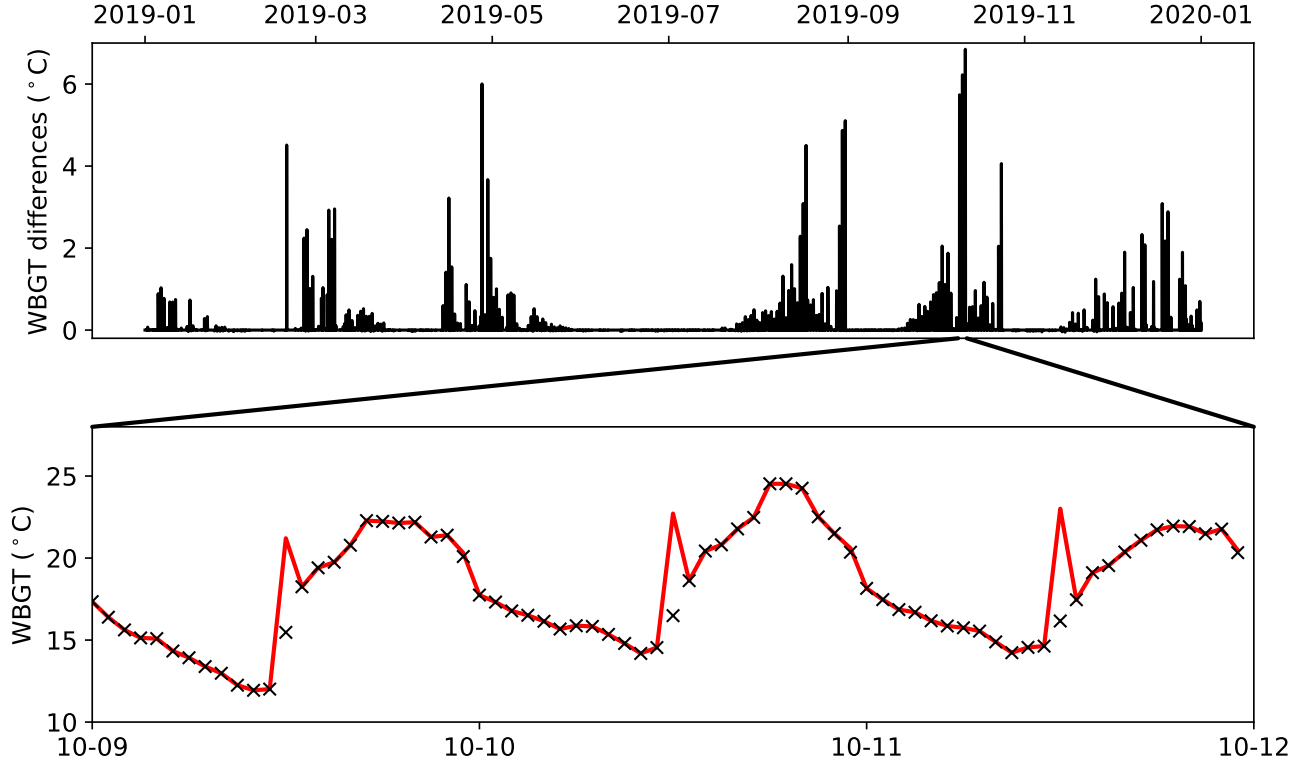# Supporting Information for "Explicit calculations of Wet Bulb Globe Temperature compared with approximations and why it matters for labor productivity"
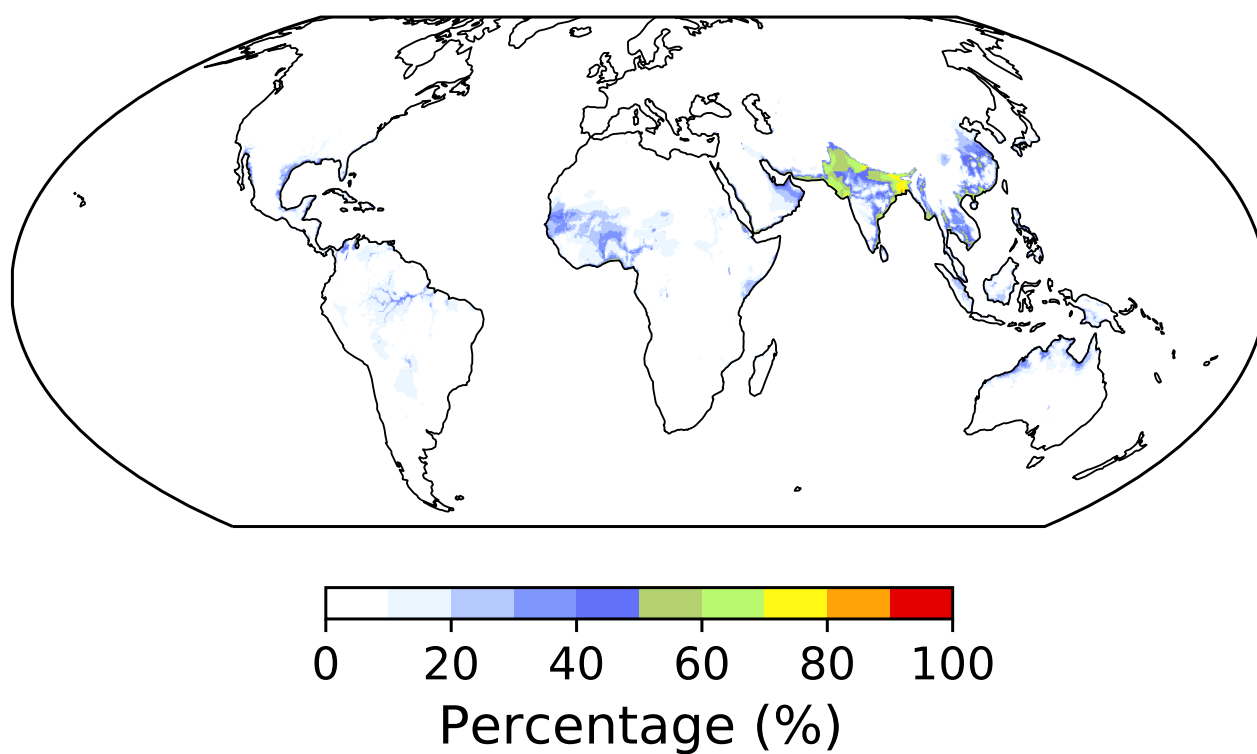
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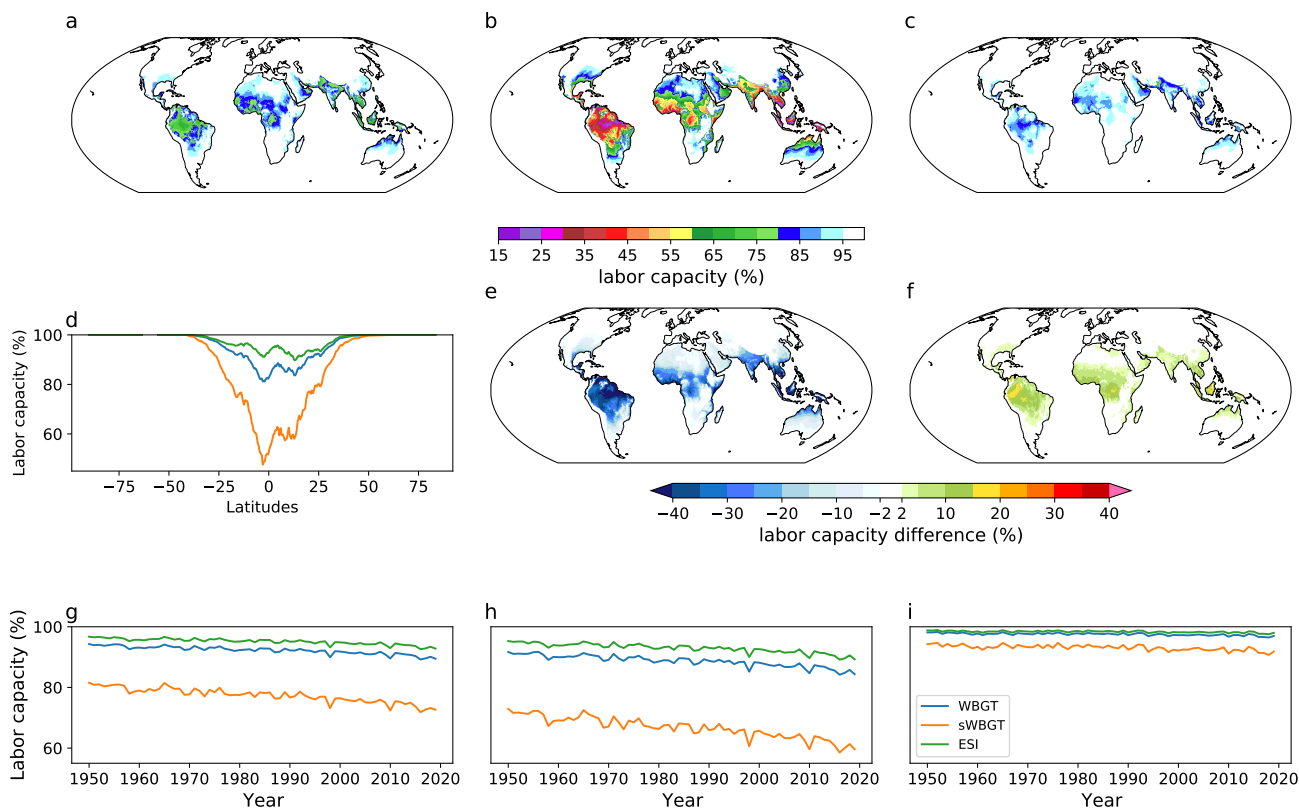
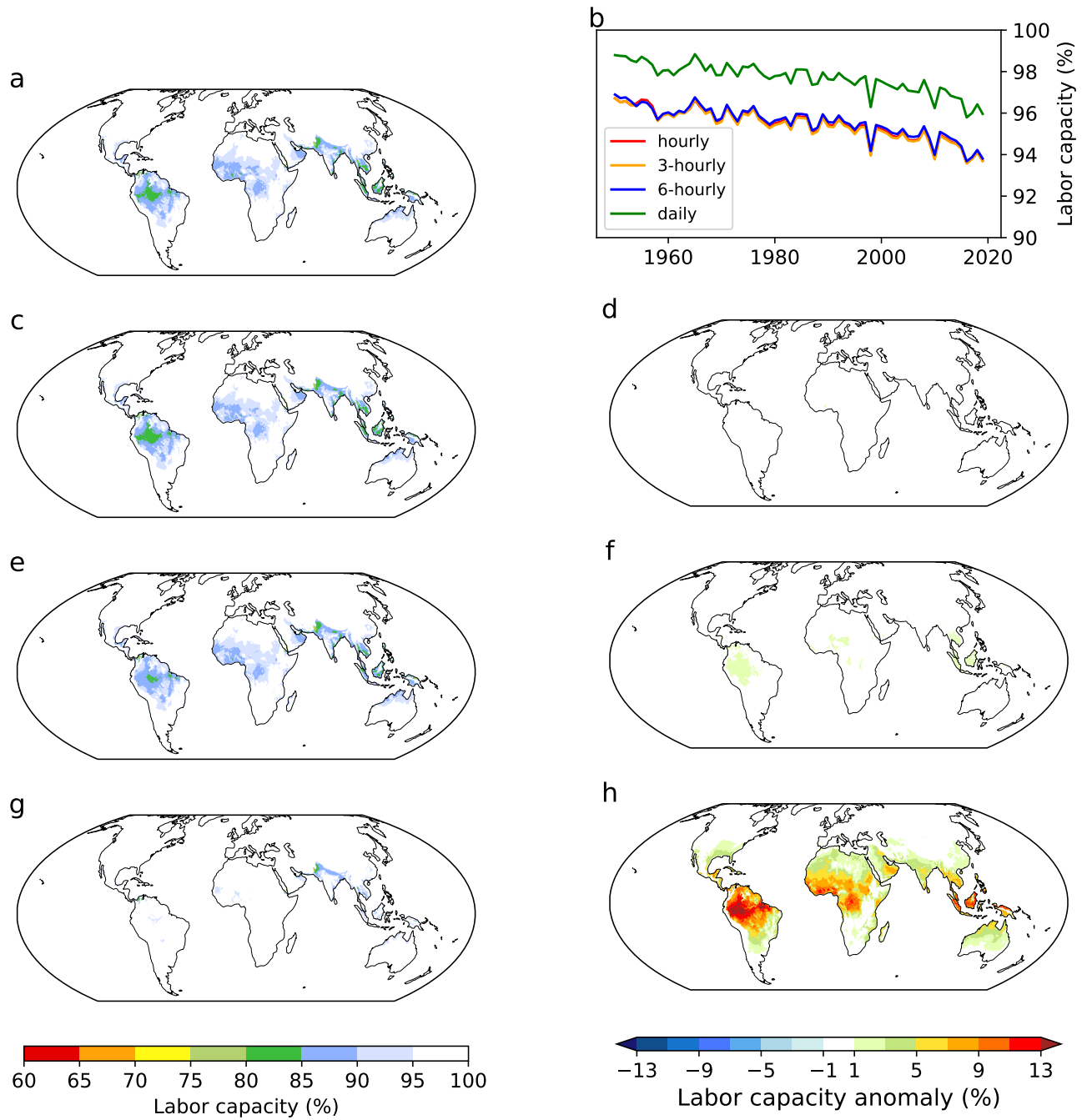## Contents of this file

1. Figures S1 to S4

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Figure S1. Comparison between WBGTs calculated with the average cosine zenith angle during each hourly interval ($\overline{cos\theta}$) and that during only the sunlit part of each interval ($\overline{cos\theta_{sunlit}}$). A grid cell at 36°N and 84.25°E (close to Y-12 National Security Complex in U.S.) is selected for demonstration purpose. Shown in upper panel are differences in hourly WBGT values calculated from two types of cosine zenith angle in 2019 (WBGT calculated from $\overline{cos\theta}$ - WBGT calculated from $\overline{cos\theta_{sunlit}}$). The lower panel zooms in a 3-day period from October 9 to 11, 2019 showing WBGTs calculated with $\overline{cos\theta}$ (red solid curve) and $\overline{cos\theta_{sunlit}}$ (black cross). WBGT values calculated from $\overline{cos\theta}$ show erroneous peaks around sunrise.

Figure S2. Occurrence percentage of positive biases >5°C for sWBGT during 1990-2019 with an additional requirement of WBGT >= 25°C. Only the hottest calendar month (defined by climatological monthly average WBGT) is included.

Figure S3. Same as Fig. 7 but labor capacity is calculated during daytime only

Figure S4. Annual average labor productivity calculated from hourly inputs (a); annual average labor productivity calculated from 8 times daily (c), 4 times daily (e), and daily average inputs (g), and their anomalies (d, f, h respectively) compared with that based on hourly inputs (other resolutions minus hourly); population weighted global annual average labor productivity during 1950-2019 (b).

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