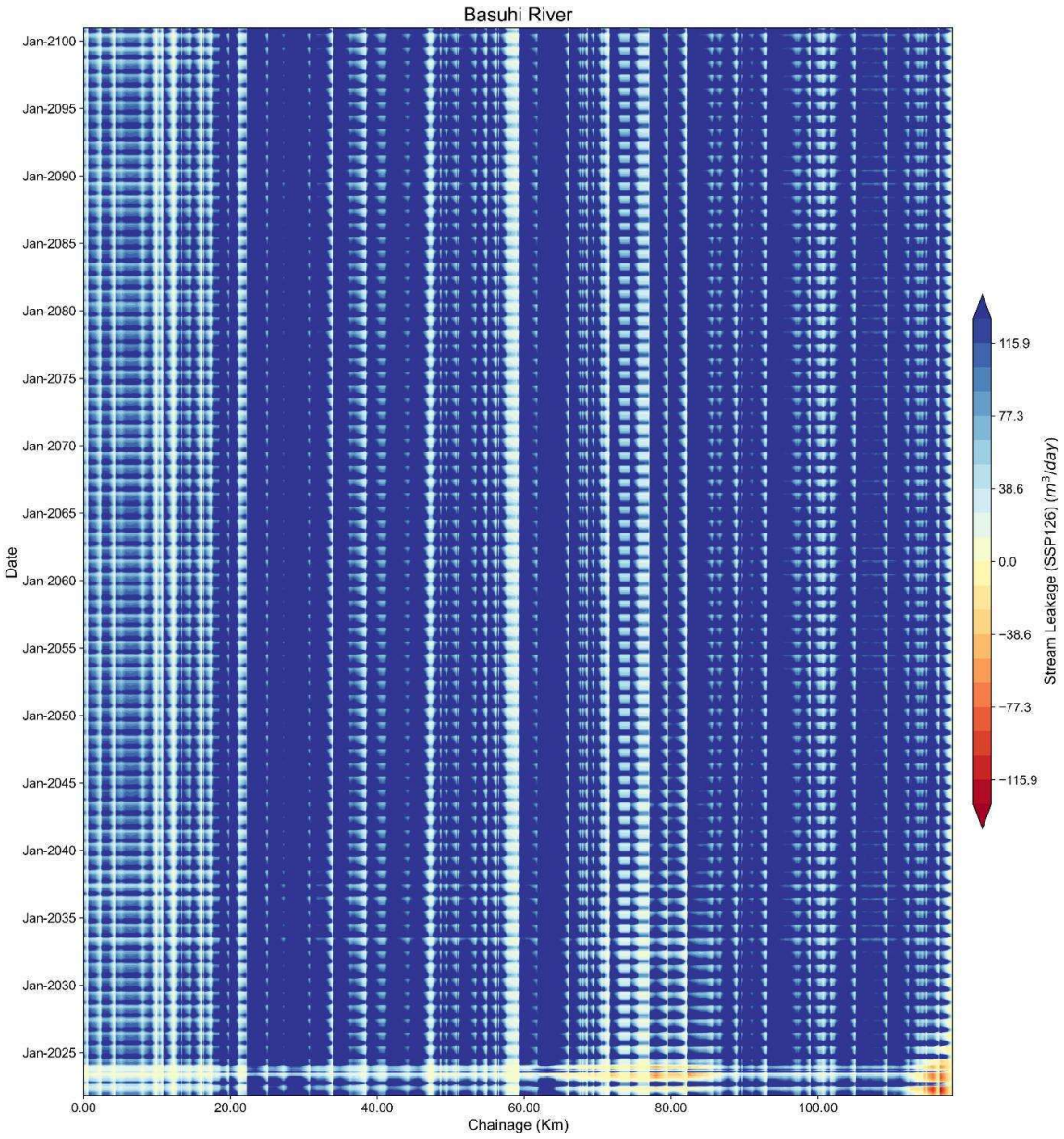
F 6.Contour plot of RAE with time and space for scenario SSP245 of Morwa river



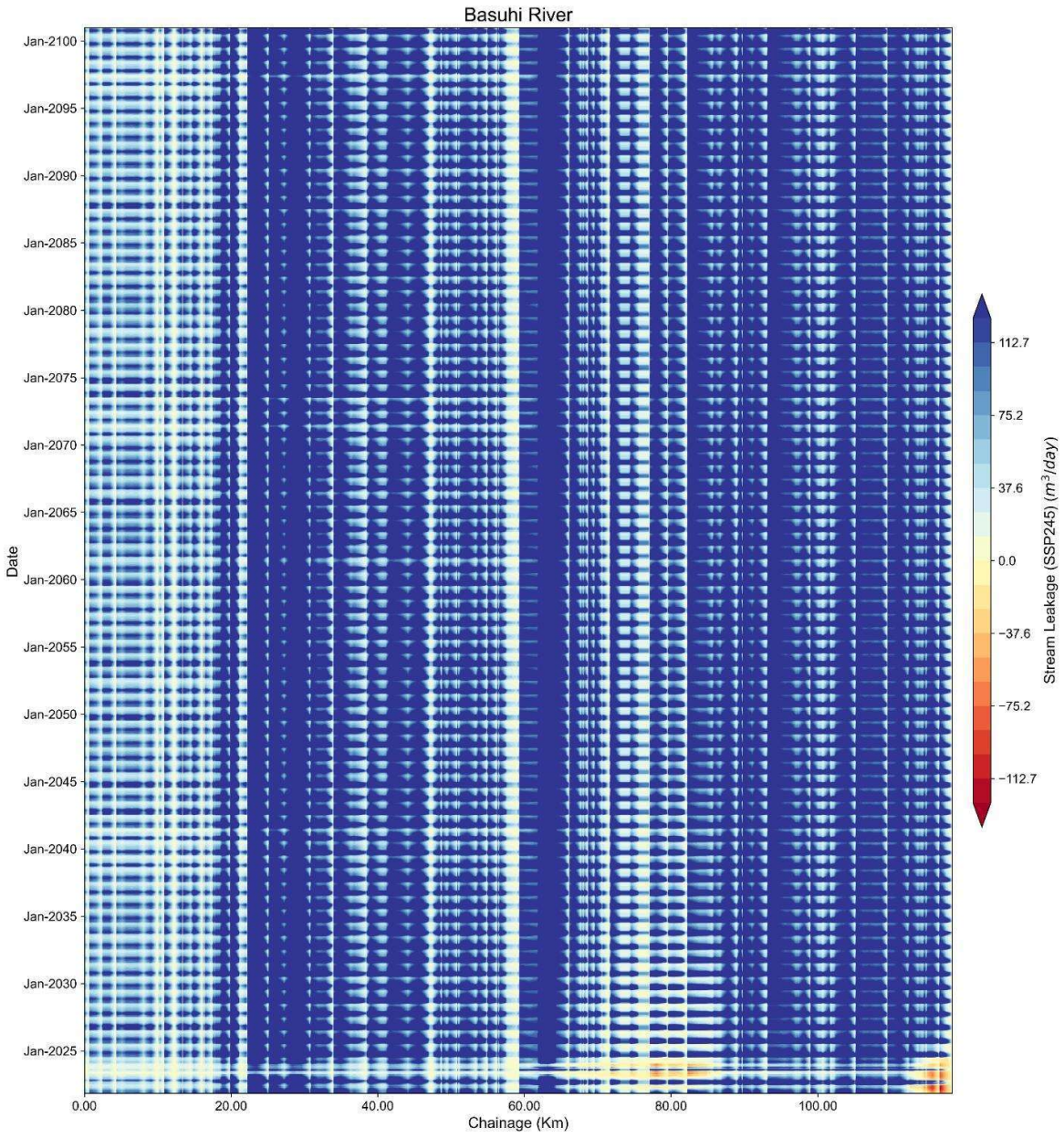
F 7.Contour plot of RAE with time and space for scenario SSP370 of Morwa river



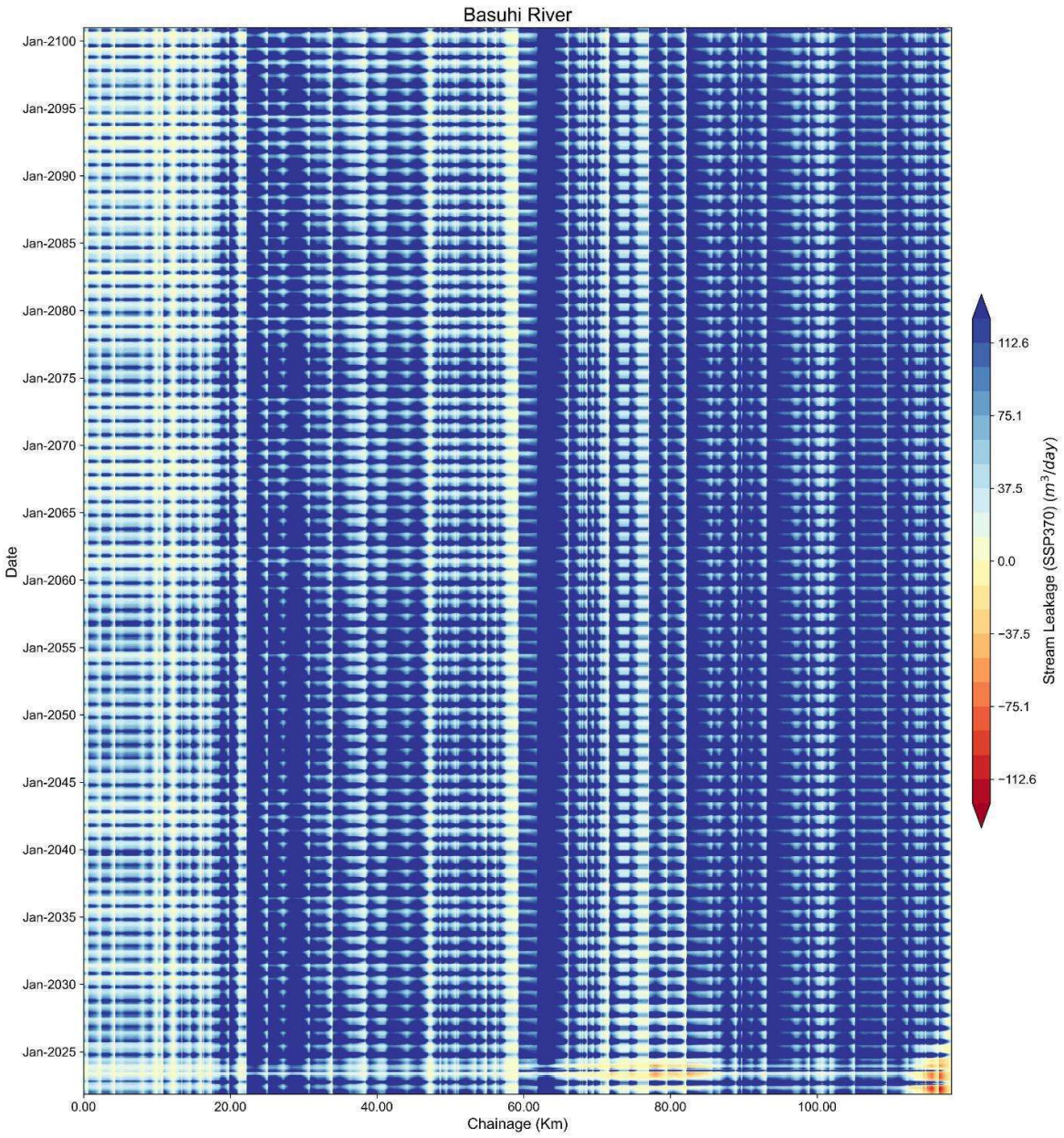
F 8. Contour plot of RAE with time and space for scenario SSP585 of Morwa River



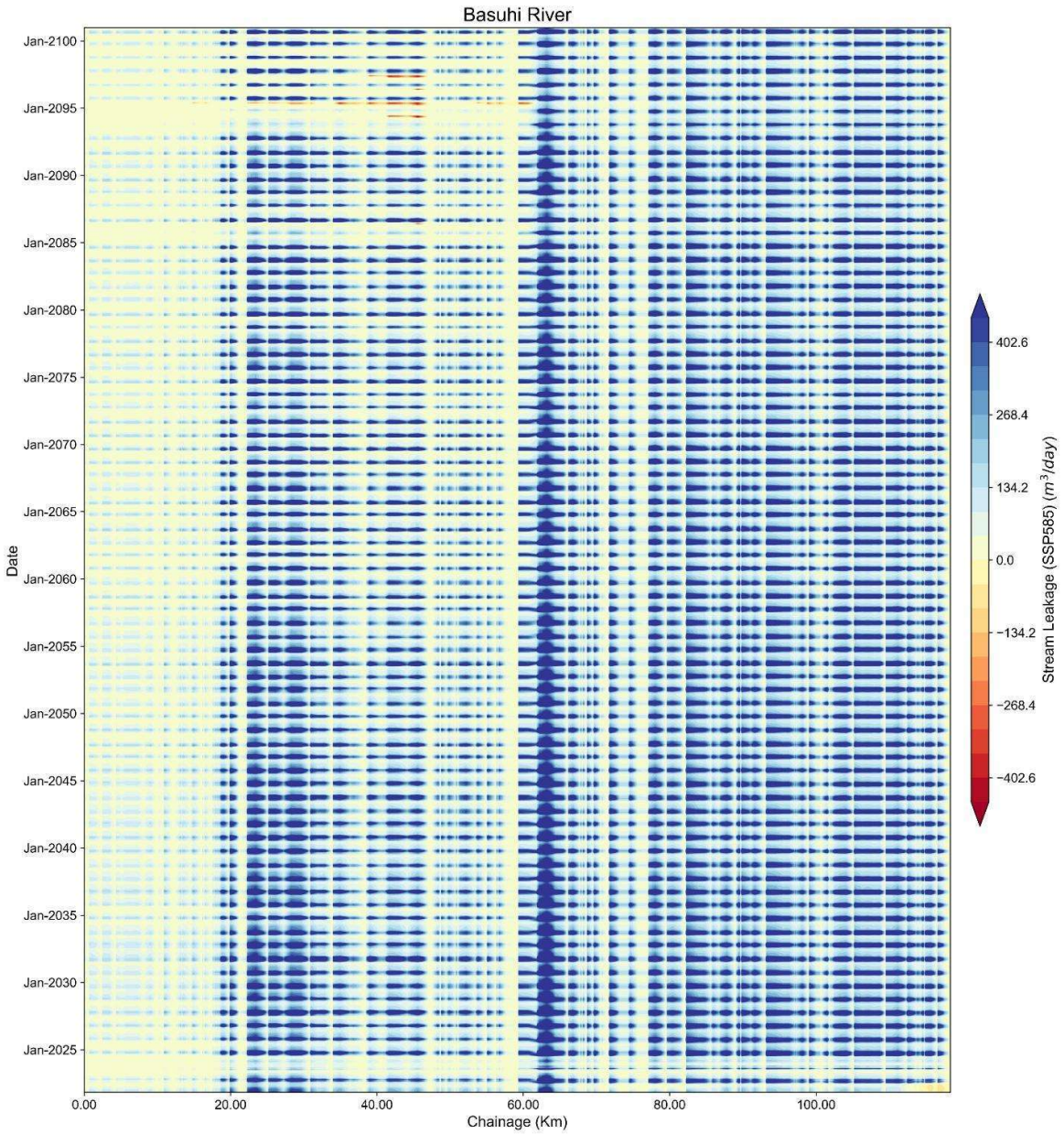
F 9.Contour plot of RAE with time and space for scenario SSP126 of Basuhi river



F 10.Contour plot of RAE with time and space for scenario SSP245 of Basuhi river



F 11.Contour plot of RAE with time and space for scenario SSP370 of Basuhi river



F 12.Contour plot of RAE with time and space for scenario SSP585 of Basuhi river

Appendix G: Fitted Relationships between Aquifer and Well Parameters and PARR

Table G.1. The fitted curves between PARR and aquifer parameters and Well Parameters (y=PARR and x=Parameters)

		Confined Aquifer		Unconfined Aquifer	
	t_{end}	**Fitted Curve**	R^2	**Fitted Curve**	R^2
H_K	*1 hour*	$y = -5431.5x^2 + 2190x + 2.08$	0.99	$y = -2005x^2 + 593.99x + 2.17$	0.99
	1 day	$y = -3040.6x^2 + 1600.1x + 1.08$	0.99	$y = -1039.1x^2 + 377.34x + 0.42$	0.99
	1 month	$y = -1889.9x^2 + 1238.9x + 0.64$	0.99	$y = -493.85x^2 + 259.41x + 0.18$	0.99
	1 year	$y = -49.258x^2 + 1090.1x + 0.30$	0.99	$y = -184.42x^2 + 213.83x + 0.12$	0.99
S_s/S_y	*1 hour*	$y = -2\times10^6x^2 + 4979.4x + 2.97$	0.98	$y = -0.9111x^2 + 8.9083x + 0.71$	0.99
	1 day	$y = -1\times10^6x^2 + 2037.9x + 2.05$	0.96	$y = -1.4585x^2 + 1.4498x + 0.43$	0.99
	1 month	$y = -592982x^2 + 1055.9x + 1.5$	0.95	$y = -0.7057x^2 + 0.571x + 0.29$	0.98
	1 year	$y = -397875x^2 + 702.74x + 1.29$	0.96	$y = -0.451x^2 + 0.3463x + 0.23$	0.98
VANI	*1 hour*	Insensitive	--	$y = -0.0127x^2 + 0.2921x + 1.66$	0.99
	1 day	Insensitive	--	$y = -0.0009x^2 + 0.0237x + 0.59$	0.99
	1 month	Insensitive	--	$y = -0.0003x^2 + 0.0074x + 0.35$	0.99
	1 year	Insensitive	--	$y = -0.0002x^2 + 0.0036x + 0.27$	0.99
HANI	*1 hour*	$y = -0.0443x^2 + 1.1853x + 2.38$	0.99	$y = -0.0213x^2 + 0.6518x + 1.83$	0.99
	1 day	$y = -0.0305x^2 + 0.8042x + 1.50$	0.99	$y = -0.0087x^2 + 0.2314x + 0.43$	0.98
	1 month	$y = -0.0227x^2 + 0.5951x + 1.06$	0.99	$y = -0.0052x^2 + 0.1367x + 0.24$	0.99
	1 year	$y = -0.0206x^2 + 0.5x + 0.88$	0.99	$y = -0.004x^2 + 0.1062x + 0.18$	0.99
L_{sc}	*1 hour*	$y = -9\times10^{-6}x^3 + 0.0005x^2 + 0.0361x + 1.64$	0.99	$y = -3\times10^{-6}x^3 + 0.0001x^2 + 0.0323x + 0.61$	0.99
	1 day	$y = -3\times10^{-6}x^3 + 5\times10^{-5}x^2 + 0.025x + 1.30$	0.99	$y = -3\times10^{-7}x^3 - 4\times10^{-5}x^2 + 0.0104x + 0.25$	0.99
	1 month	$y = -1\times10^{-6}x^3 - 5\times10^{-5}x^2 + 0.0172x + 1.06$	0.99	$y = 3\times10^{-7}x^3 - 7\times10^{-5}x^2 + 0.006x + 0.19$	0.99
	1 year	$y = -6\times10^{-7}x^3 - 6\times10^{-5}x^2 + 0.0134x + 0.94$	0.99	$y = 3\times10^{-7}x^3 - 5\times10^{-5}x^2 + 0.0043x + 0.17$	0.99
H_{sc}	*1 hour*	$y = 6\times10^{-5}x^3 - 0.0051x^2 + 0.0292x + 5.93$	0.99	$y = 0.0001x^3 - 0.0075x^2 - 0.0475x + 8.45$	0.99
	1 day	$y = 1\times10^{-5}x^3 - 0.0017x^2 + 0.0141x + 3.07$	0.99	$y = 5\times10^{-6}x^3 - 0.0007x^2 + 0.001x + 1.14$	0.99
	1 month	$y = 3\times10^{-6}x^3 - 0.0007x^2 + 0.0063x + 2.03$	0.99	$y = -9\times10^{-6}x^3 - 7\times10^{-5}x^2 - 0.0006x + 0.50$	0.98
	1 year	$y = 1\times10^{-6}x^3 - 0.0004x^2 + 0.0038x + 1.62$	0.99	$y = -1\times10^{-6}x^3 - 1\times10^{-5}x^2 - 0.0006x + 0.35$	0.99

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