Appendix A. Variables of transformed energy balance equation into autoregressive mixed model.

Variable	Definition
$T_{in(t)}$	Observed value of indoor temperature at current time (t) (unit: degrees Celsius, ˚C)
ßo	Intercept that represents internal heat sources contribution to indoor temperature at time (t)
ß$_1$	Represents the fixed effect estimate of how solar radiation (building absorption) contributes to indoor temperature at time (t)
$Solar_{(t)}$	Modeled hourly amount of global horizontal solar radiation reaching the earth's surface (unit: Mega Joule/meter^2, MJ/m^2)
$Solar_{(avg)}$	Modeled daily average of the amount of global horizontal solar radiation reaching the earth's surface (unit: Mega Joule/meter^2, MJ/m^2)
ß$_2$	Fixed effect estimate (also an autocorrelation term) which represents the influence of the previous temperature on the current temperature
$T_{(t-\Delta t)}$	Observed hourly value for indoor temperature at lagged interval to current temperature at time (t) (unit: degrees Celsius, ˚C)
ß$_3$	Fixed effect estimate that represents the influence of outdoor temperatures (and unmeasured factors such as windows being opened, heat absorption of the home and external and internal convection) on indoor temperature
ß$_4$	Fixed effect estimate that represents the influence of dewpoint temperature on indoor temperature
T_{out}	Observed hourly outdoor temperature at current time (unit: degrees Celsius, ˚C)
e_{it}	Difference in estimate between the observed temperature value and the actual location temperature

Appendix B. The intercepts and coefficients of the five variations of the mixed model (fit to data for the entire summer) were used to generate the five versions of the mixed model to create the predicted series of indoor temperatures

Mixed Model #1

$$T_{(in\,(t))} = 1.083 + 0.019 * T_{out} + 0.932 * T_{(in\,(t-\Delta t))} + 0.005 * Solar + 0.01 * Dewpoint_{(t)}$$

Mixed Model #2

$$T_{(in\,(t))} = 1.072 + 0.020 * T_{out} + 0.937 * T_{(in\,(t-\Delta t))} + 0.0075 * Dewpoint_{(t)}$$

Mixed Model #3

$$T_{(in\,(t))} = 17.847 + 0.212 * T_{out} + 0.0602 * Solar + 0.142 * Dewpoint_{(t)}$$

Mixed Model #4

$$T_{(in\,(t))} = 18.821 + 0.238 * T_{out} + 0.121 * Dewpoint_{(t)}$$

Mixed Model #5

$$T_{(in\,(t))} = 0.995 + 0.0209 * T_{out} + 0.941 * T_{(in\,(t-\Delta t))} + 0.003 * Solar$$

Appendix C. The intercepts and coefficients of the five variations of the mixed model (fit to data for the entire summer) were used to generate the five versions of the mixed model to create the predicted series of indoor temperatures

Mixed Model #1

$$T_{(in(t))} = 1.083 + 0.019 * T_{out} + 0.932 * T_{(in(t-\Delta t))} + 0.005 * Solar + 0.01 * Dewpoint_{(t)}$$

Mixed Model #2

$$T_{(in(t))} = 1.072 + 0.020 * T_{out} + 0.937 * T_{(in(t-\Delta t))} + 0.0075 * Dewpoint_{(t)}$$

Mixed Model #3

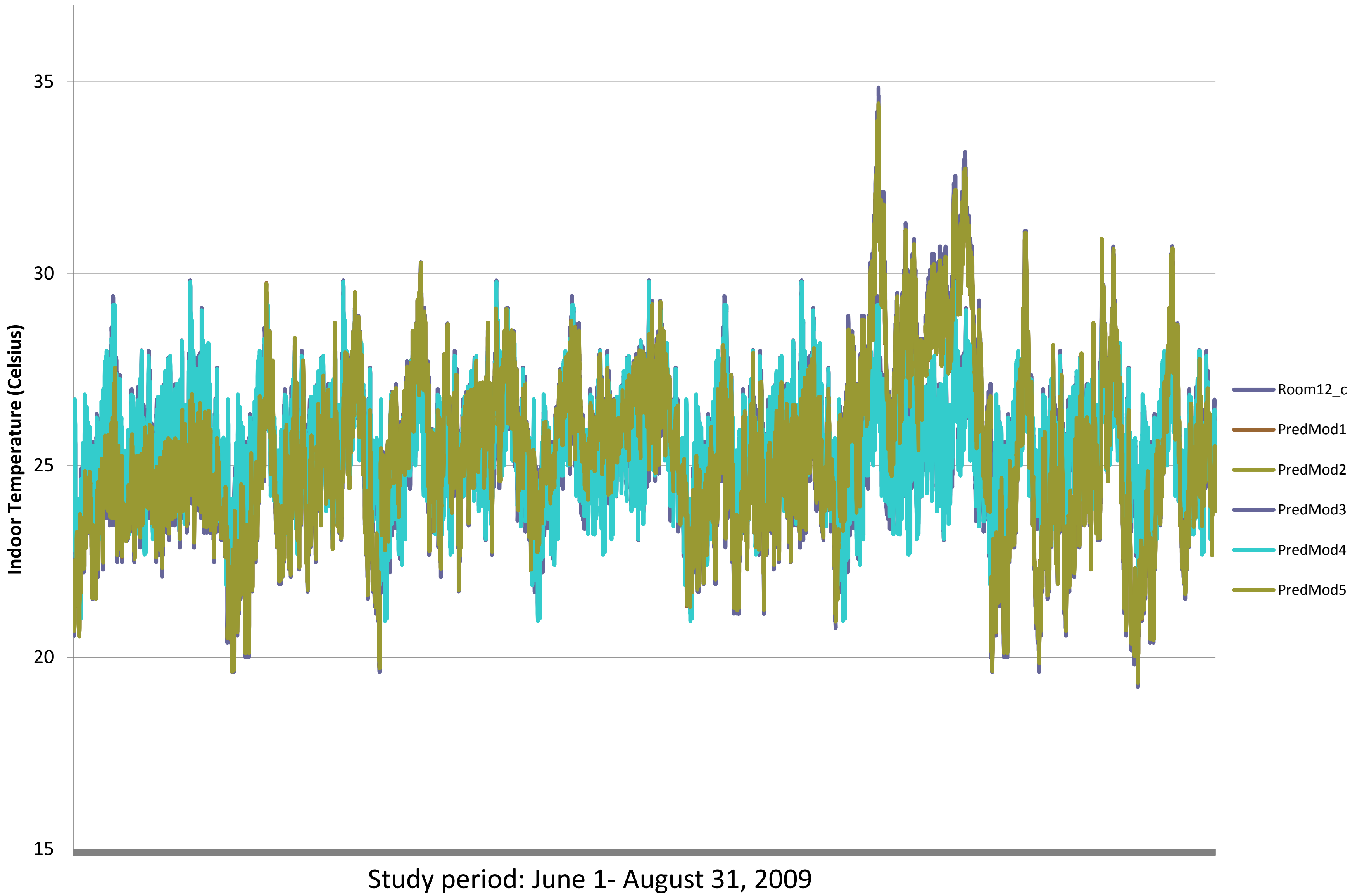
$$T_{(in(t))} = 17.847 + 0.212 * T_{out} + 0.0602 * Solar + 0.142 * Dewpoint_{(t)}$$

Mixed Model #4

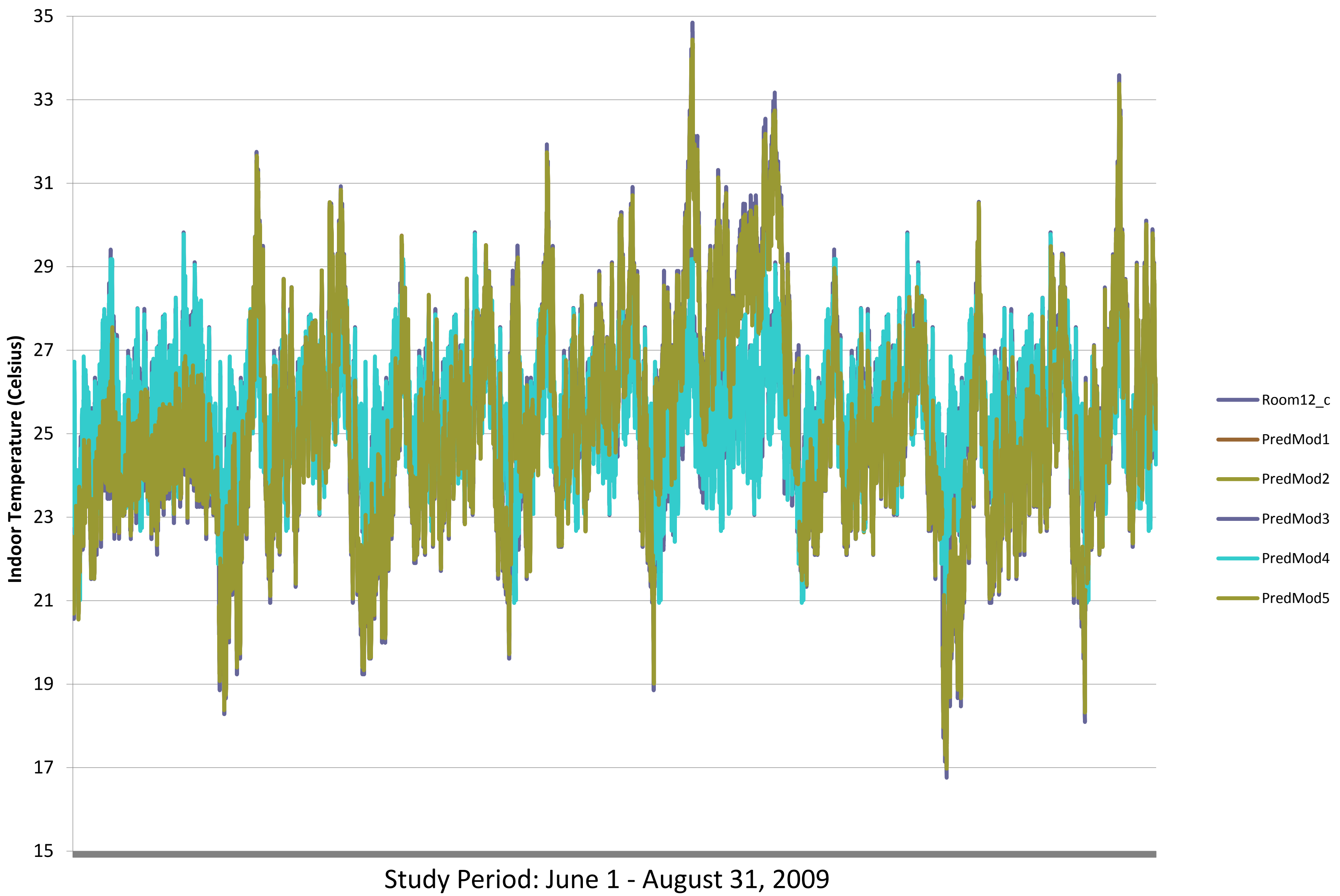
$$T_{(in(t))} = 18.821 + 0.238 * T_{out} + 0.121 * Dewpoint_{(t)}$$

Mixed Model #5

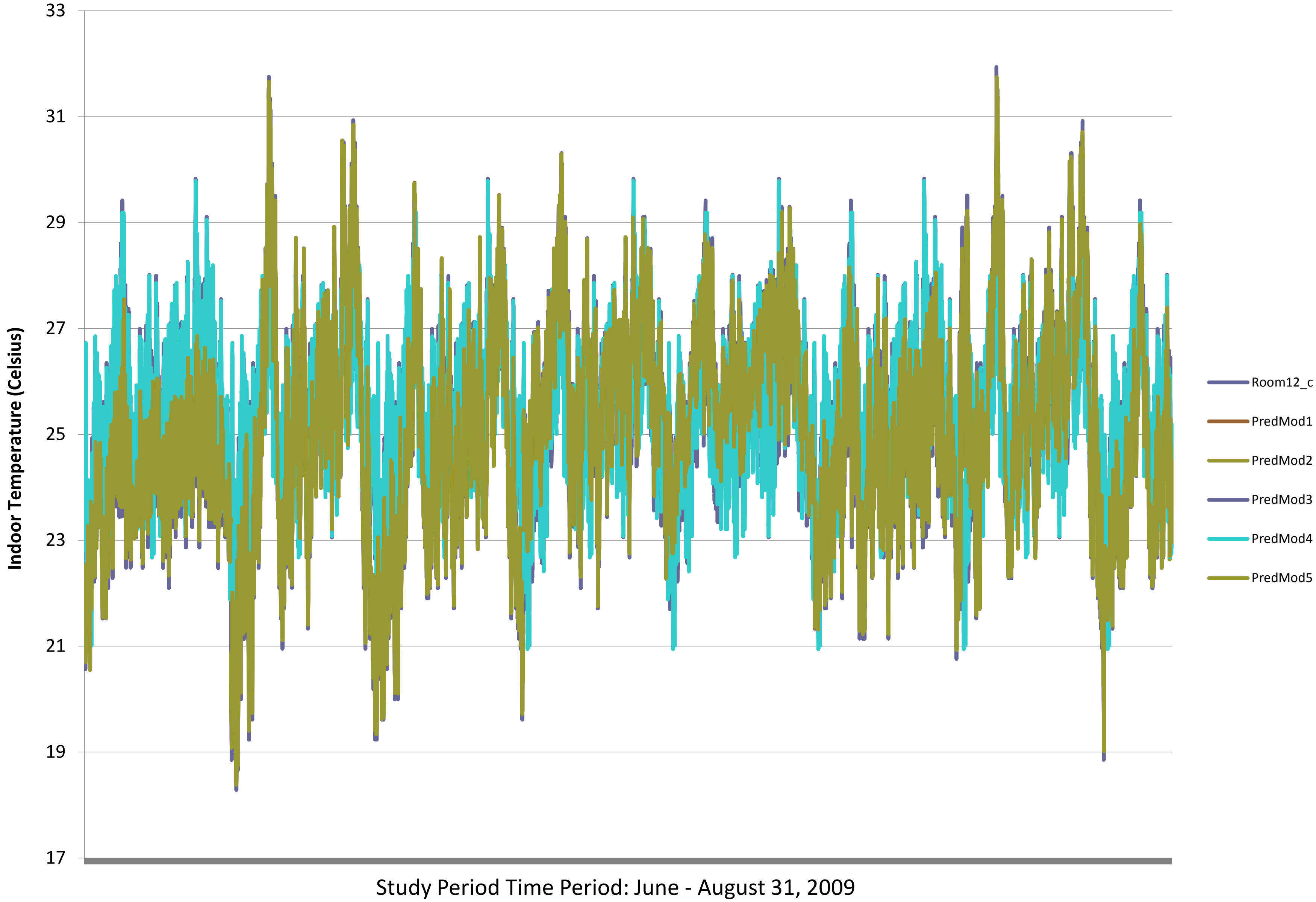
$$T_{(in(t))} = 0.995 + 0.0209 * T_{out} + 0.941 * T_{(in(t-\Delta t))} + 0.003 * Solar$$



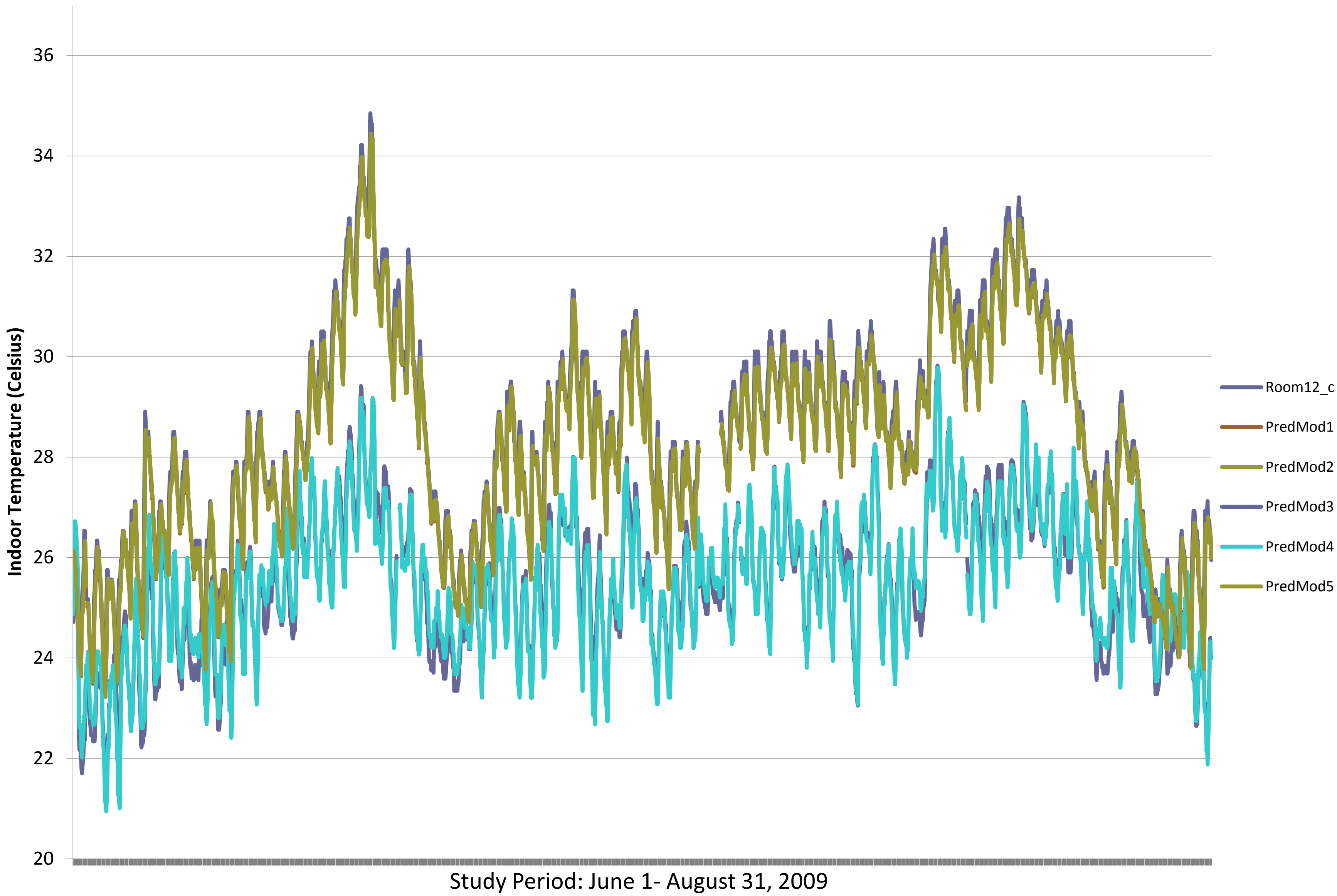
Appendix D1: Graph comparing predicted indoor temperatures for locations with Air conditioning using prediction modeling equations



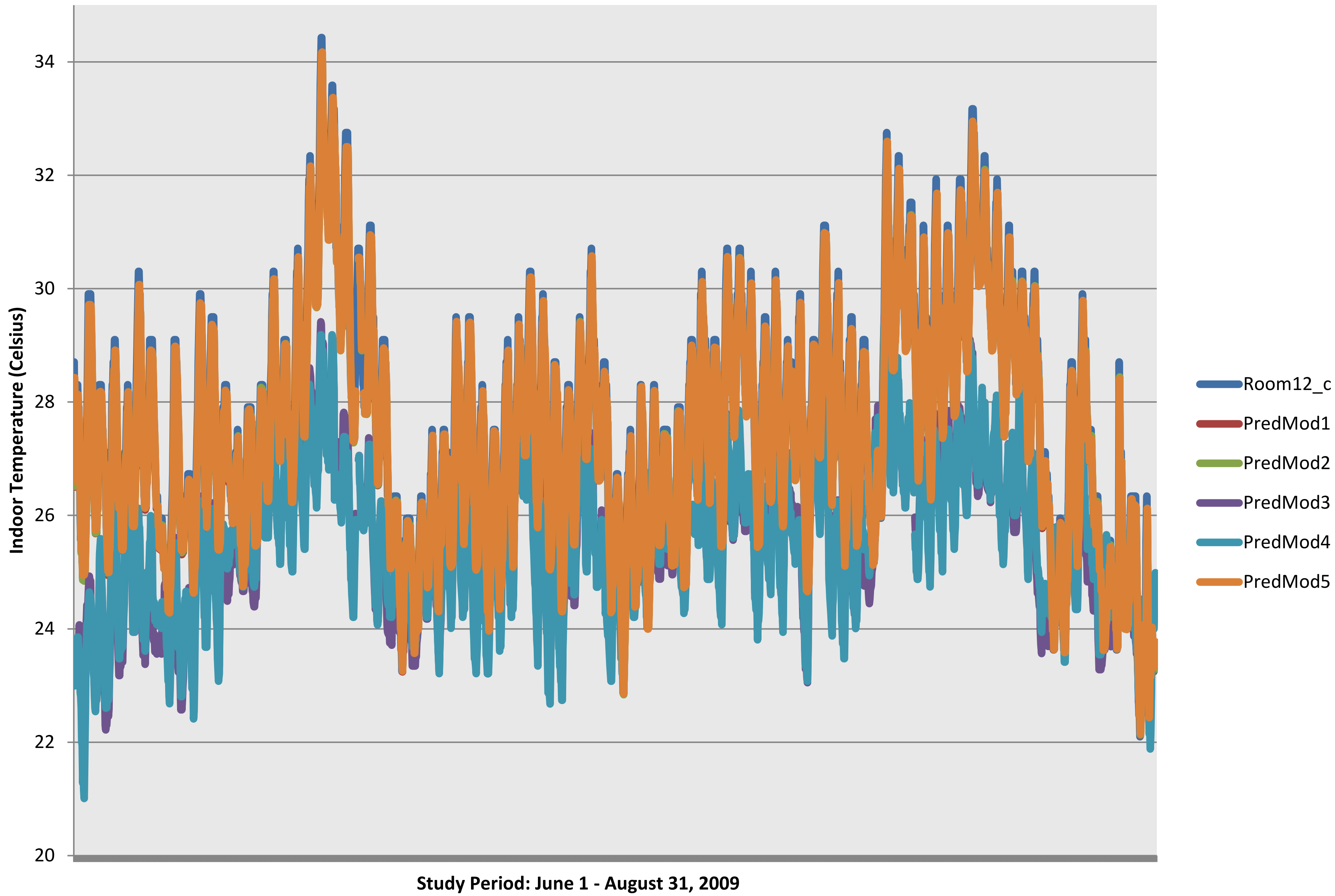
Appendix D2: Graph comparing predicted indoor temperatures for non-high rise type homes using prediction modeling equations



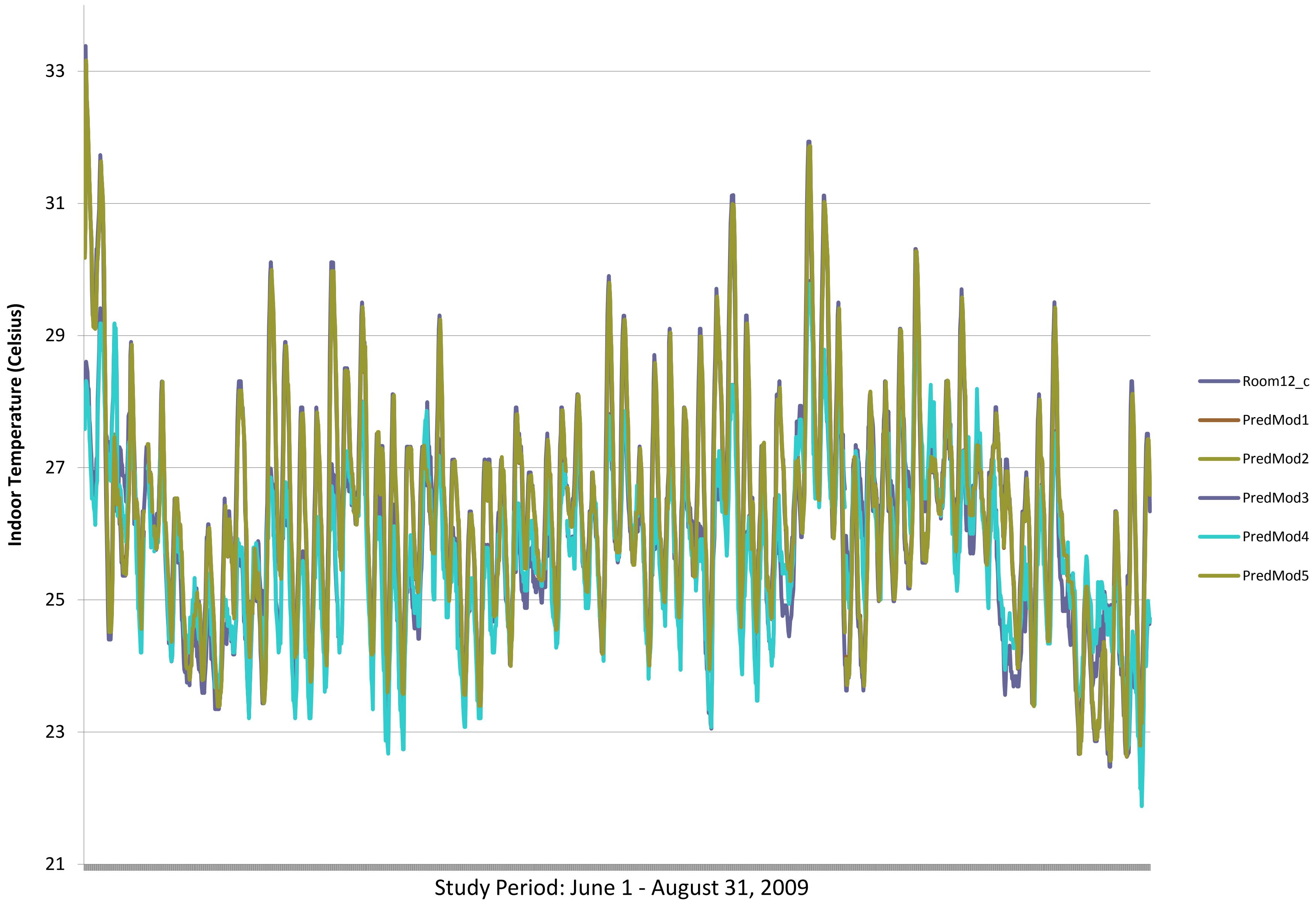
Appendix D3: Graph comparing predicted indoor temperatures for locations constructed of brick using prediction modeling equations.



Appendix D4: Graph comparing predicted indoor temperatures for Location 8 using prediction modeling equations



Appendix D5: Graph comparing predicted indoor temperatures for Location 13 using prediction modeling equations



Appendix D6: Graph comparing Predicted Indoor Temperatures for Location 26 using Prediction Modeling equations

Appendix E.

The parameters in the house-specific model can be written in terms of the parameters in the energy balance equation (Equation 1):

$$\beta_0 = \frac{R_{0,in}}{\frac{C}{\Delta t} + (h_0 + f_{open} \cdot h_v)} \quad , \quad \beta_1 = \frac{S_{absorption\,(t)}}{\frac{C}{\Delta t} + (h_0 + f_{open} \cdot h_v)} \quad , \quad \beta_2 = \frac{\frac{C}{\Delta t}}{\frac{C}{\Delta t} + (h_0 + f_{open} \cdot h_v)} \quad ,$$

$$\beta_3 = \frac{(h_0 + f_{open} \cdot h_v)}{\frac{C}{\Delta t} + (h_0 + f_{open} \cdot h_v)} , \cdot \beta_4 = \frac{\text{Dewpoint(t)}}{\frac{C}{\Delta t} + (h_0 + f_{open} \cdot h_v)}$$