

# **Near future building performance prediction and long-term climate change adaptation for buildings**

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**Welsh School of Architecture**

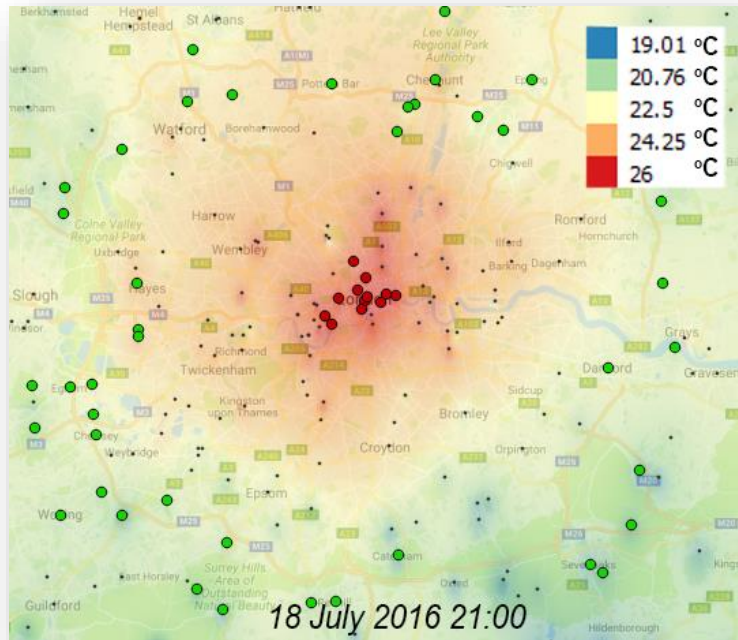
**Cardiff University**

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# Ongoing projects

**Forecast of building energy demand and renewable generation  
2014-2019, Fellow**



**Modular external wall retrofit + renewable and storage  
2017-2021, PI**



**HuMiD - Health cost of mould and damp in Welsh homes  
2017-2018, PI**



**Renewable Energy Systems in Zero Carbon Villages  
2018-2019, PI**



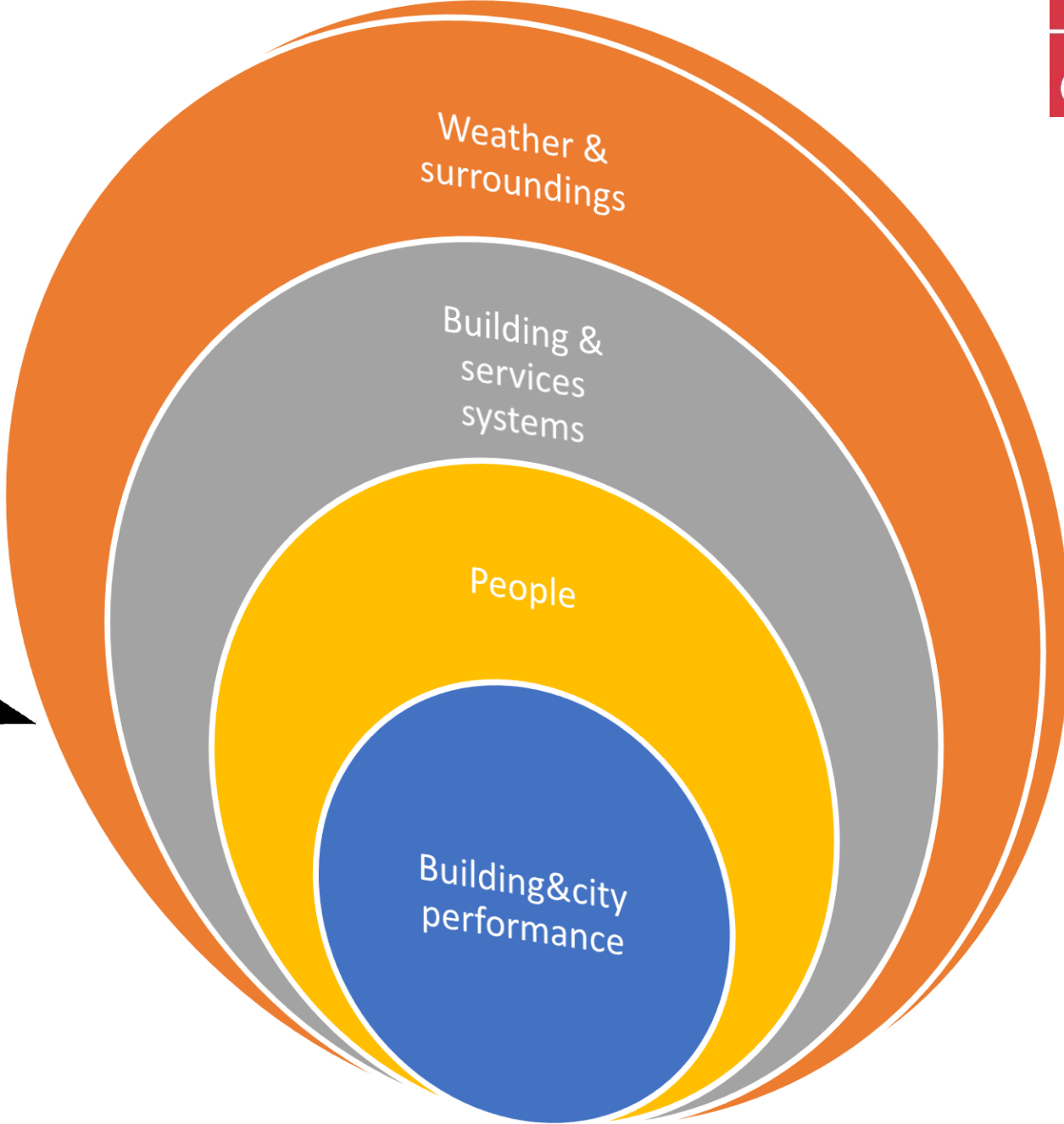
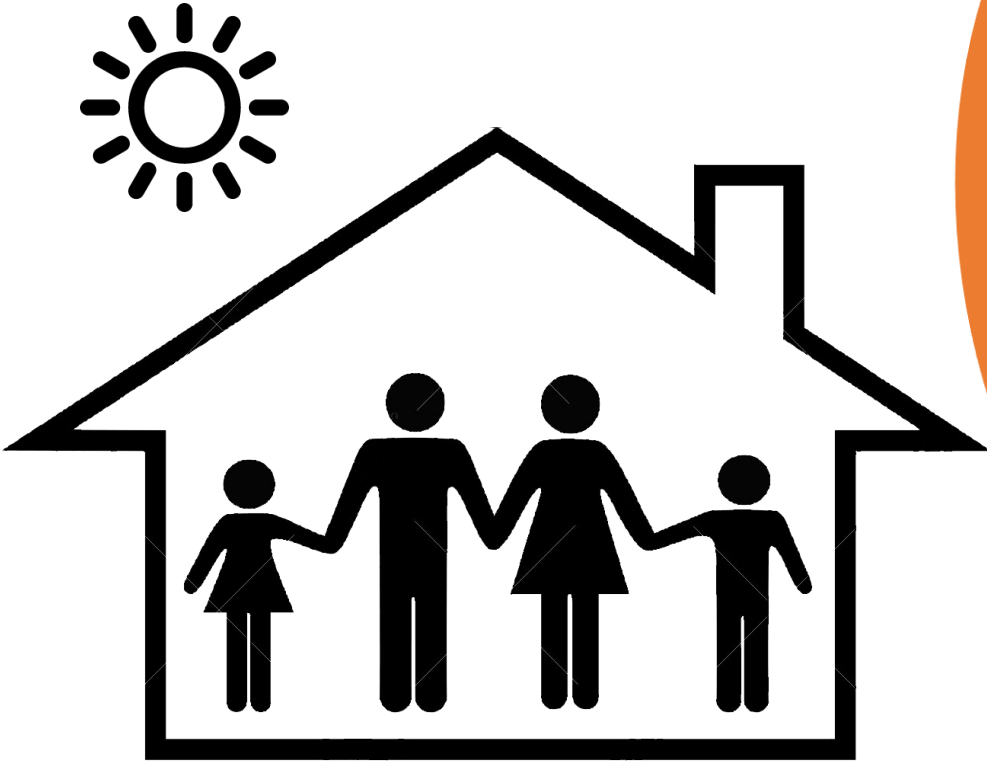
**HABITAT- HARvest modular façade for zero bills Buildings In Tibet  
plATeau  
2018, PI**



# HABITAT- Harvest modular façade for zero bills buildings In Tibet plateau



# Built Environment



# UK climate change projections

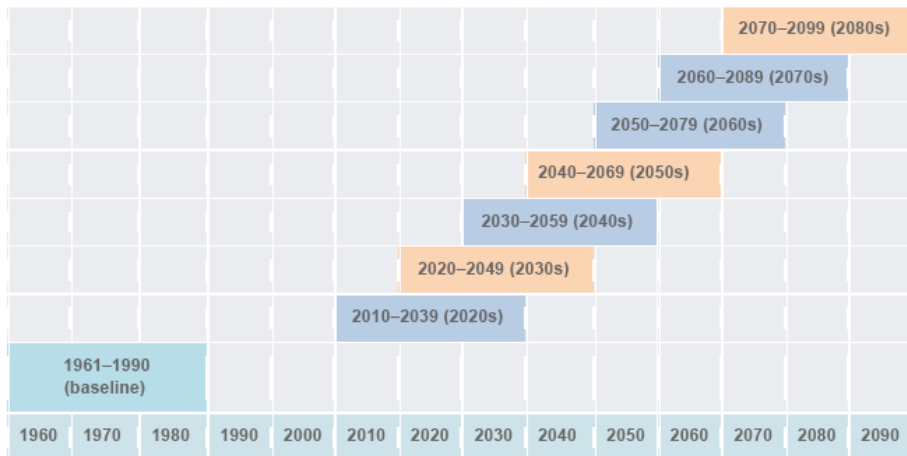
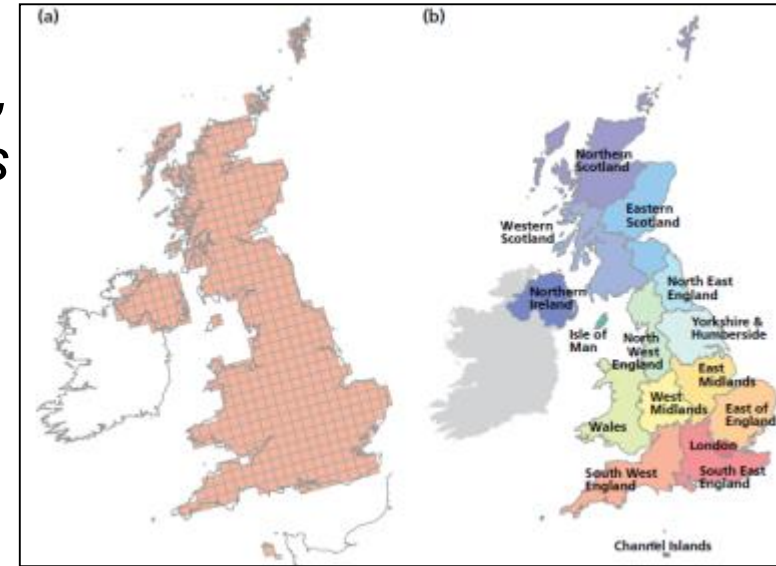
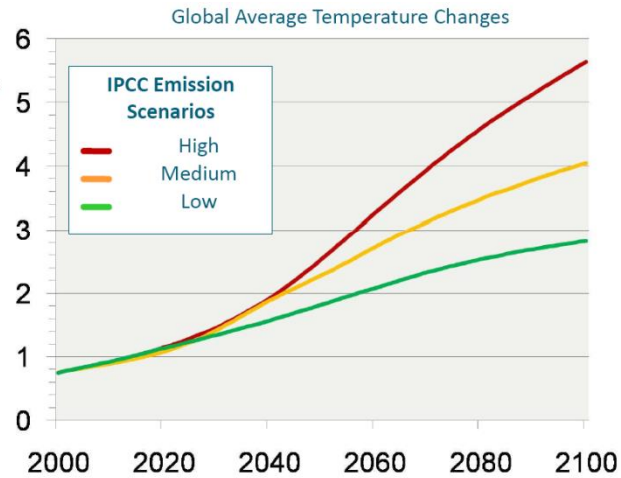
25km grid, 16 admin regions, 23 river-basins and 9 marine regions

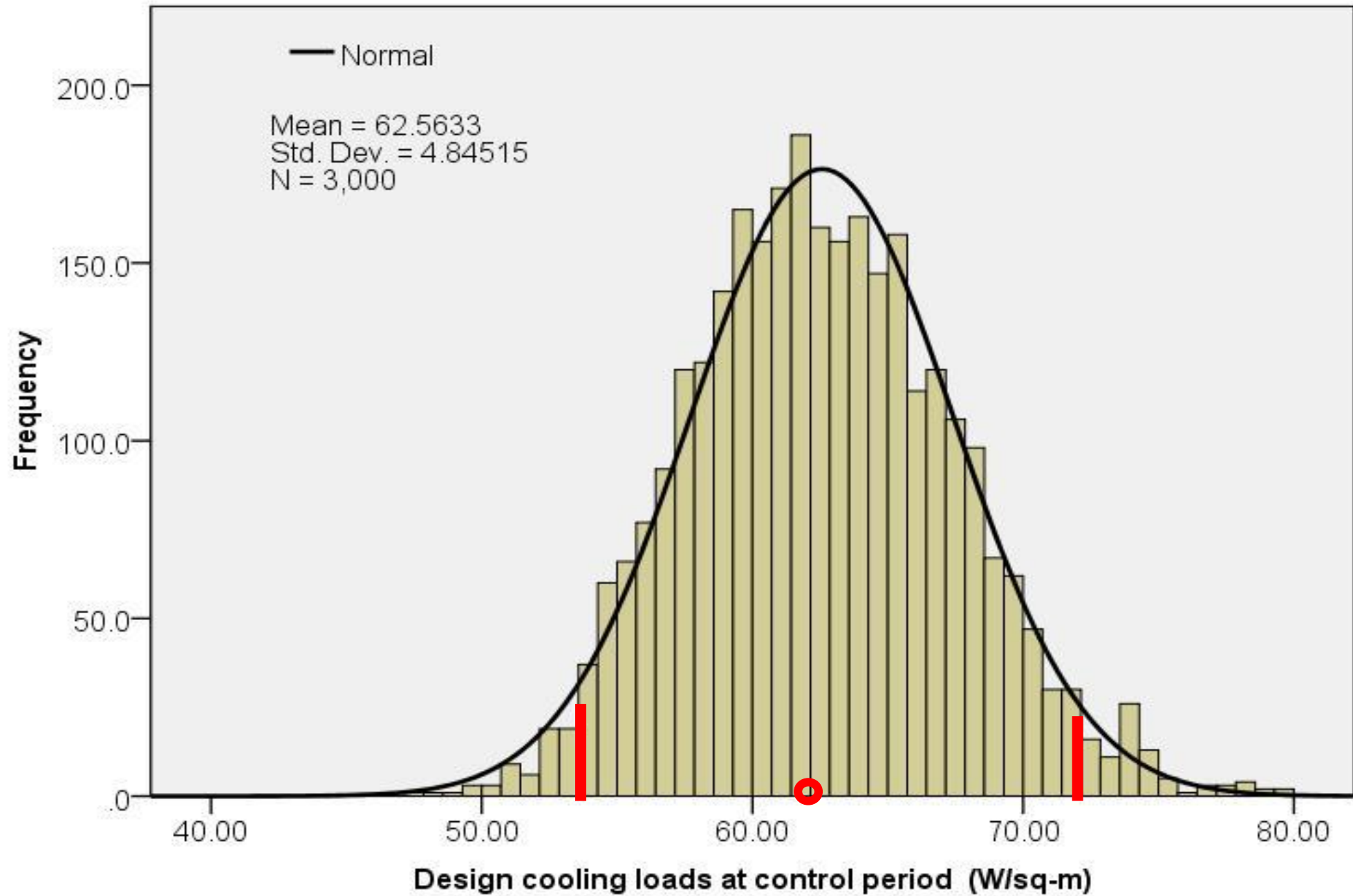
Seven different time frames

Three different emission scenarios

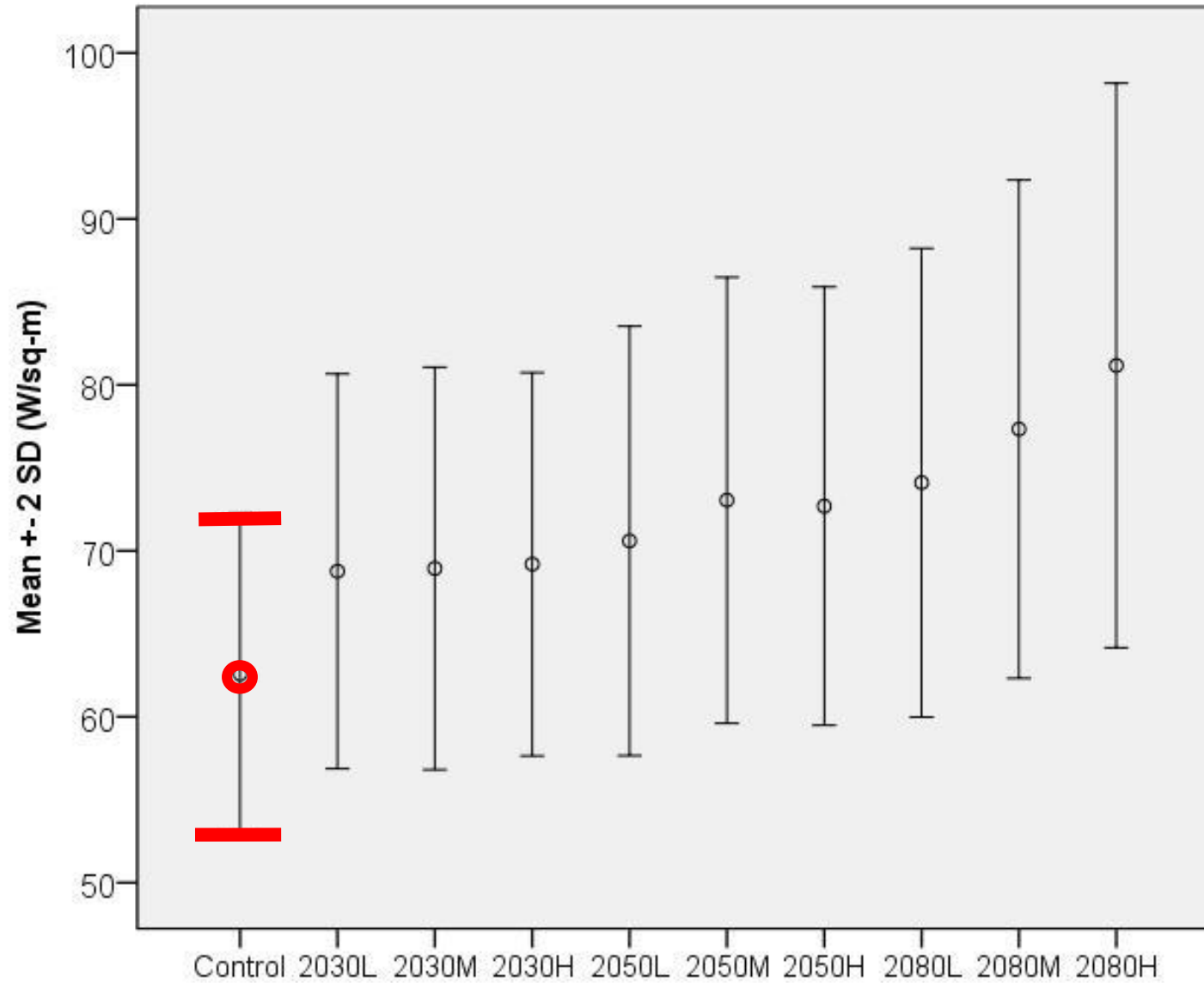


Temp Rise °C

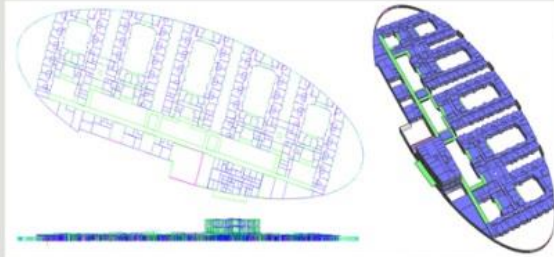




# Regression model







### EDGE LANE HOSPITAL

MENTAL HEALTH FACILITY ON A BROWNFIELD SITE IN LIVERPOOL



### EBBW VALE SCHOOL

NEW BUILT SCHOOL FOR 1200 STUDENTS IN EBBW VALE, BLAENAU GWENT



### QUEEN ELIZABETH II HOSPITAL

8000 SQM PURPOSE BUILT HEALTHCARE FACILITY IN WELWYN GARDEN CITY



### NW BICESTER ECO-TOWN

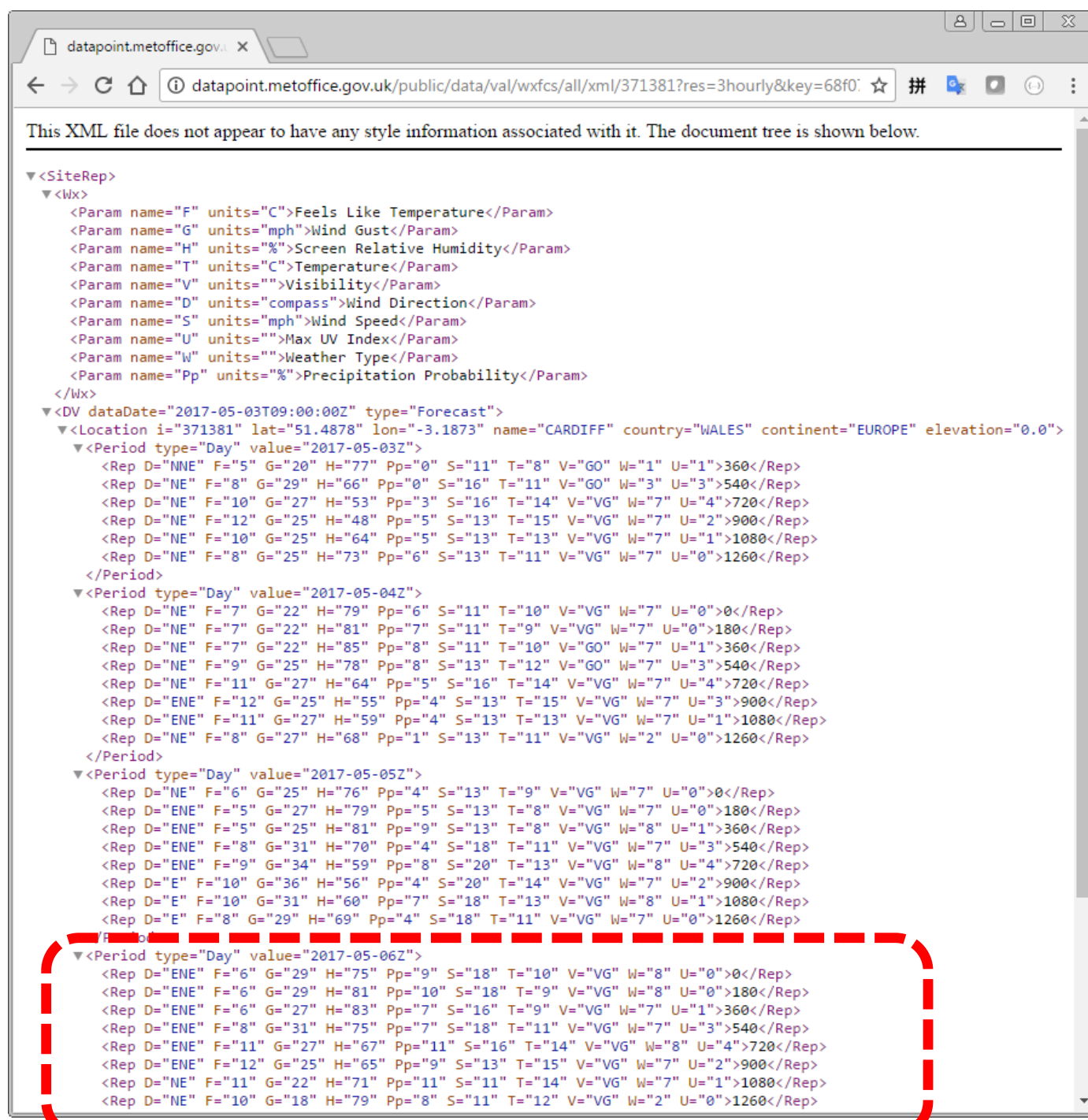
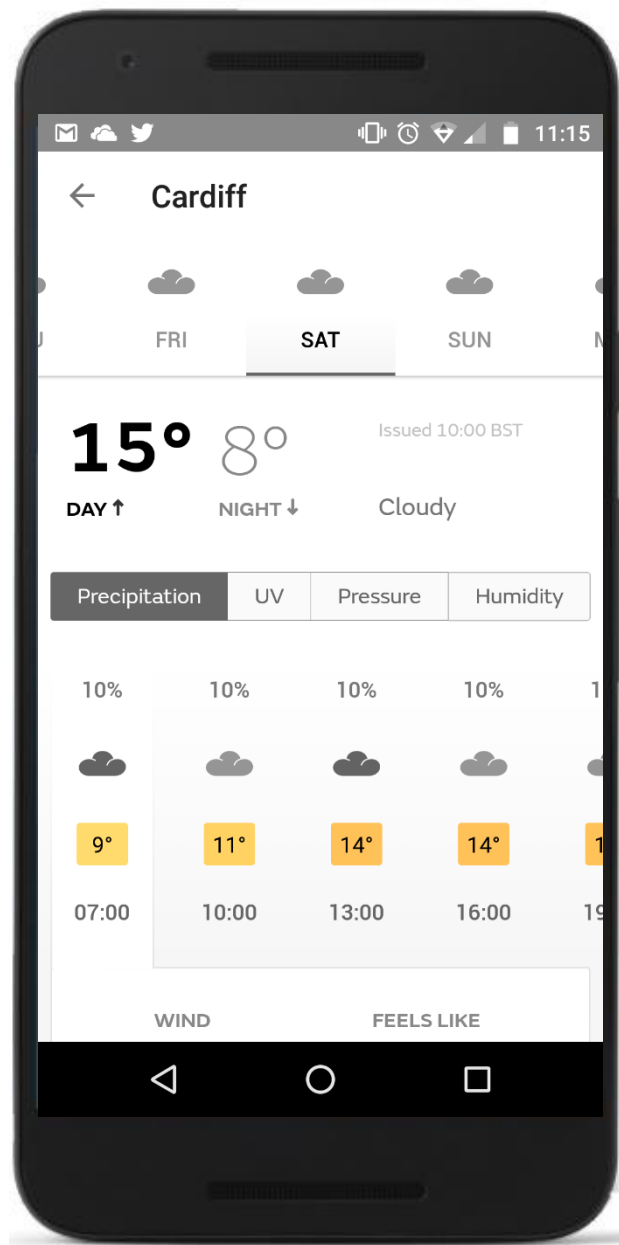
ECO DEVELOPMENT IN BICESTER PLANNED TO DELIVER 5000 HOMES



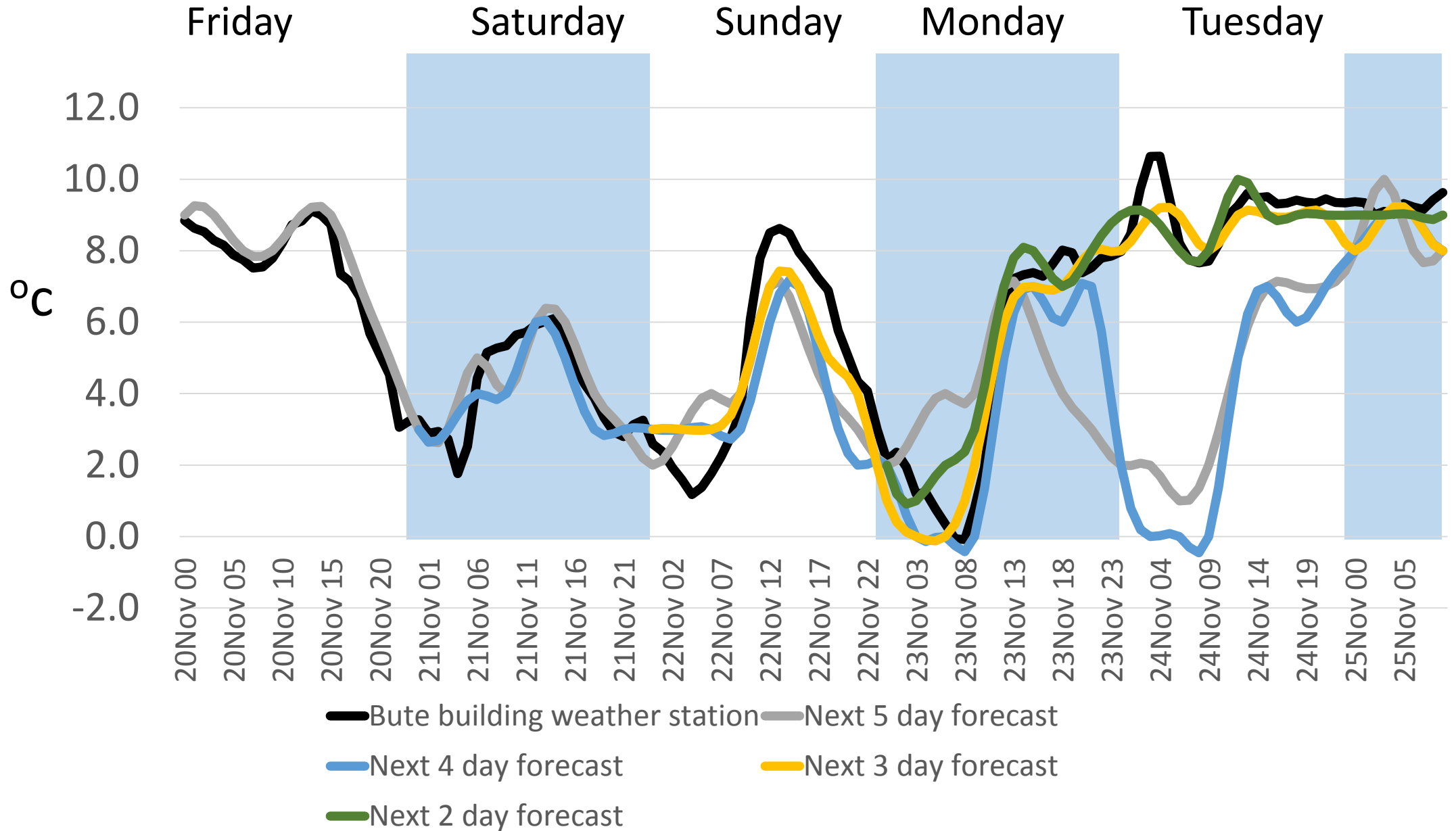
### DRAGON JUNIOR SCHOOL

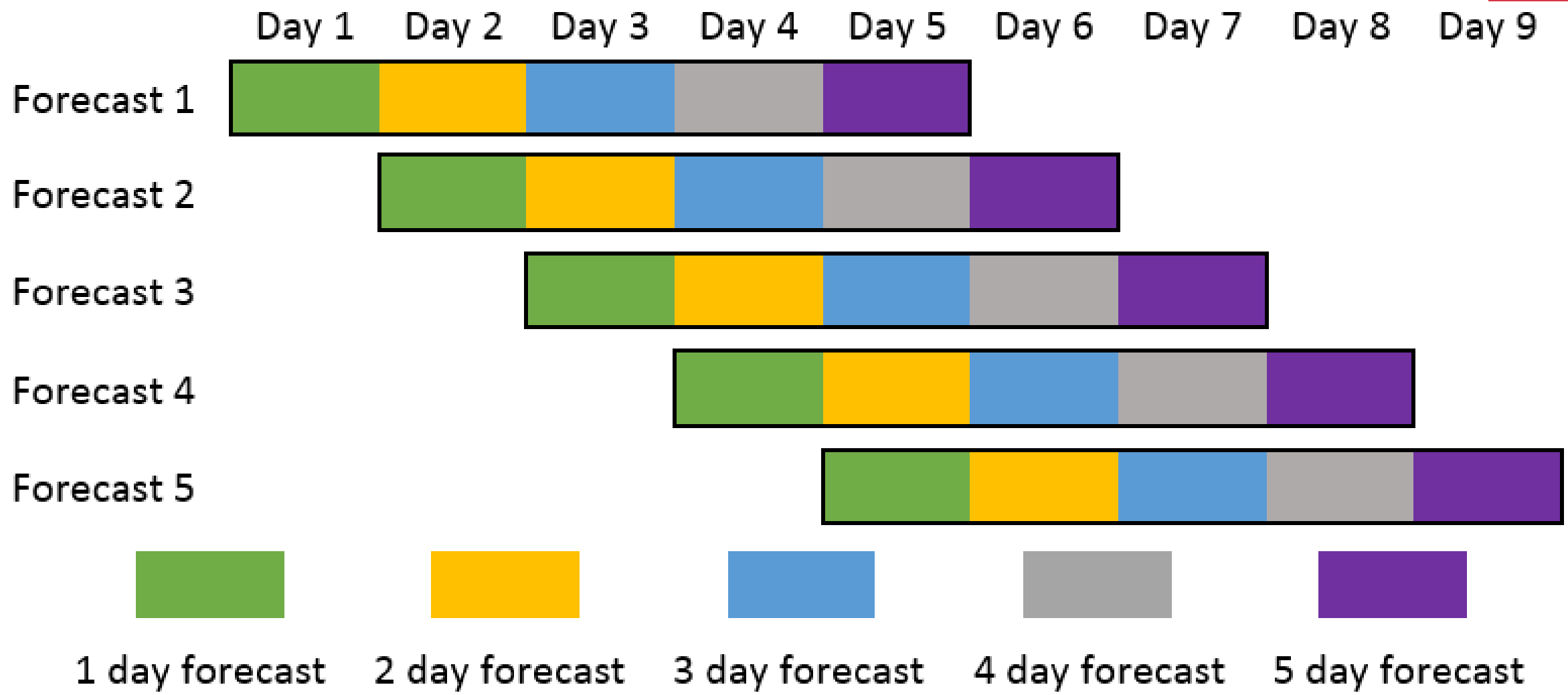
LOW ENERGY CONSUMPTION SCHOOL IN OXFORD



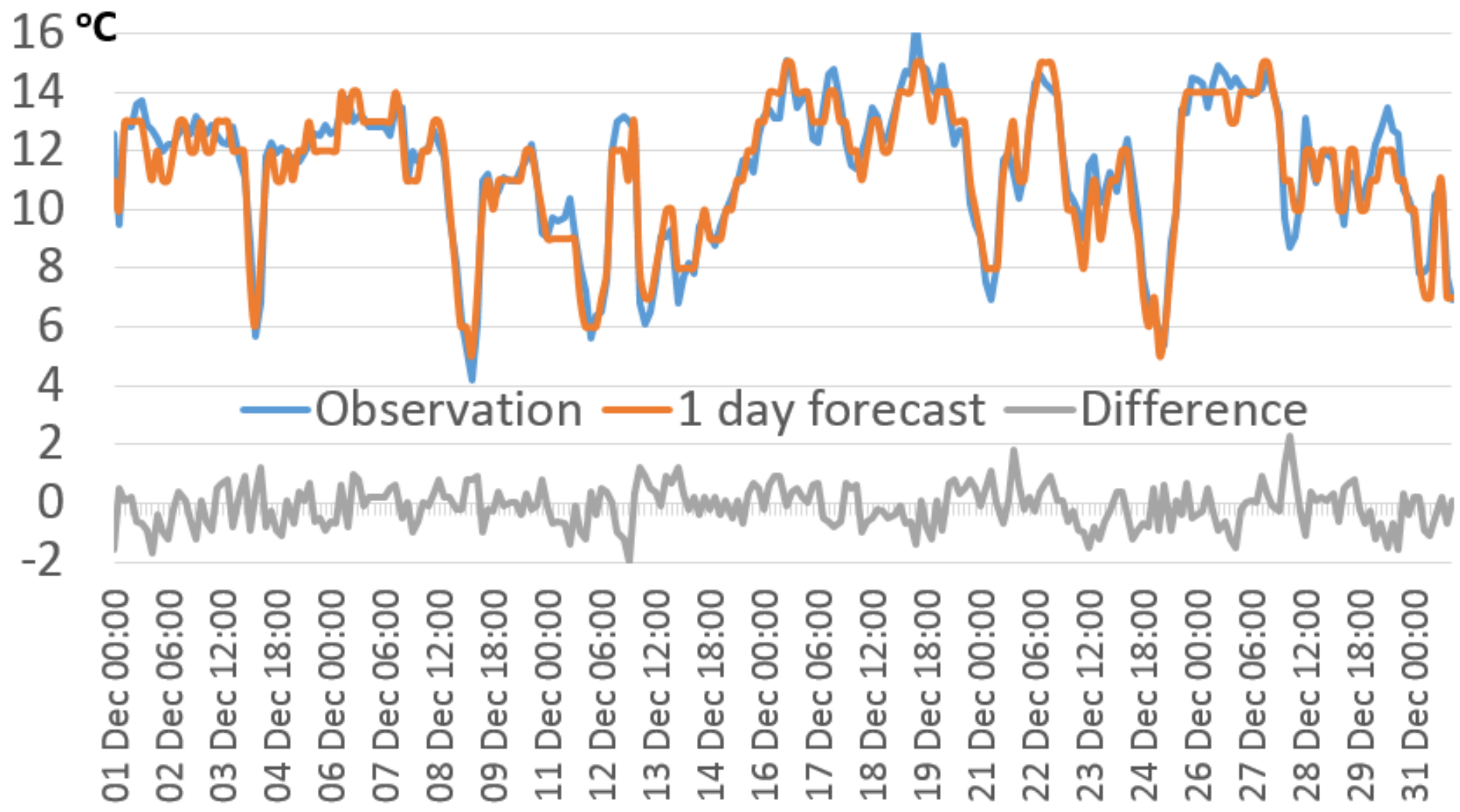


# Observation vs. Forecast

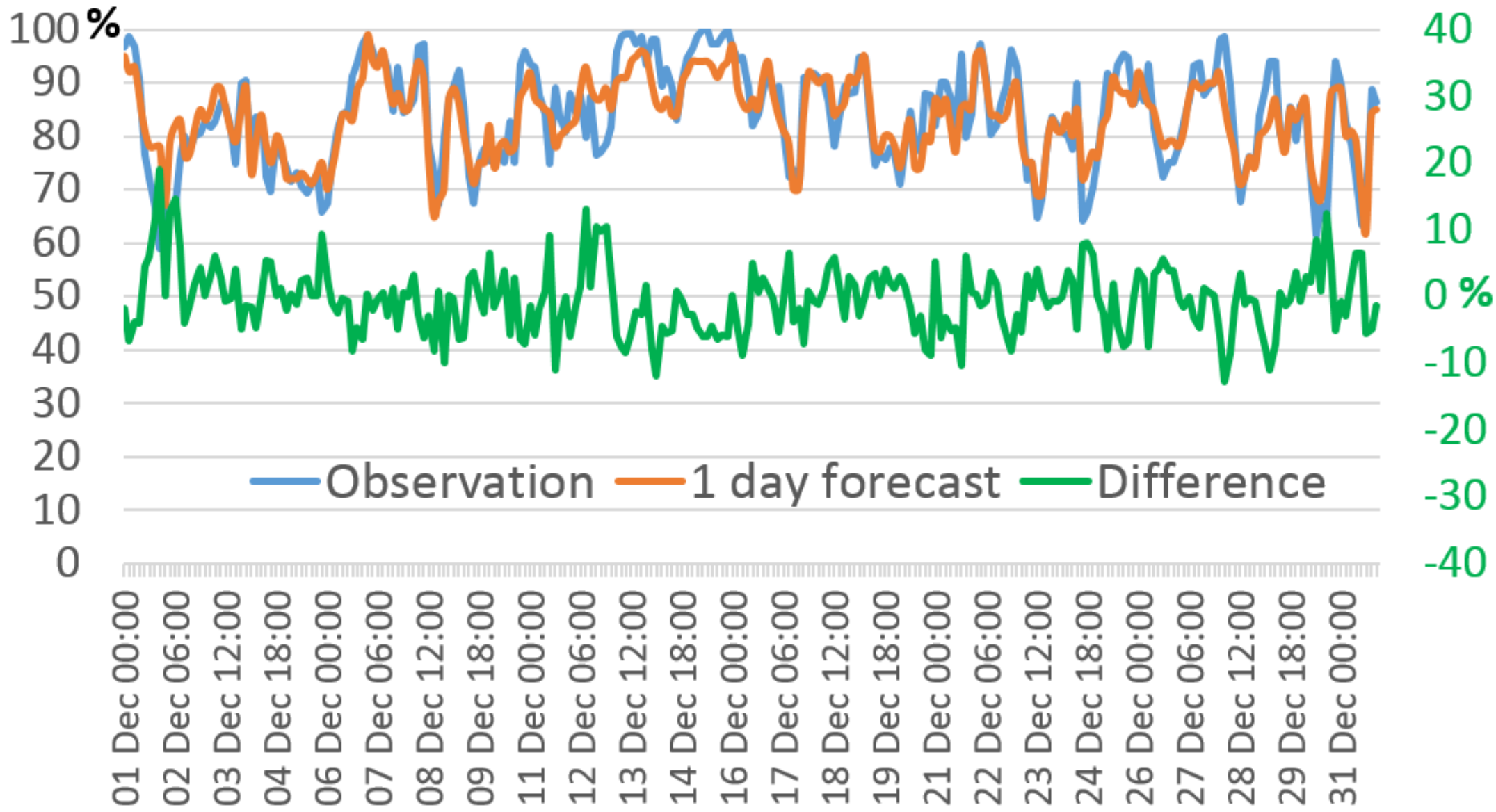




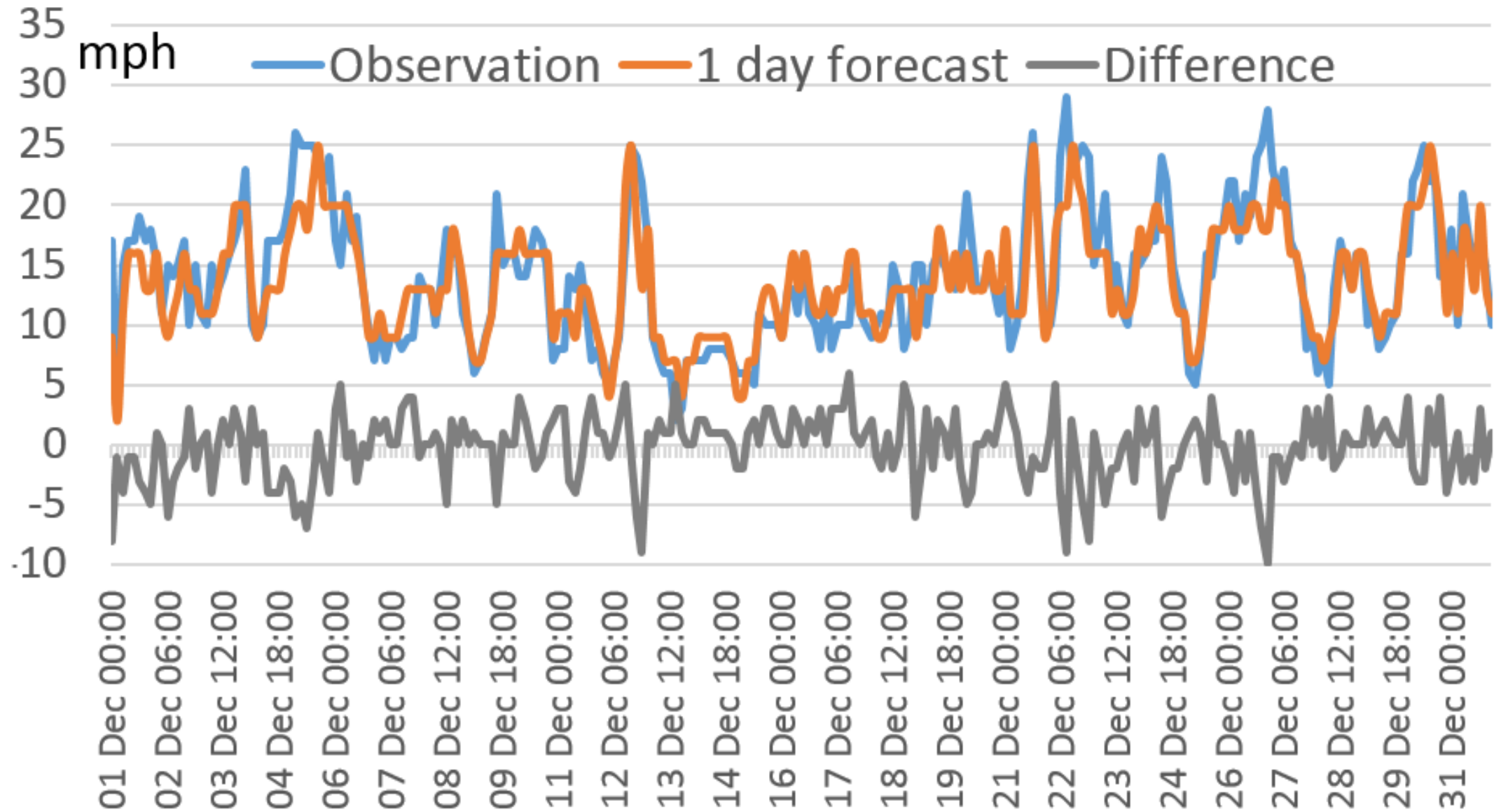
# Temperature Forecast vs. Observation, Dec2015 Heathrow



# Relative Humidity Forecast vs. Observation, Dec2015 Heathrow

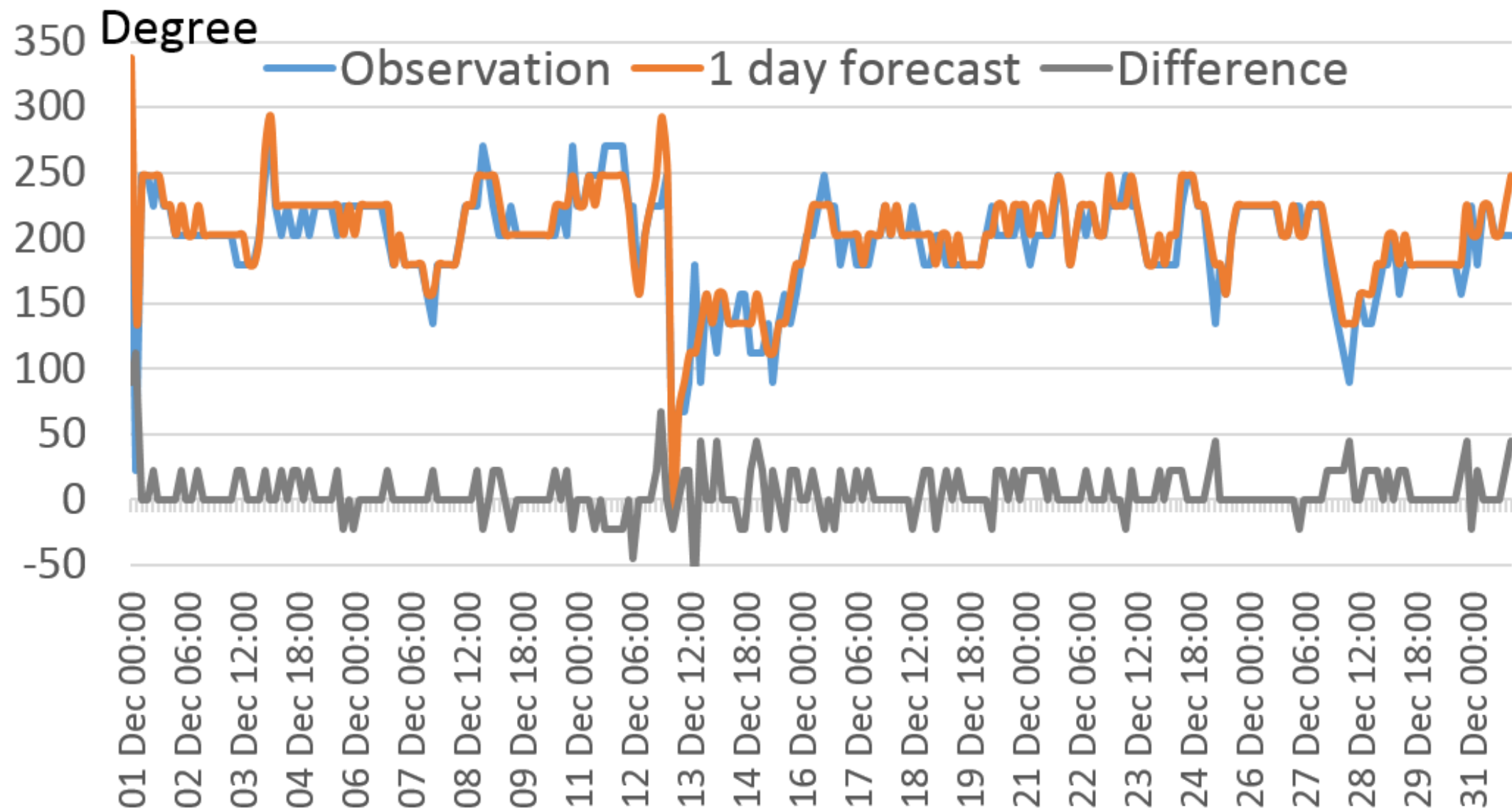


# Wind Speed Forecast vs. Observation, Dec2015 Heathrow



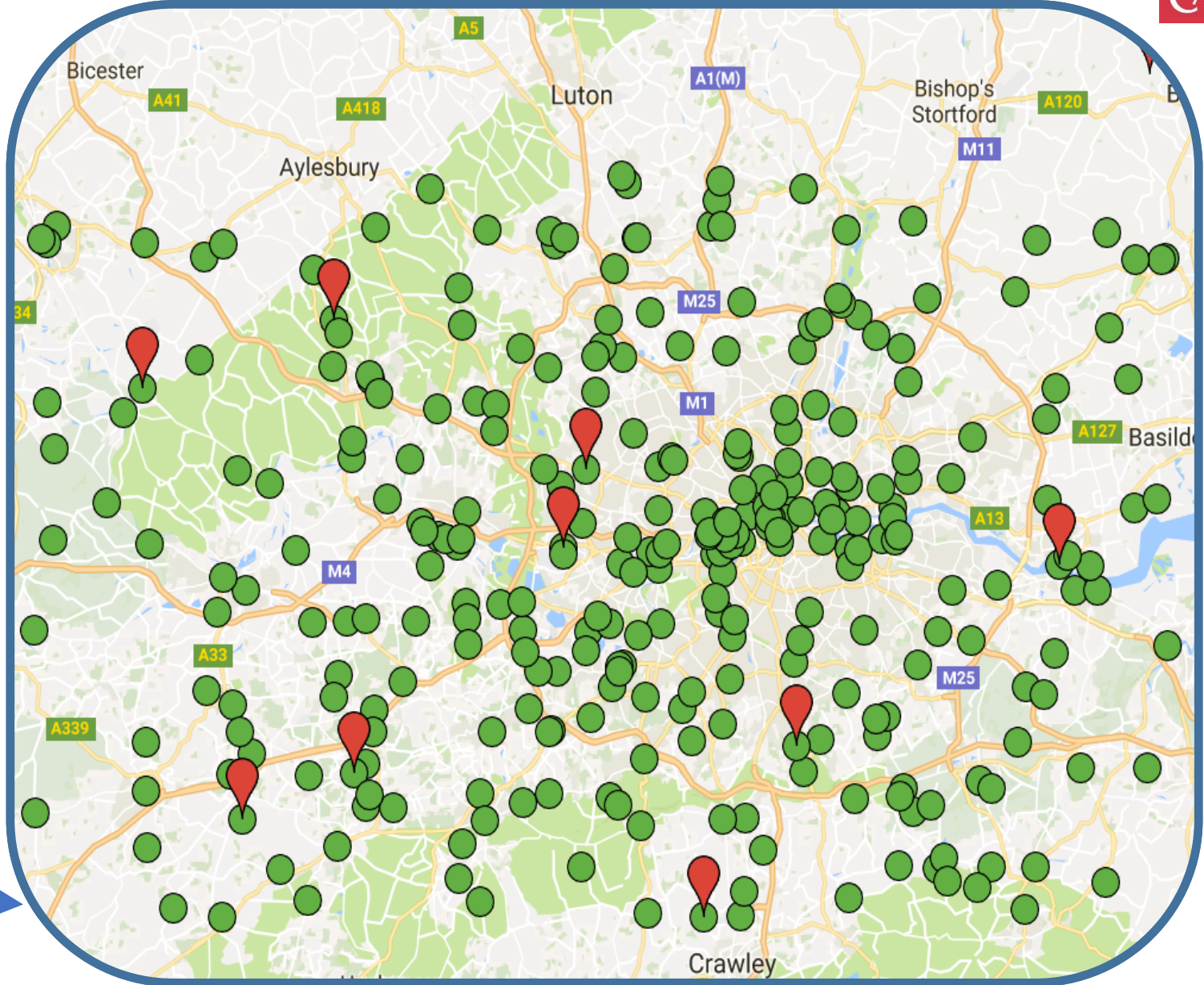
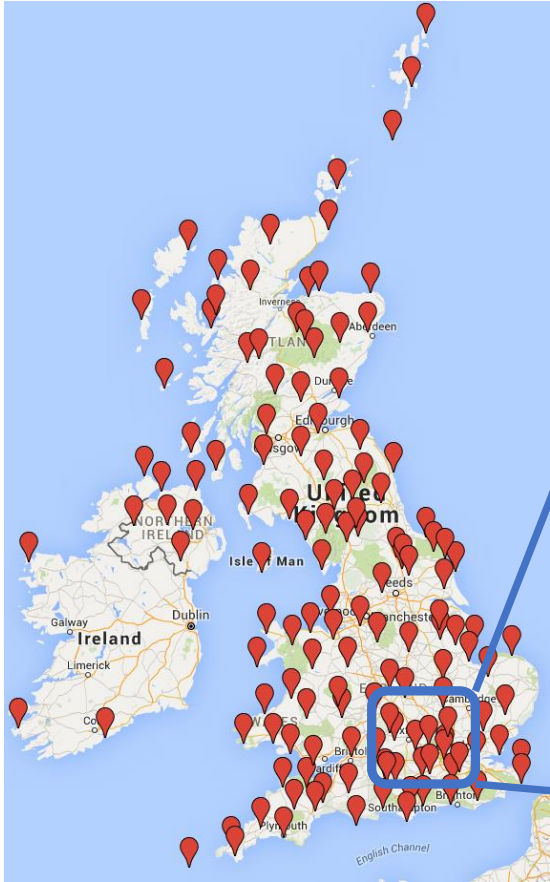


# Wind Direction Forecast vs. Observation, Dec2015 Heathrow

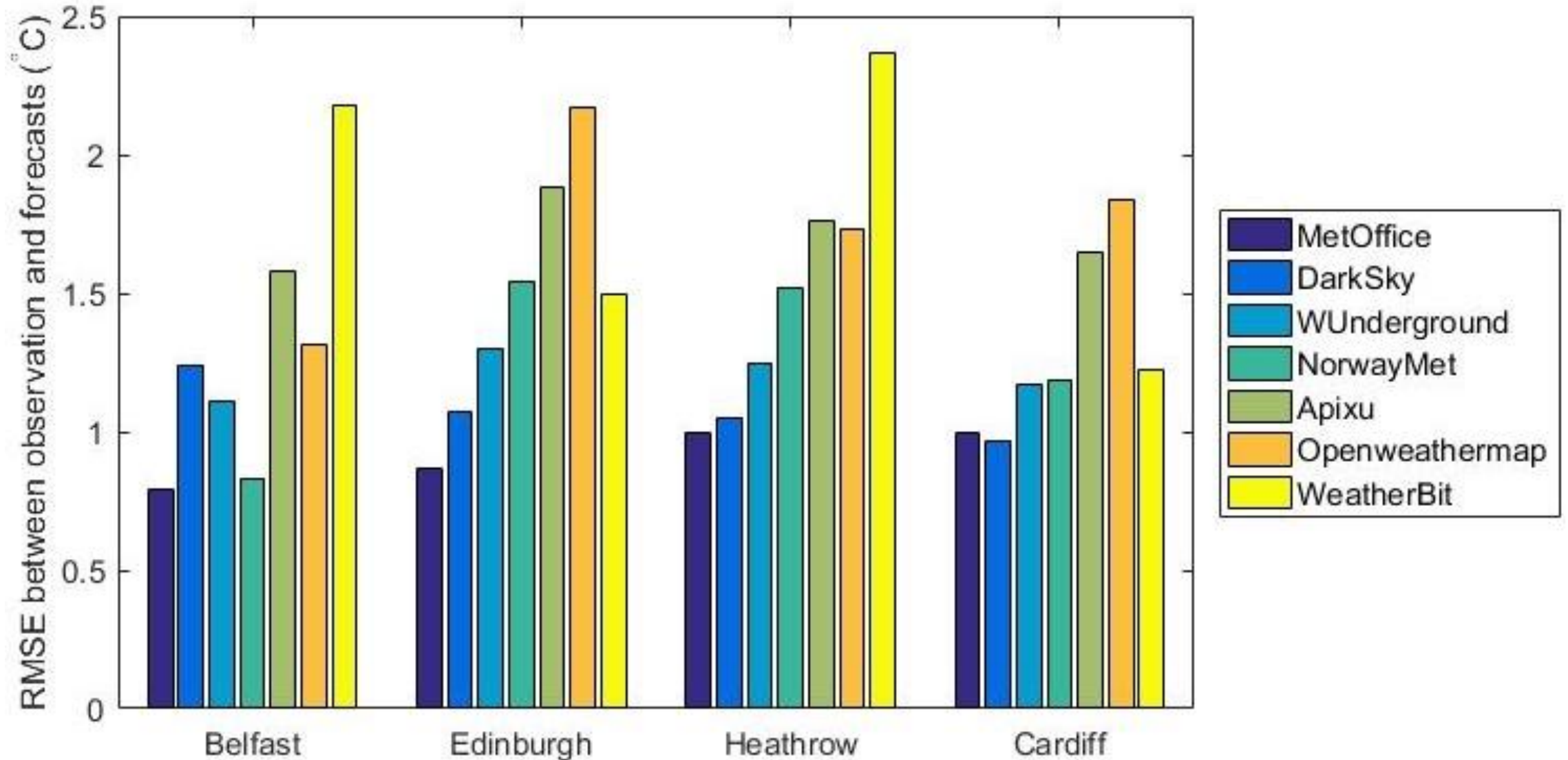


# 6000 forecast locations

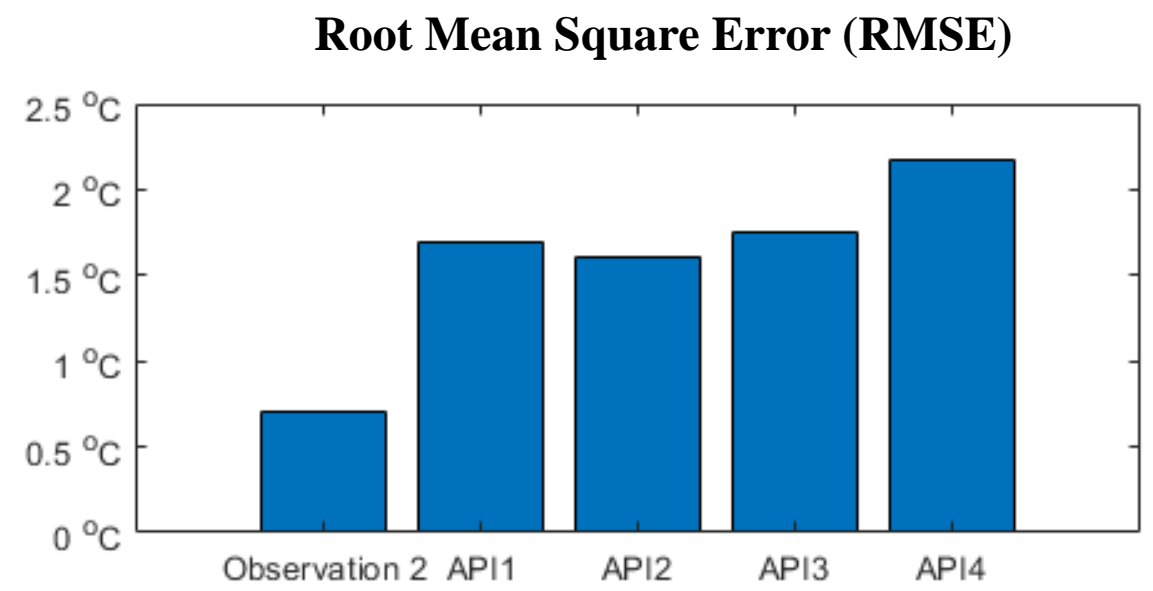
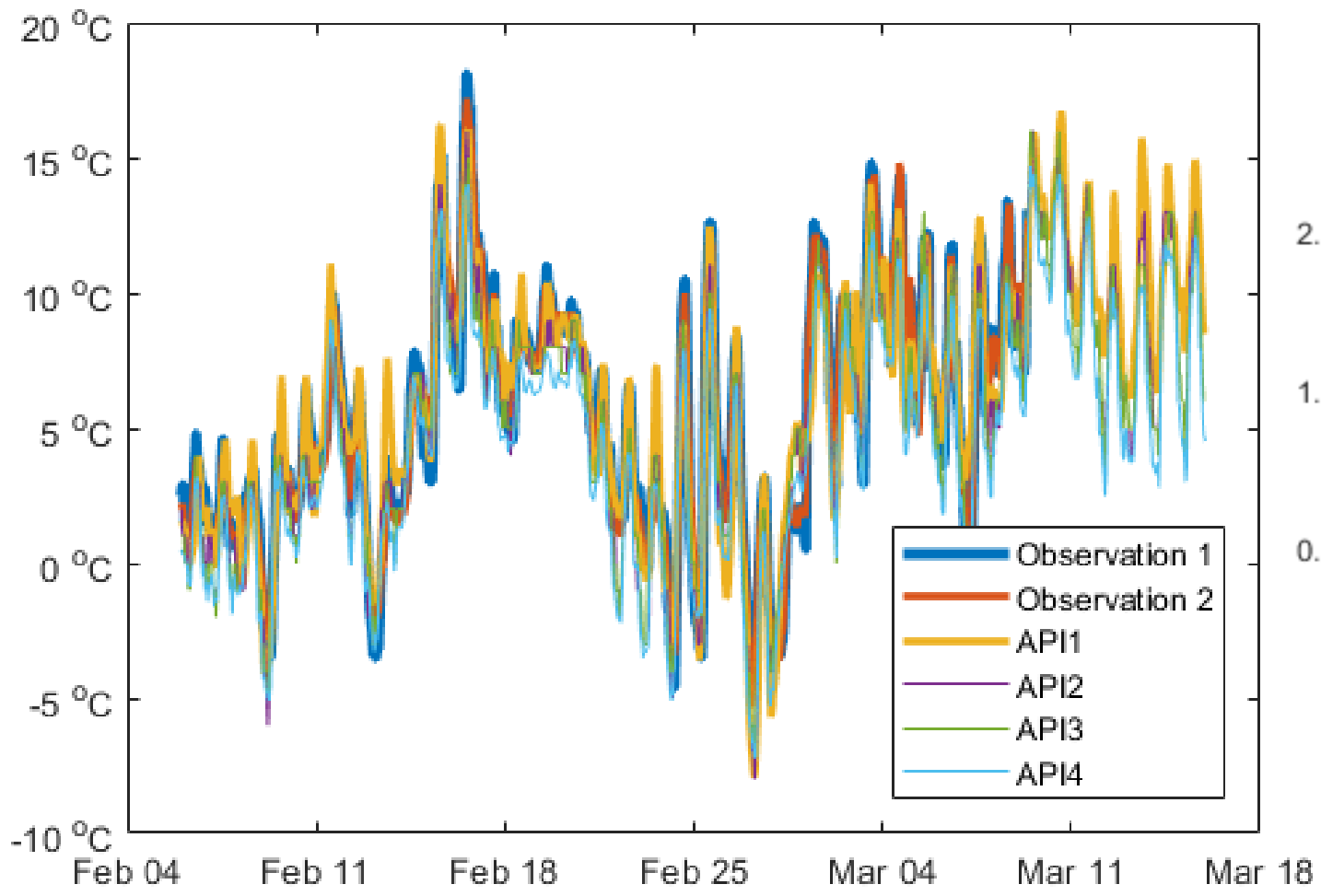
## 140 observation stations



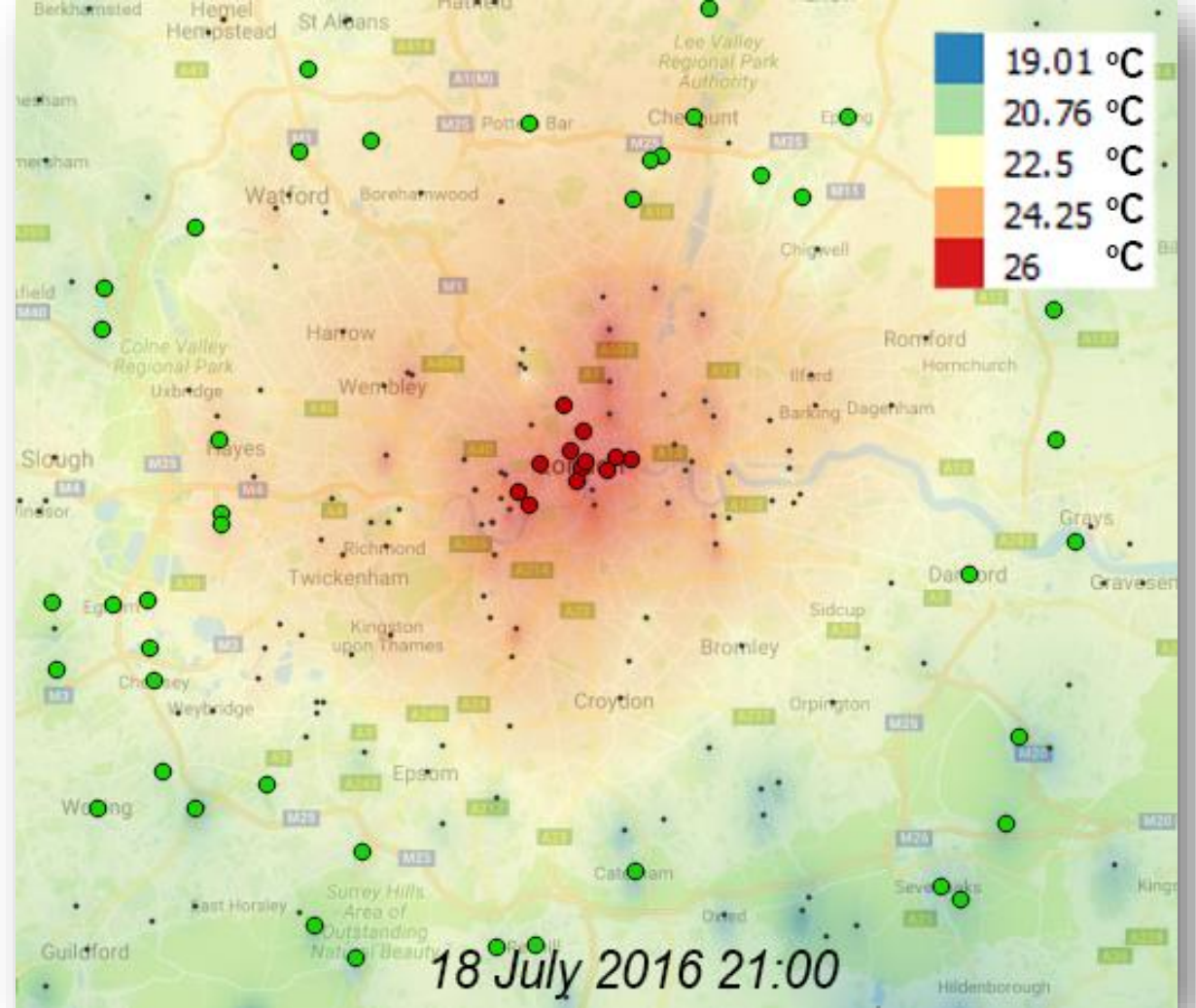
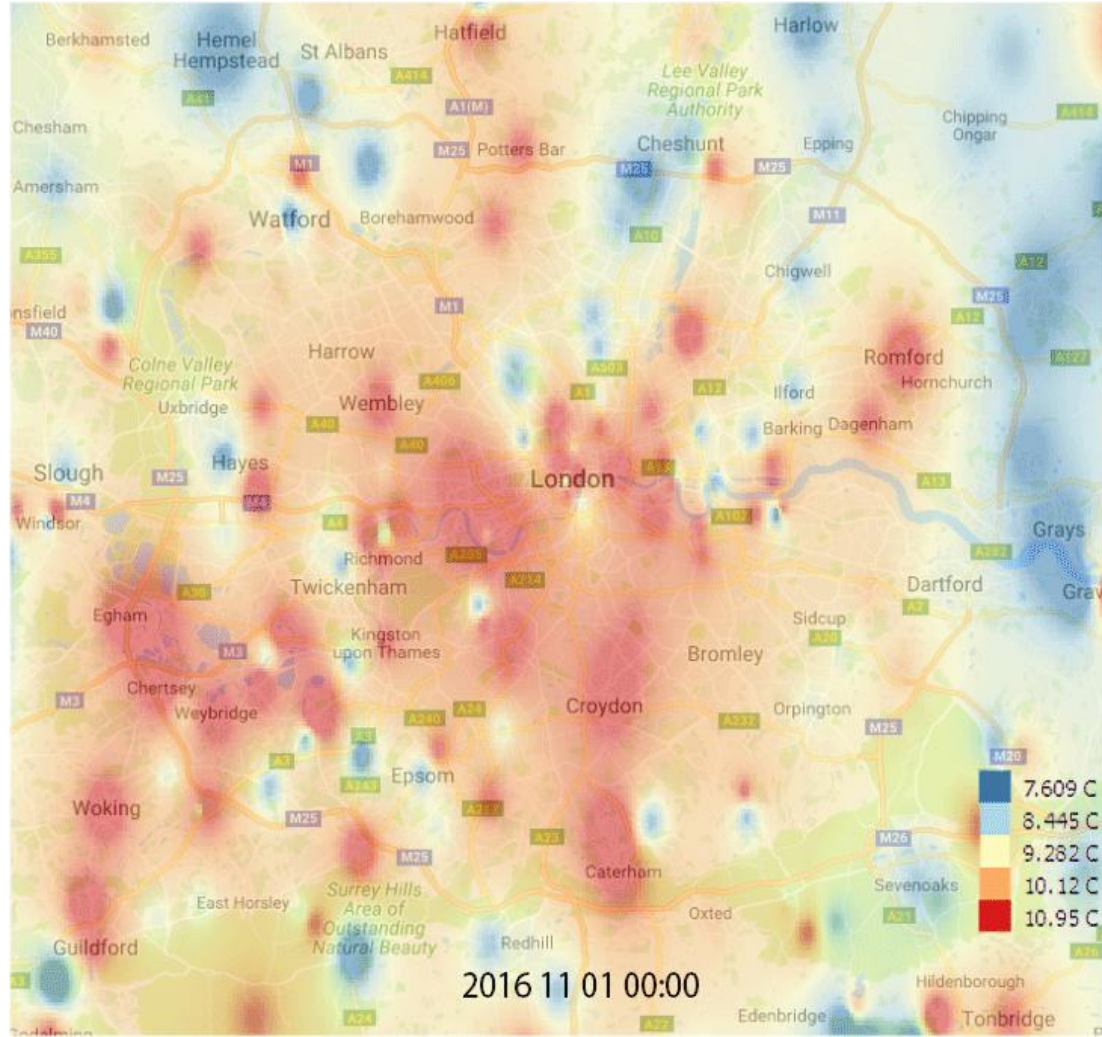
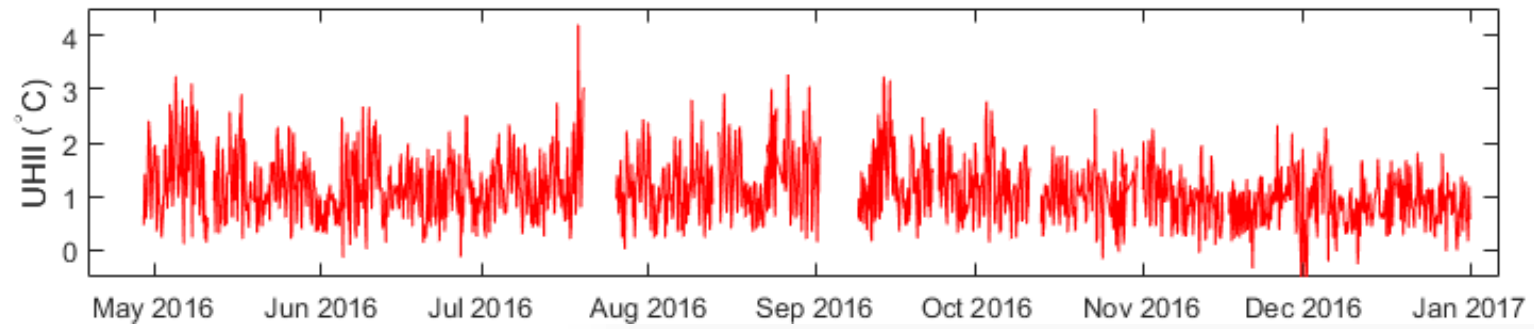
# Temperature Forecast vs. Observation (1-6 April 2017, UK)



# Temperature observations and forecasts (6 Feb-15 Mar 2018, University of Navarra)



# UHII



# Q&A

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