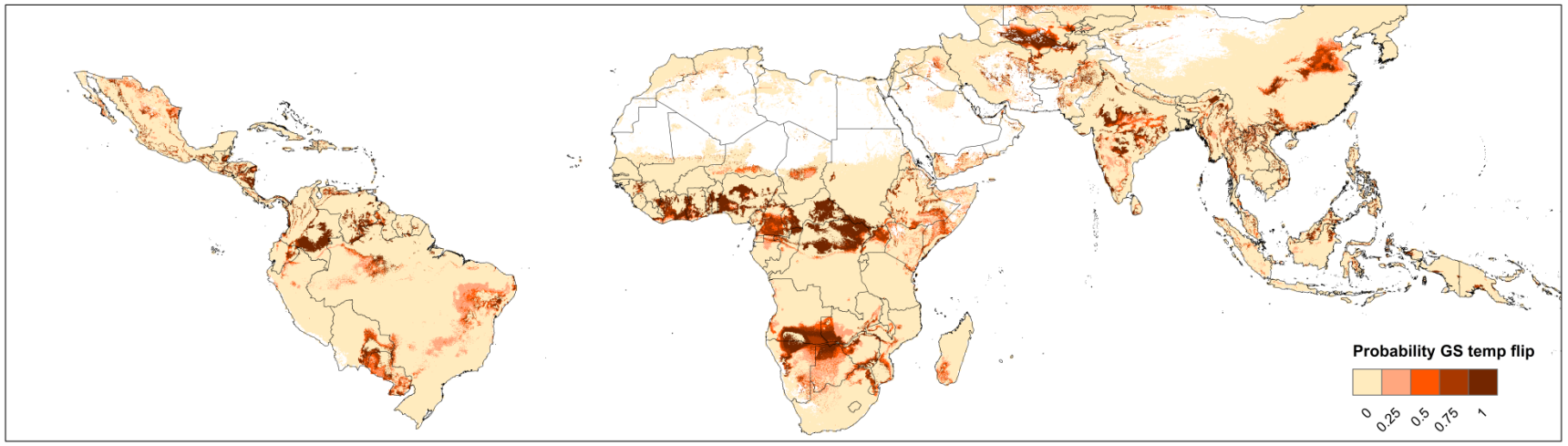
Appendix Two: Probability maps of climate change thresholds

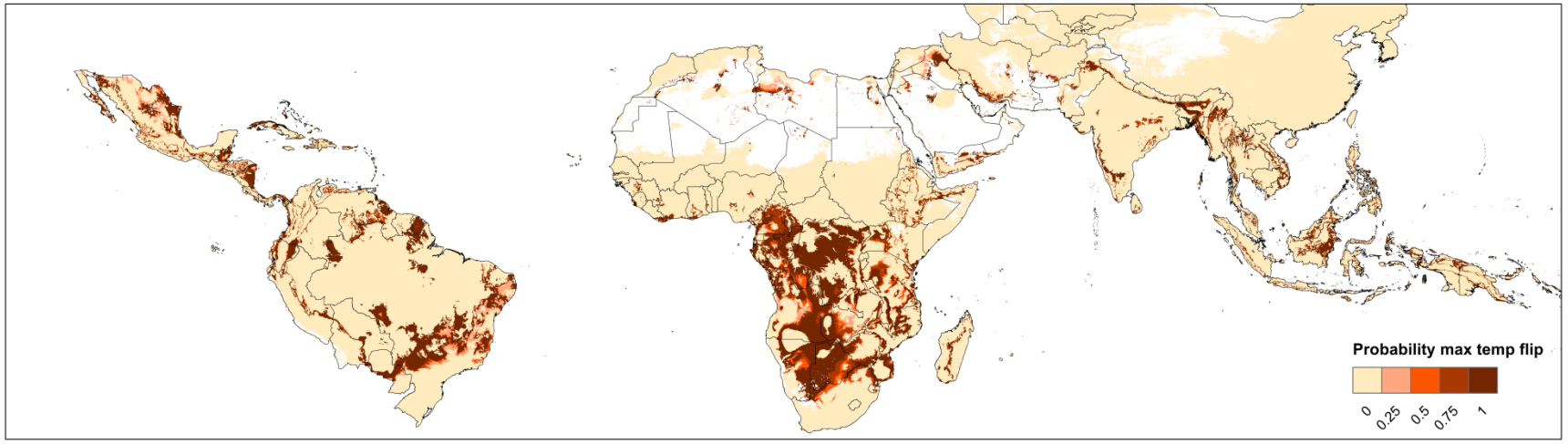
The appendix here presents probability maps of the eight different thresholds as projected by the GCMs used (the missing threshold is for annual CV of rainfall, which we are not able to project into the future in any meaningful way). Rather than using the mean climatology for the 2050s as projected in response to the A2 SRES scenario (as in section 2 of the main report), here we have calculated the probability that each pixel in the global tropics will reach the respective threshold. It should be pointed out that for this study, we had access to appropriate data from only four GCMs; but the same maps could be generated for a much larger sample of the 21 or so GCMs that went into the AR4, if the data were available.

Taking the maximum temperature threshold during the growing season as an example, the maps can be interpreted as follows. The darkest red areas are areas where all four models used in the analysis agreed on the temperature flip. It can be seen that there are several areas, such as southern Colombia and large areas in West, Central and South-Western Africa, where the models agree, and (from this subsample of climate models anyway) the result is robust – i.e., it does not matter which climate model is used. There are other widespread areas in this map where there is less agreement: for NE Brazil and large parts of East Africa, for example, only 1, 2 or 3 of the GCMs project this temperature flip. In such cases, the results are not so robust, in that it does matter which climate model is used for a specific analysis. And there are large parts of the global tropics where this threshold is not projected to be attained by any of the models; Tanzania, for example, is projected to avoid this growing-season maximum temperature flip.

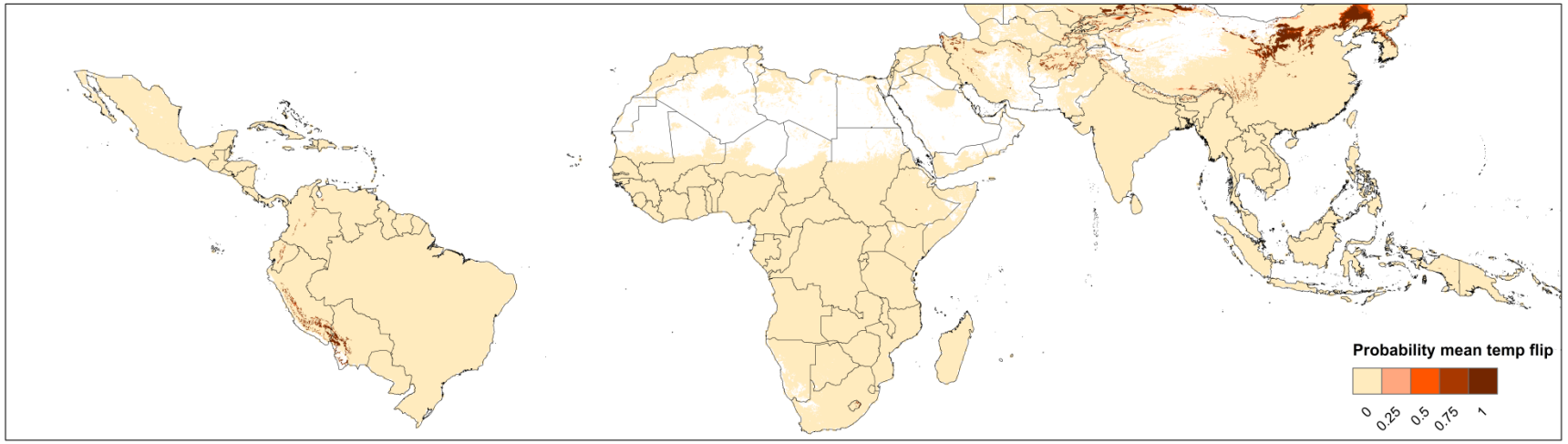
Two points might be made in addition. First, there are some differences between the use of an "average" climatology to derive the threshold maps in section 2 with the probability maps shown here. Second, the temperature-related thresholds tend to have less uncertainty associated with them (i.e., the between-model variation is muted and the maps are darker brown) than the rainfall-related thresholds. This highlights again the need for caution in interpreting the threshold maps and for recognising that between-model differences may be important sources of uncertainty in some regions of the global tropics.



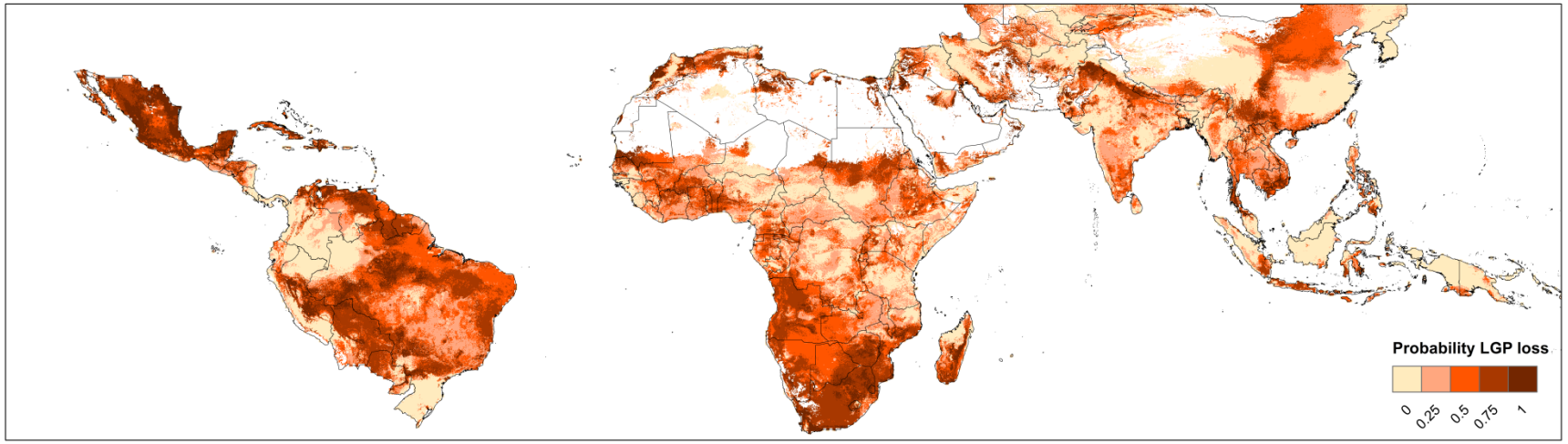
Probability flip Tmax primary growing season from < 30 C to > 30 C



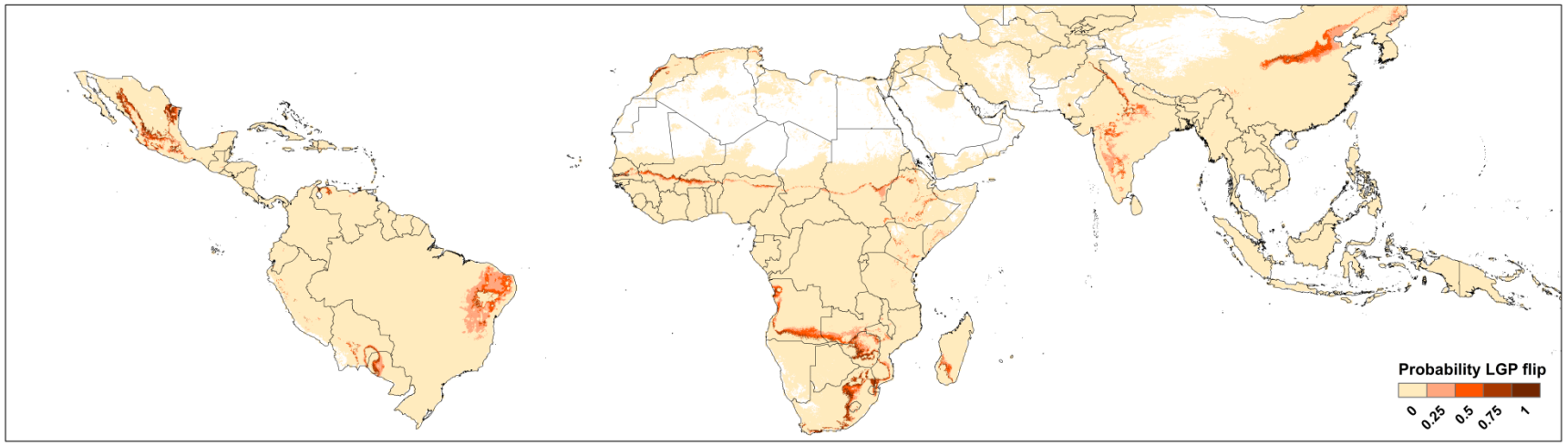
Probability Tmax flips < 30 C to > 30 C



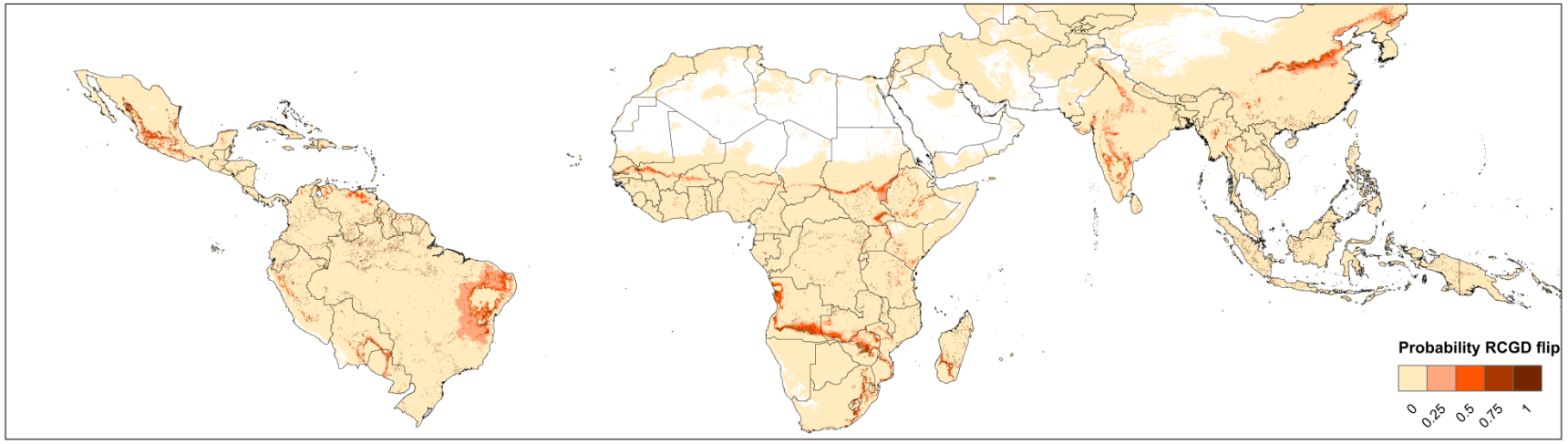
Probability Tmean flips from < 8 C to > 8 C



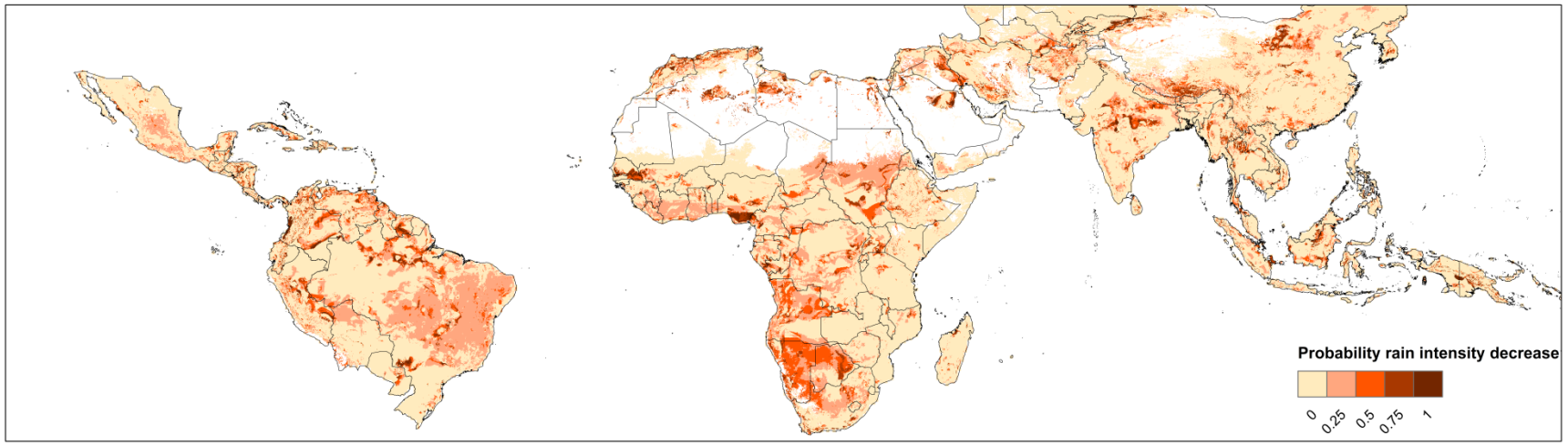
Probability of LGP decrease > 5%



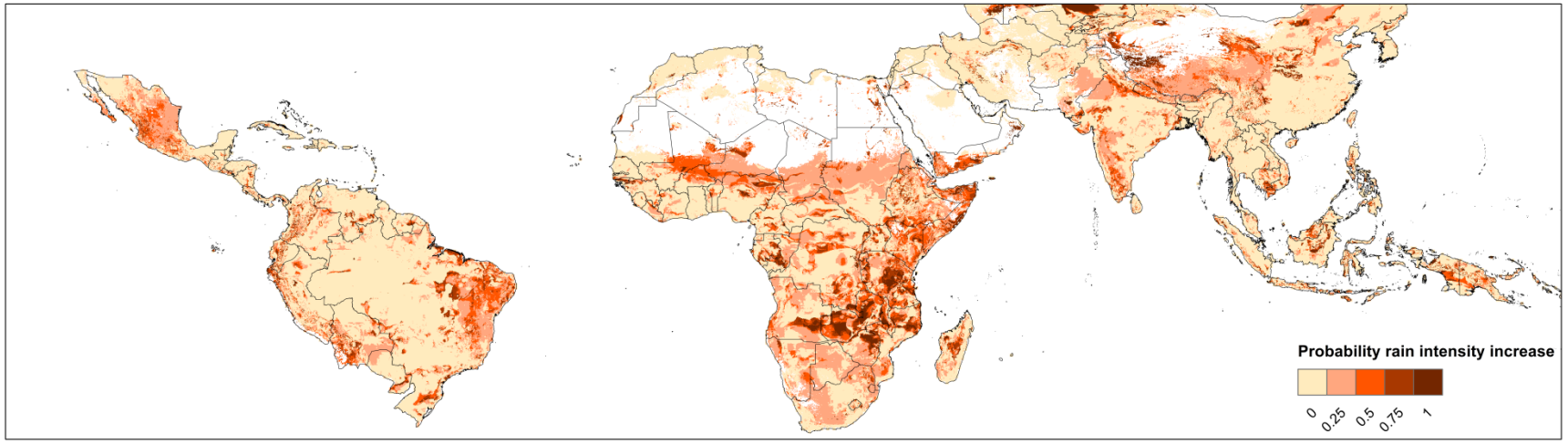
Probability of LGP flip from >120 days to < 120 days



Probability of RCGD flip from > 90 days to < 90 days



Probability rain per rainy day decreases



Probility rain per rain day increases