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Supplement of

HESFIRE: a global fire model to explore the role of anthropogenic and weather drivers

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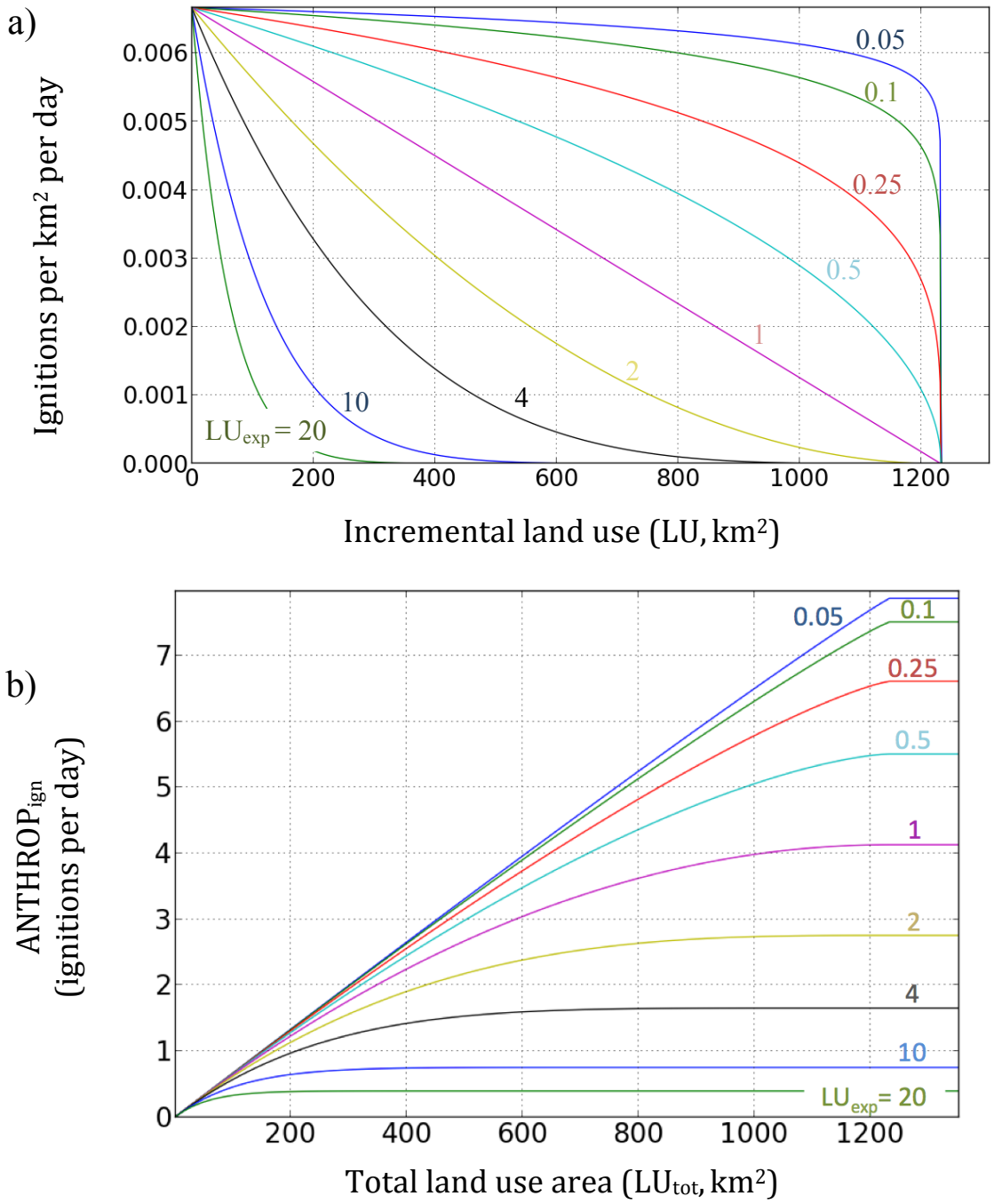

Figure S1. Relationship between land use and anthropogenic ignitions ($ANTHROP_{ign}$) for 1-degree grid-cells around the equator (12300km²). The initial number of ignitions per km² (LU_{ign}) and GDP were here chosen equal to 0.01 and 20000$ per capita, respectively. They act as simple scalers of the whole functions and do not affect their shape (see Eq. 3 and Eq.4). a) function controlling the decreasing contribution of land use to ignitions, as a function of land use and LU_{exp}. In a given grid-cell, the first km² of landuse contribute more than additional ones (see text). b) number of anthropogenic ignitions as a function of total land use and LU_{exp}. This function is the integral of the corresponding curve in a), over [0 LU_{tot}].

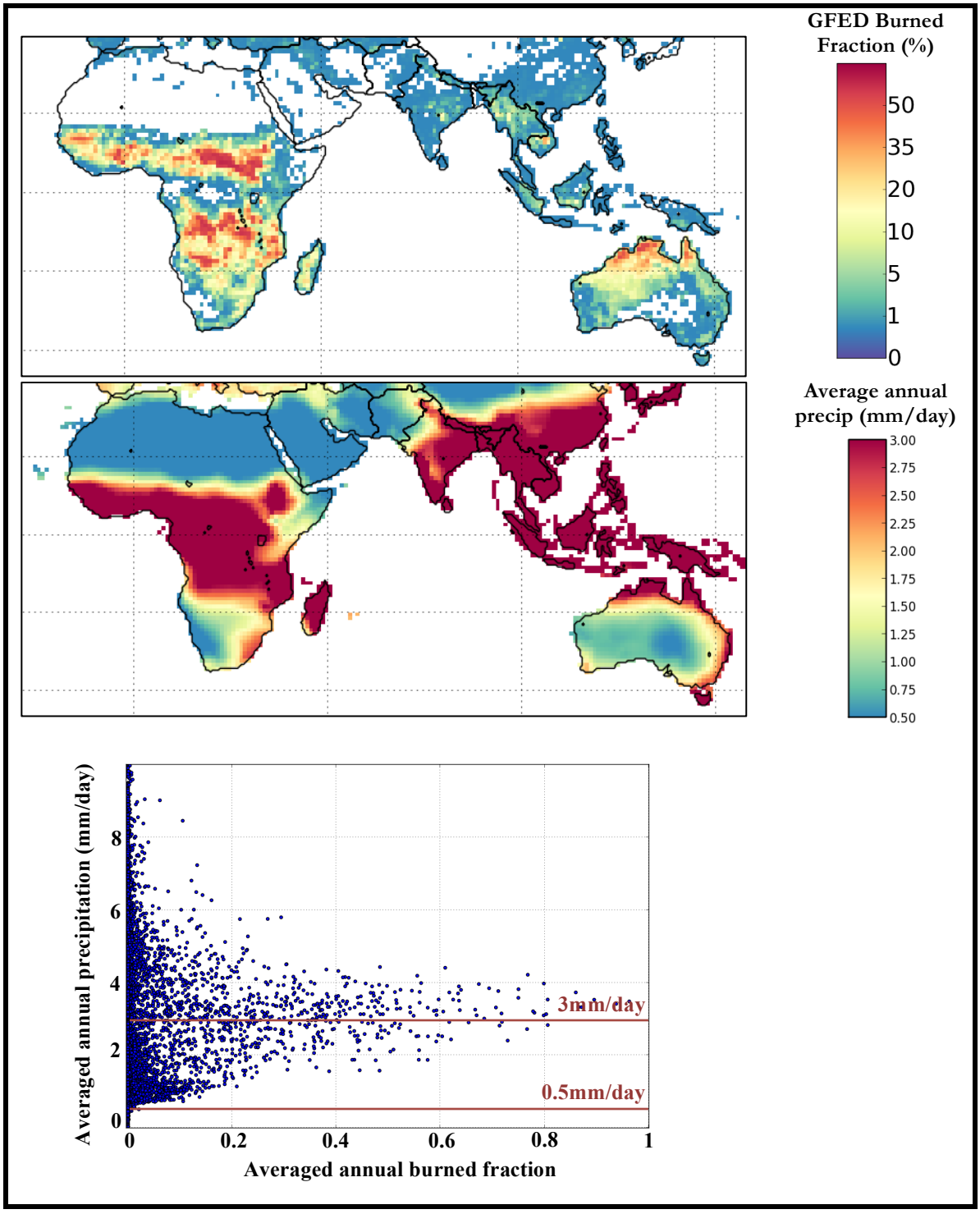

Figure S2. Top: GFED average annual burned fraction. Middle: GPCP average annual precipitation within the 0.5-3mm/day range. Bottom: scatter plot showing the distribution of GFED burned fraction versus GPCP precipitation.

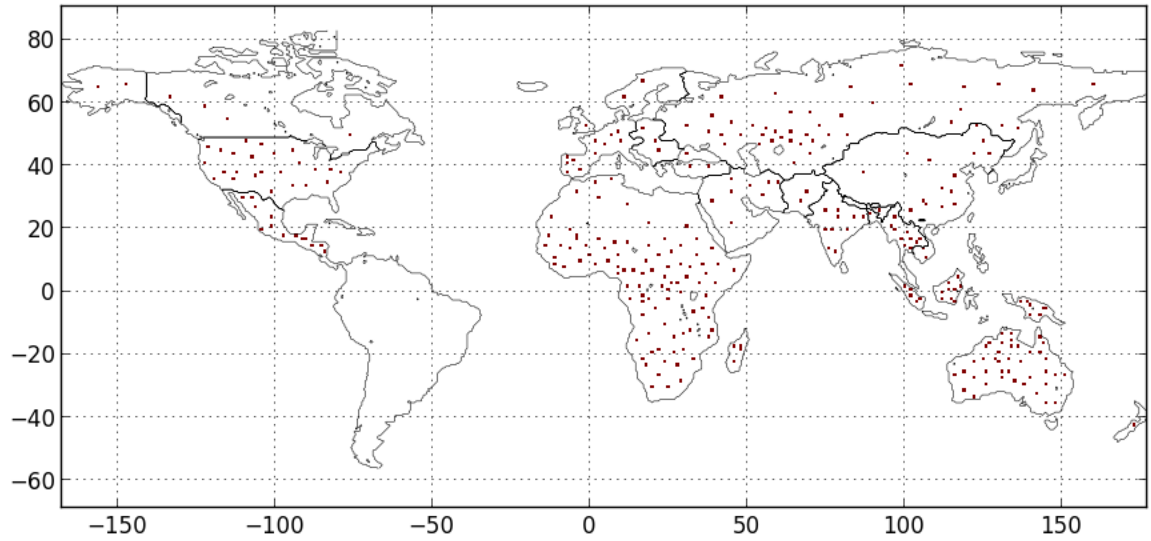

Figure S3. Grid-cell subset used for the main optimization run. Note that no grid-cell was selected over South America, and the selection was sparse over boreal regions (to avoid bias in model parameters due to biased inputs) and over arid regions were fire do not occur (e.g. deserts).

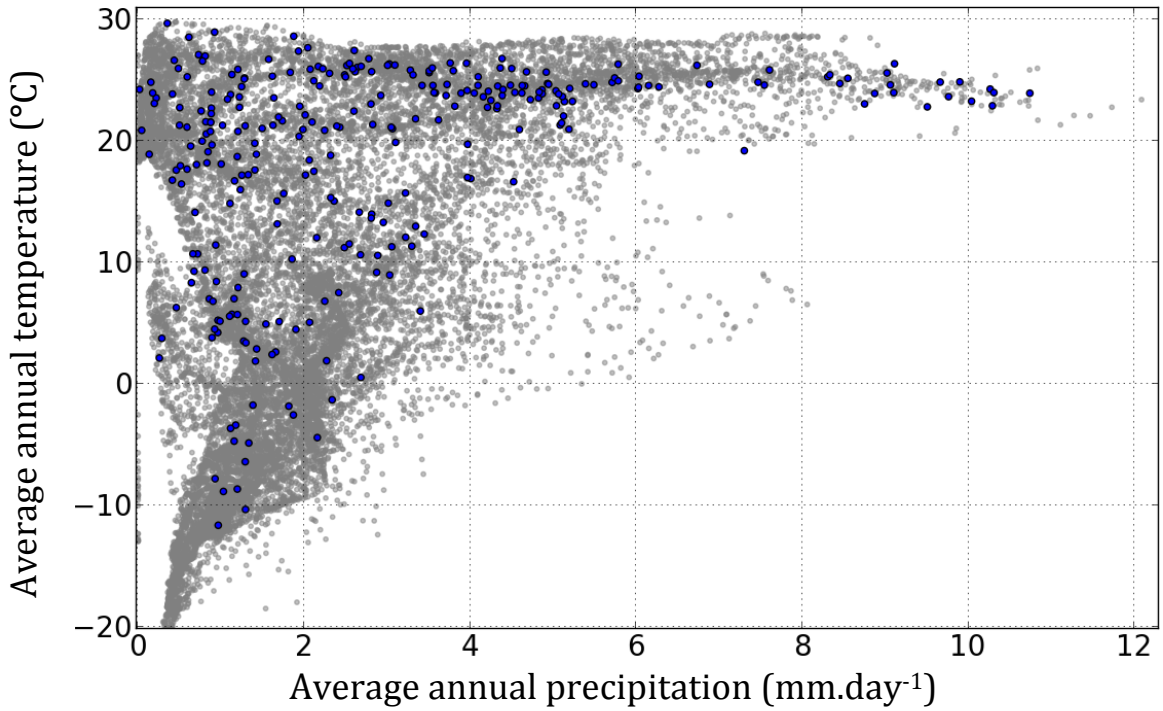

Figure S4. Scatter plot of average annual precipitation and temperature for all terrestrial 1-degree grid-cells (grey) and for the subset used for the main optimization. Note that the area not covered by the subset (0 to 10°C and 4 to 8mm per day) are confined to coastal areas of western Canada. This region was screened out of the subset given the climate input bias mentioned in the text.

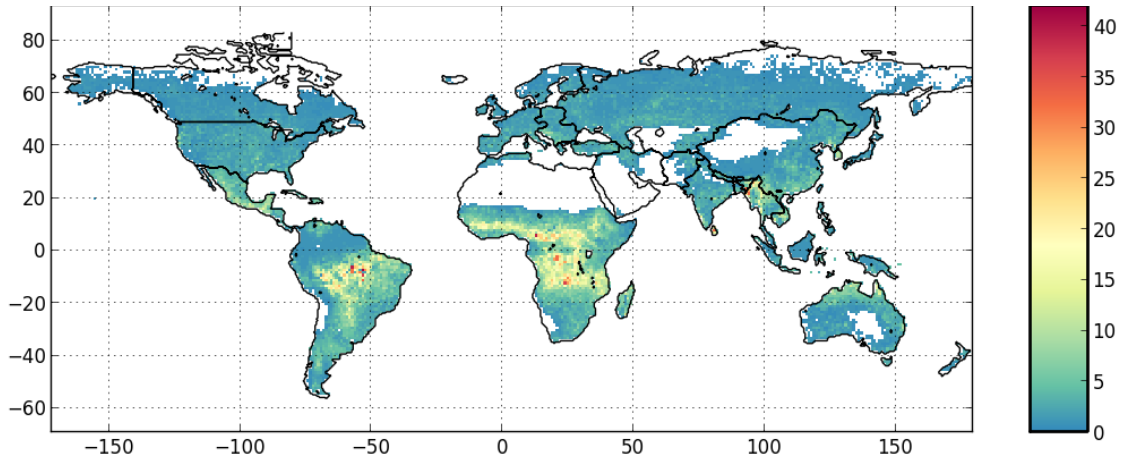

Figure S5. Maximum fire duration for each grid-cell, in days. Note that some grid-cells which do not have any fire in the paper do have fires in this figure: we re-ran the model and the stochastic modeling of ignition success means that successive runs are not identical, and fires may occur where they did not before. Note also that long-duration fires that do occur in boreal regions (up to 50+ days, Sedano and Randerson, 2014) are not captured by the model, in line with the climate data bias and other limitations mentioned in the paper.

References:

Sedano, F. and Randerson, J. T.: Multi-scale influence of vapor pressure deficit on fire ignition and spread in boreal forest ecosystems, Biogeosciences, 11(14), 3739–3755, doi:10.5194/bg-11-3739-2014, 2014.