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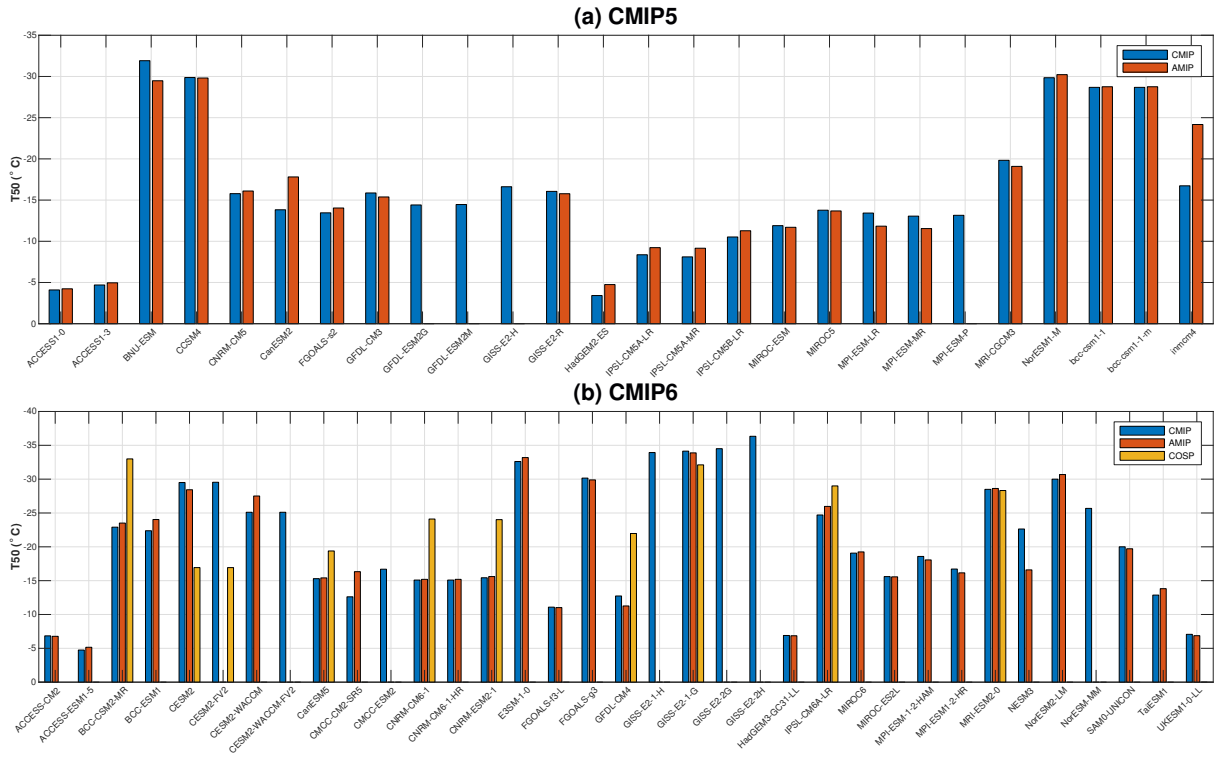


Figure S1. Comparison of extratropical T50 values produced by GCMs participating in (a) CMIP5 and (b) CMIP6. Values derived from piControl and AMIP experiments are displayed in blue and red, respectively. Extratropical T50 values produced by GCMs that provided GOCCP lidar simulator output are displayed in yellow.

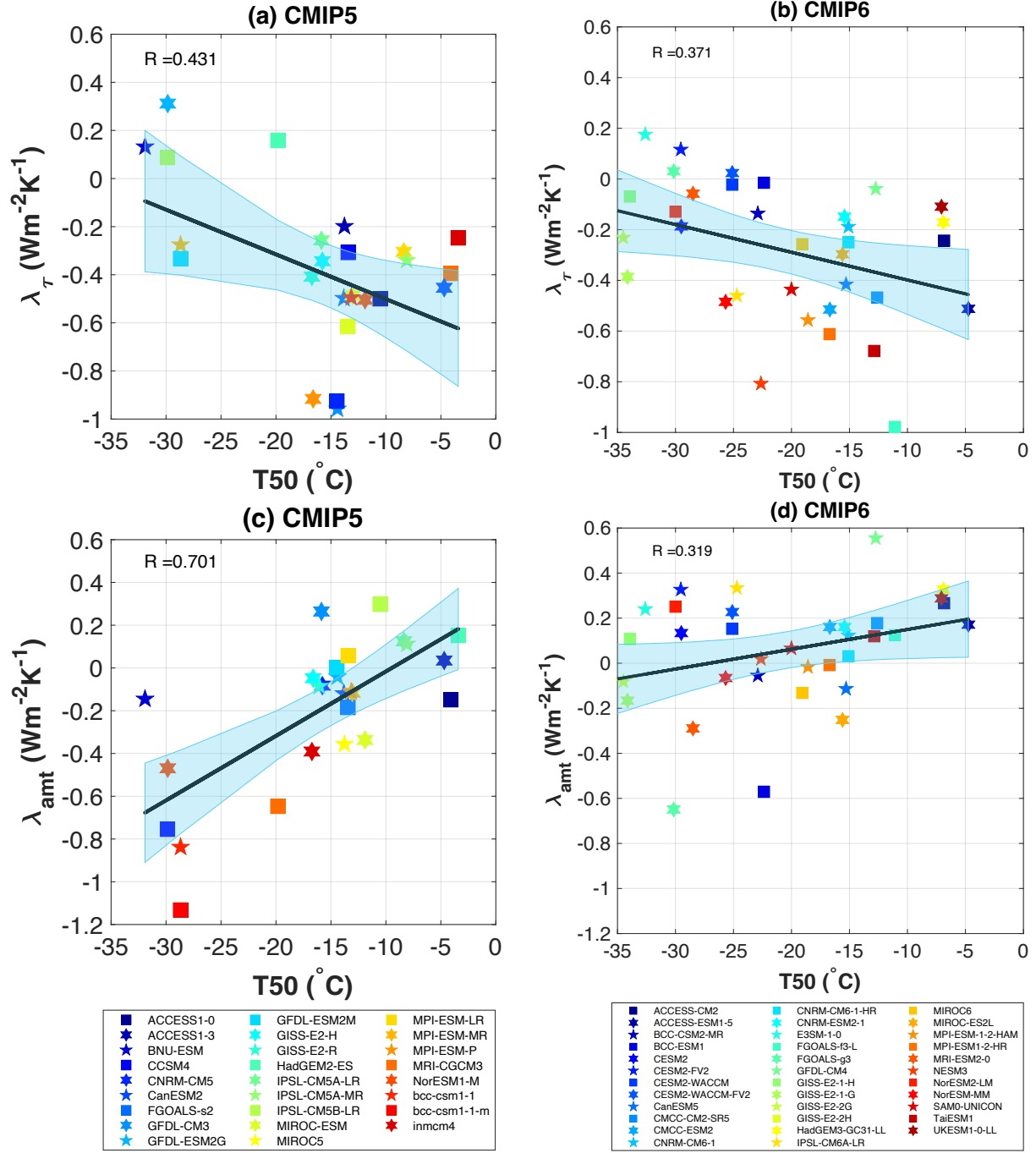


Figure S2. Linear relationship between (a) λ_{τ} and T50 in CMIP5, (b) λ_{τ} and T50 in CMIP6, (c) λ_{amt} and T50 in CMIP5, and (d) λ_{amt} and T50 in CMIP6. Each data point represents a GCM labelled in the legend for CMIP5 (left) and CMIP6 (right). The least squares linear regression slope is displayed as the solid black line and its 95% confidence interval is shaded in blue. The correlation coefficient for each regression is displayed in the top-left corner of each panel.

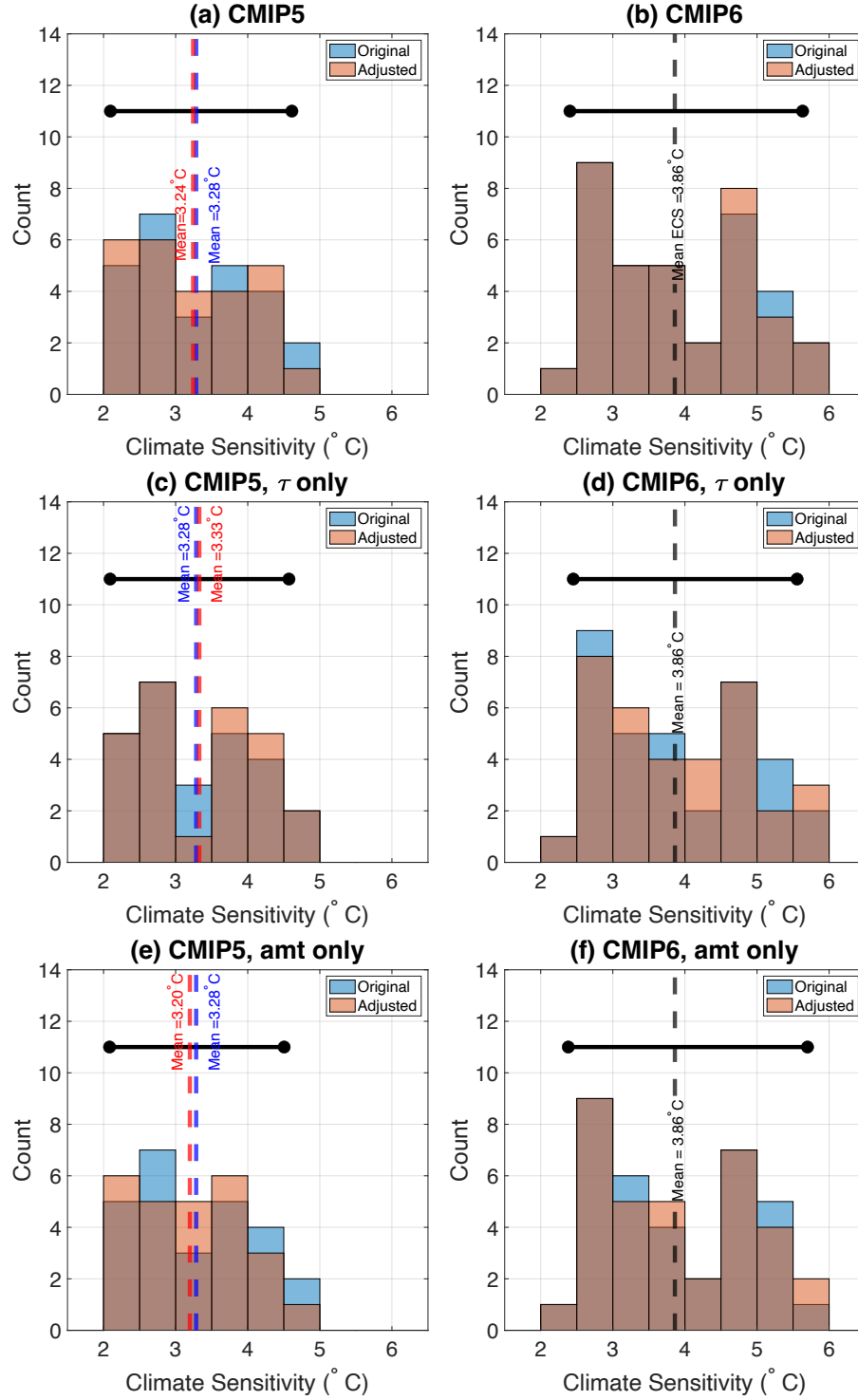


Figure S3. Histogram of climate sensitivity values (a) after adjusting for both λ_{τ} and λ_{amt} biases in the GCMs participating in CMIP5 and (b) CMIP6, (c) after adjusting for only λ_{τ} biases, i.e. assuming $\Delta\lambda_{amt}$ vanishes in Equation 4 in the GCMs participating in CMIP5 by assuming and (d) CMIP6, (e) after adjusting for only λ_{amt} biases, i.e. assuming $\Delta\lambda_{\tau}$ vanishes in Equation 4 in the GCMs participating in CMIP5 and (f) CMIP6.

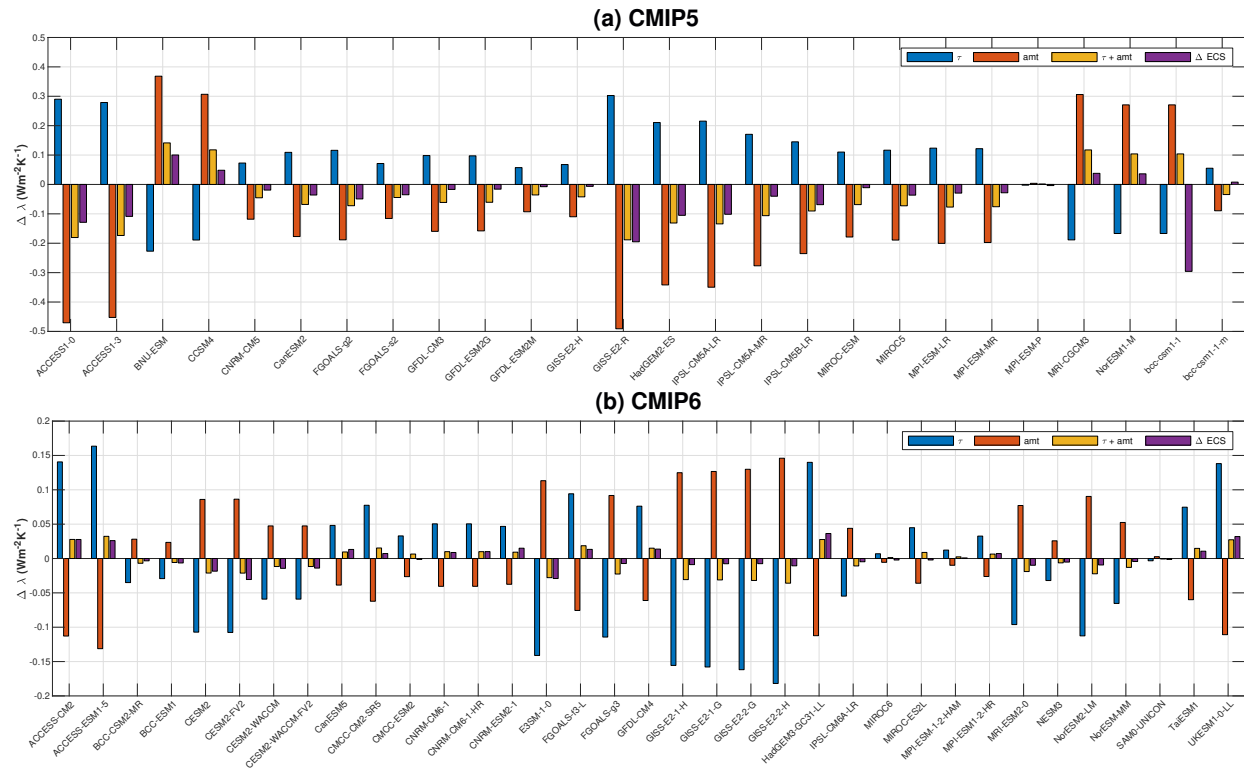


Figure S4. Adjustments in λ_τ , λ_{amt} , their sum, and the adjustment in ECS represented by $\Delta\lambda_\tau$, $\Delta\lambda_{amt}$, $\Delta\lambda_\tau + \Delta\lambda_{amt}$, and $ECS_{adj,i}$ in Equation 4, respectively for each GCM participating in (a) CMIP5 and (b) CMIP6.