Appendix A. Results for different Shared Socio-economic Pathways

Supplement to: *Trade-offs in the use of direct and indirect indicators of ecosystem degradation for risk assessment*

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Figure A1. Time series of averaged relative severity (RS) of the projected loss of ice mass for 12 tropical glacier ecosystem types, blue line and shaded ribbon represents smoothed median, maxima and minima calculated from median and median absolute deviation of 50 replicates from each of 12 GCM models under shared socio-economic pathway SSP1-2.6. Red segments indicate that all models predict collapse ($RS > 0.99$).

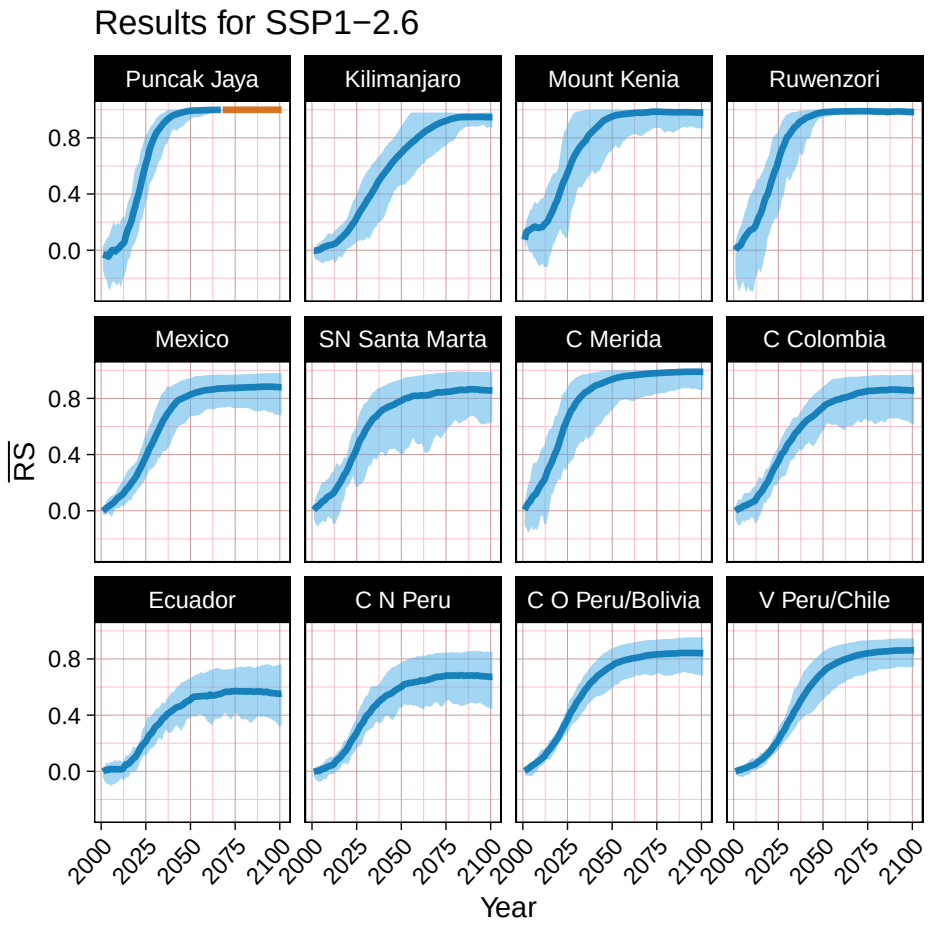

Figure A2. Histogram of year when time series of average relative severity (RS) of loss of ice mass reaches thresholds of very high severity ($\overline{RS} \geq 0.80$) and collapse ($\overline{RS} \geq 0.99$) under shared socio-economic pathway SSP1-2.6 for 12 tropical glacier ecosystem types.

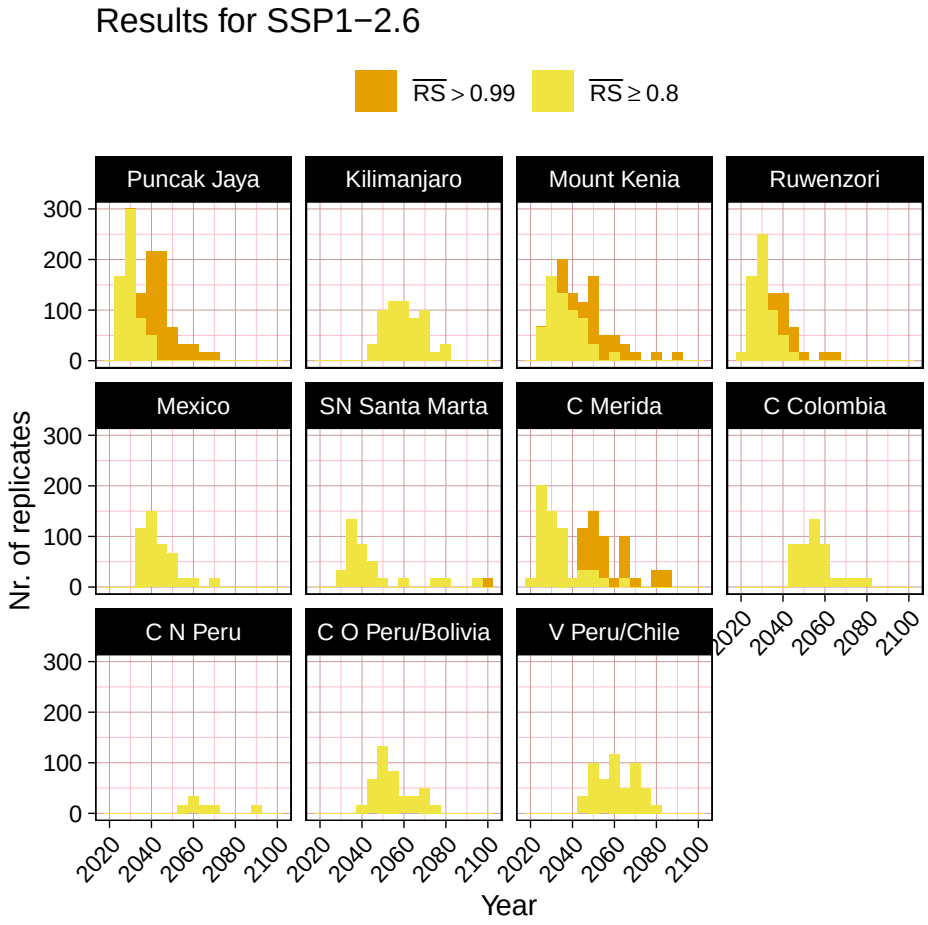

Figure A3. Time series of average relative severity (RS) for six tropical glacier ecosystem types at risk of collapse and 12 GCMs, each point is a time step (1 year) with colours indicating transition between states defined by thresholds of relative severity (moderate: 0.3, high: 0.5, very high: 0.8) and cumulative extent of decline (localised: 0.3, intermediate: 0.5 and widespread: 0.8) of loss of ice mass for shared socio-economic pathway SSP1-2.6. Years are rescaled to represent time prior to collapse (year=0).

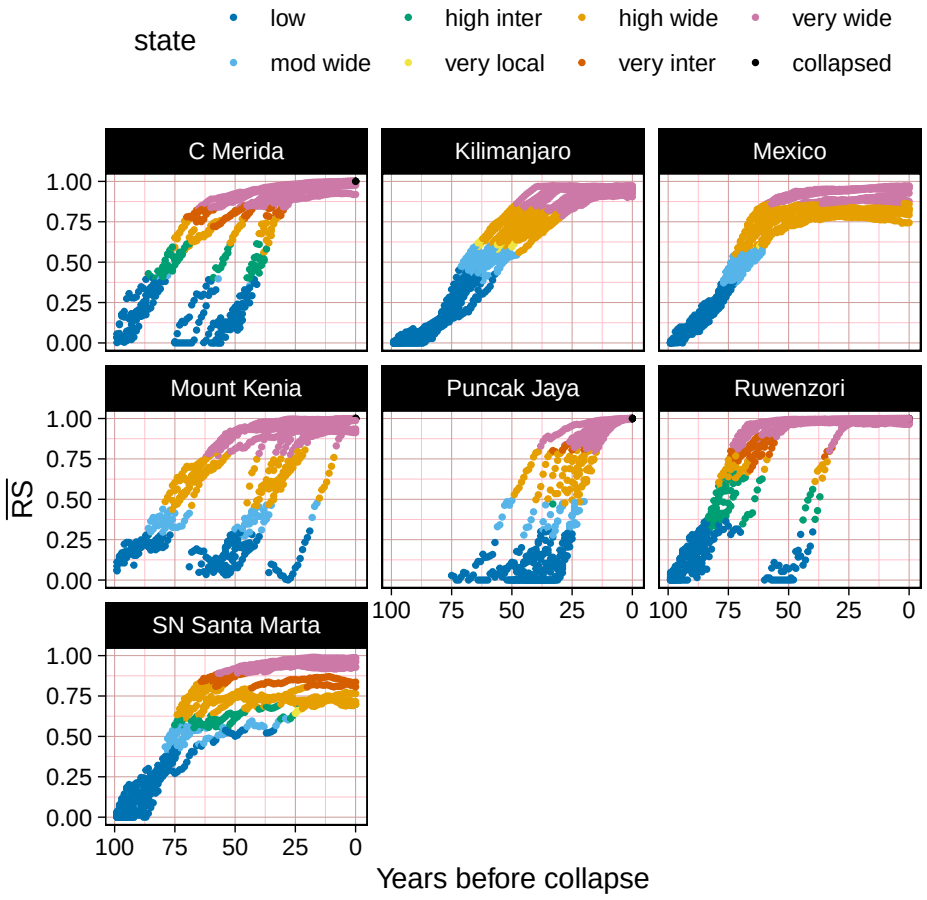

Figure A4. Time series of averaged relative severity (RS) of the projected loss of ice mass for 12 tropical glacier ecosystem types, blue line and shaded ribbon represents smoothed median, maxima and minima calculated from median and median absolute deviation of 50 replicates from each of 12 GCM models under shared socio-economic pathway SSP3-7.0. Red segments indicate that all models predict collapse ($RS > 0.99$).

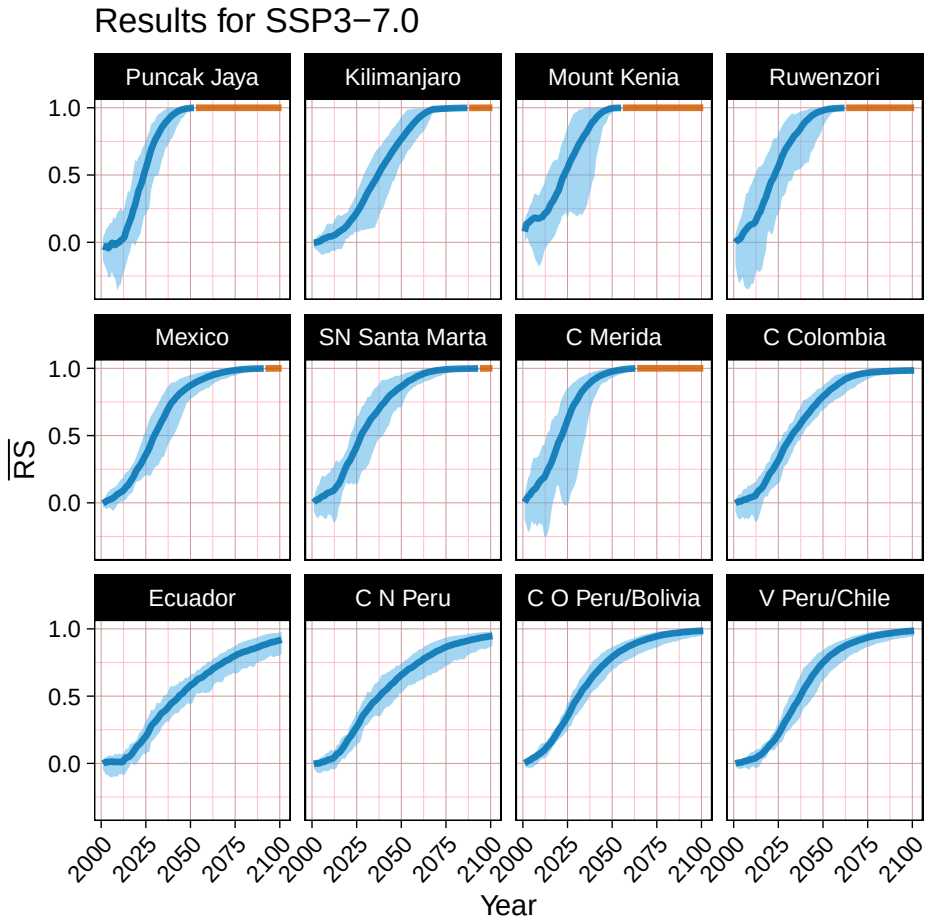

Figure A5. Histogram of year when time series of average relative severity (RS) of loss of ice mass reaches thresholds of very high severity ($\overline{\text{RS}} \geq 0.80$) and collapse ($\overline{\text{RS}} \geq 0.99$) under shared socio-economic pathway SSP3-7.0 for 12 tropical glacier ecosystem types.

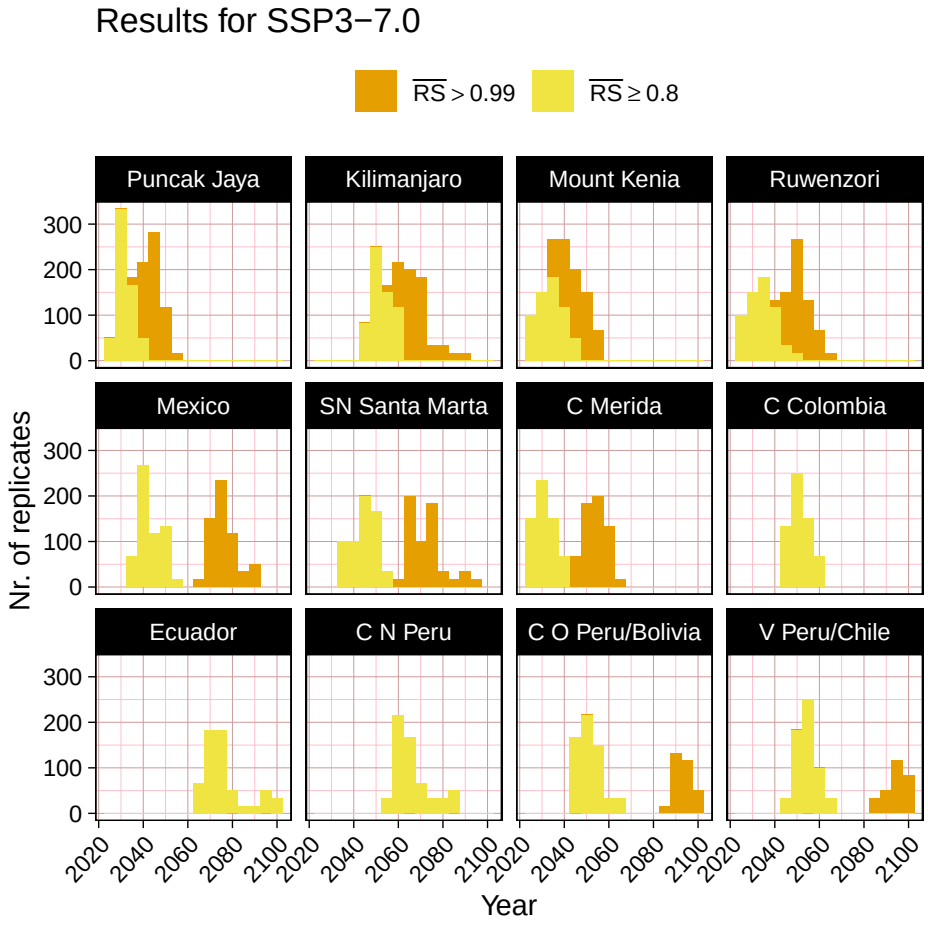

Figure A6. Time series of average relative severity (RS) for six tropical glacier ecosystem types at risk of collapse and 12 GCMs, each point is a time step (1 year) with colours indicating transition between states defined by thresholds of relative severity (moderate: 0.3, high: 0.5, very high: 0.8) and cumulative extent of decline (localised: 0.3, intermediate: 0.5 and widespread: 0.8) of loss of ice mass for shared socio-economic pathway SSP3-7.0. Years are rescaled to represent time prior to collapse (year=0).

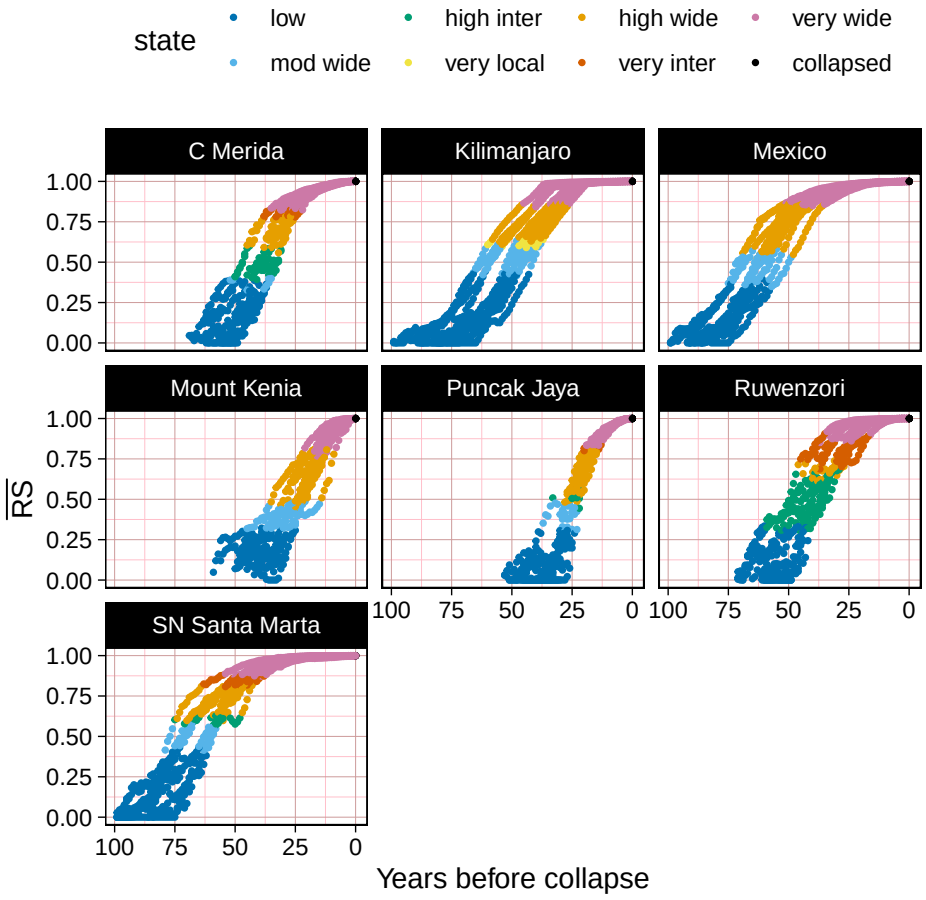

Figure A7. Time series of averaged relative severity (RS) of the projected loss of ice mass for 12 tropical glacier ecosystem types, blue line and shaded ribbon represents smoothed median, maxima and minima calculated from median and median absolute deviation of 50 replicates from each of 12 GCM models under shared socio-economic pathway SSP5-8.5. Red segments indicate that all models predict collapse ($RS > 0.99$).

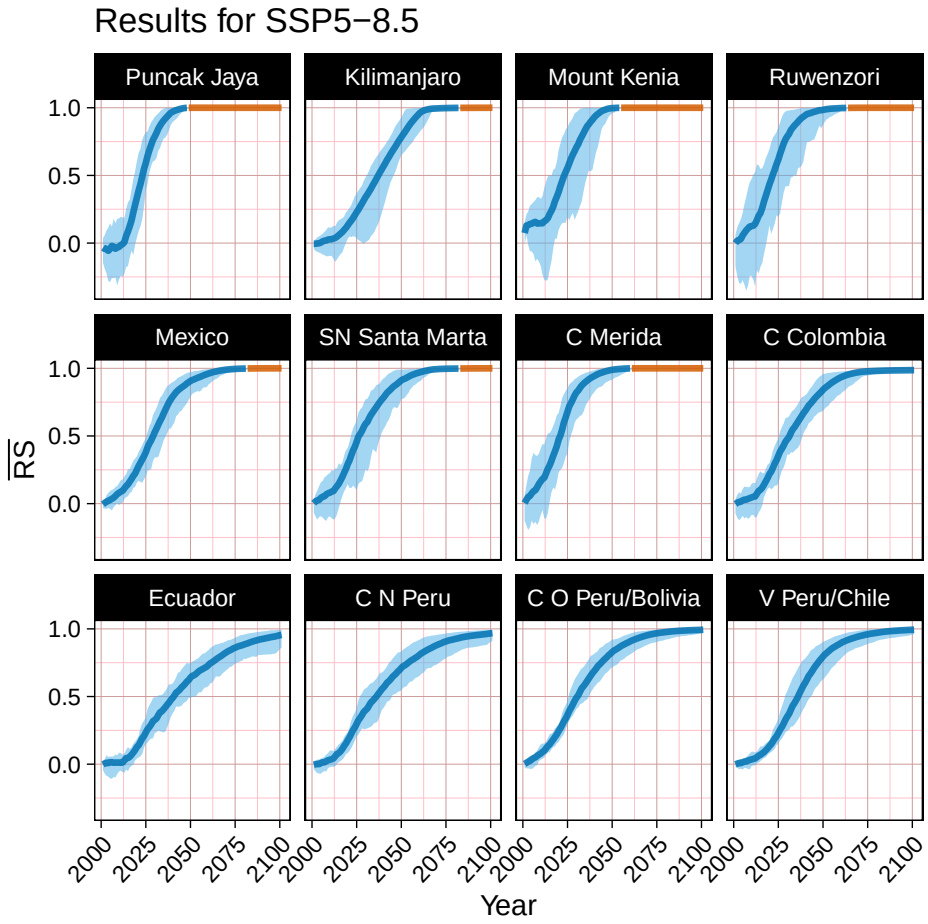

Figure A8. Histogram of year when time series of average relative severity (RS) of loss of ice mass reaches thresholds of very high severity ($\overline{\text{RS}} \geq 0.80$) and collapse ($\overline{\text{RS}} \geq 0.99$) under shared socio-economic pathway SSP5-8.5 for 12 tropical glacier ecosystem types.

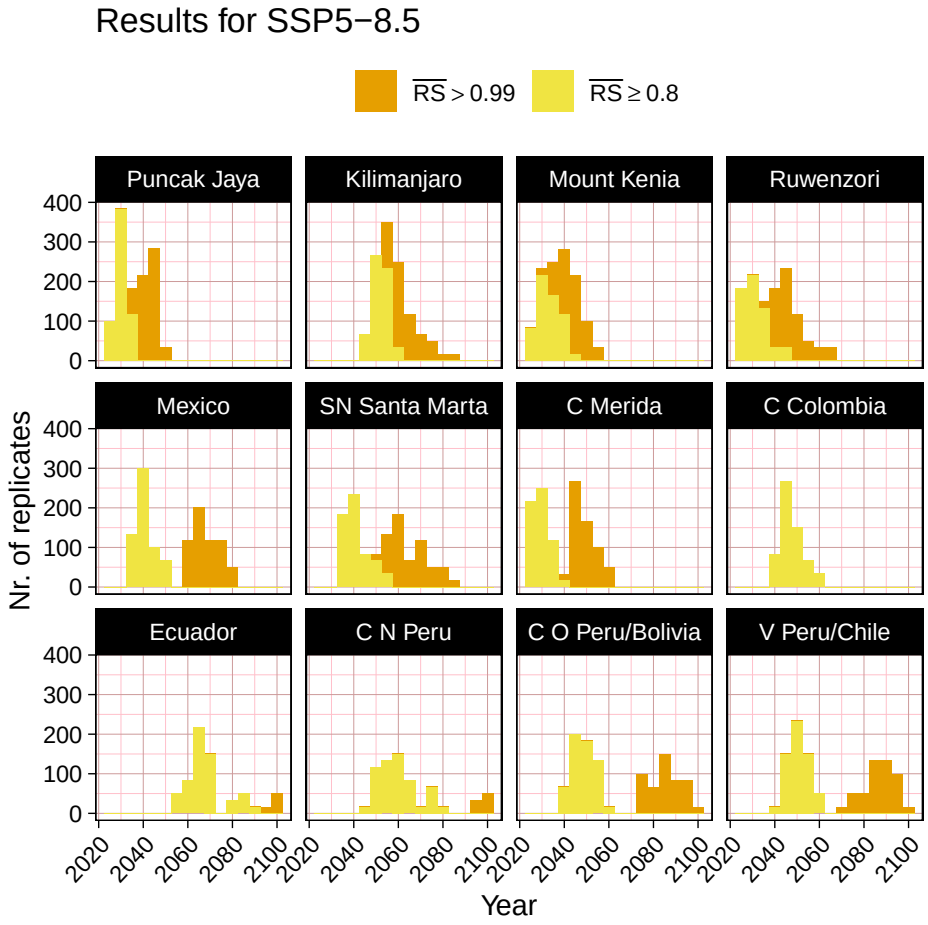

Figure A9. Time series of average relative severity (RS) for six tropical glacier ecosystem types at risk of collapse and 12 GCMs, each point is a time step (1 year) with colours indicating transition between states defined by thresholds of relative severity (moderate: 0.3, high: 0.5, very high: 0.8) and cumulative extent of decline (localised: 0.3, intermediate: 0.5 and widespread: 0.8) of loss of ice mass for shared socio-economic pathway SSP5-8.5. Years are rescaled to represent time prior to collapse (year=0).