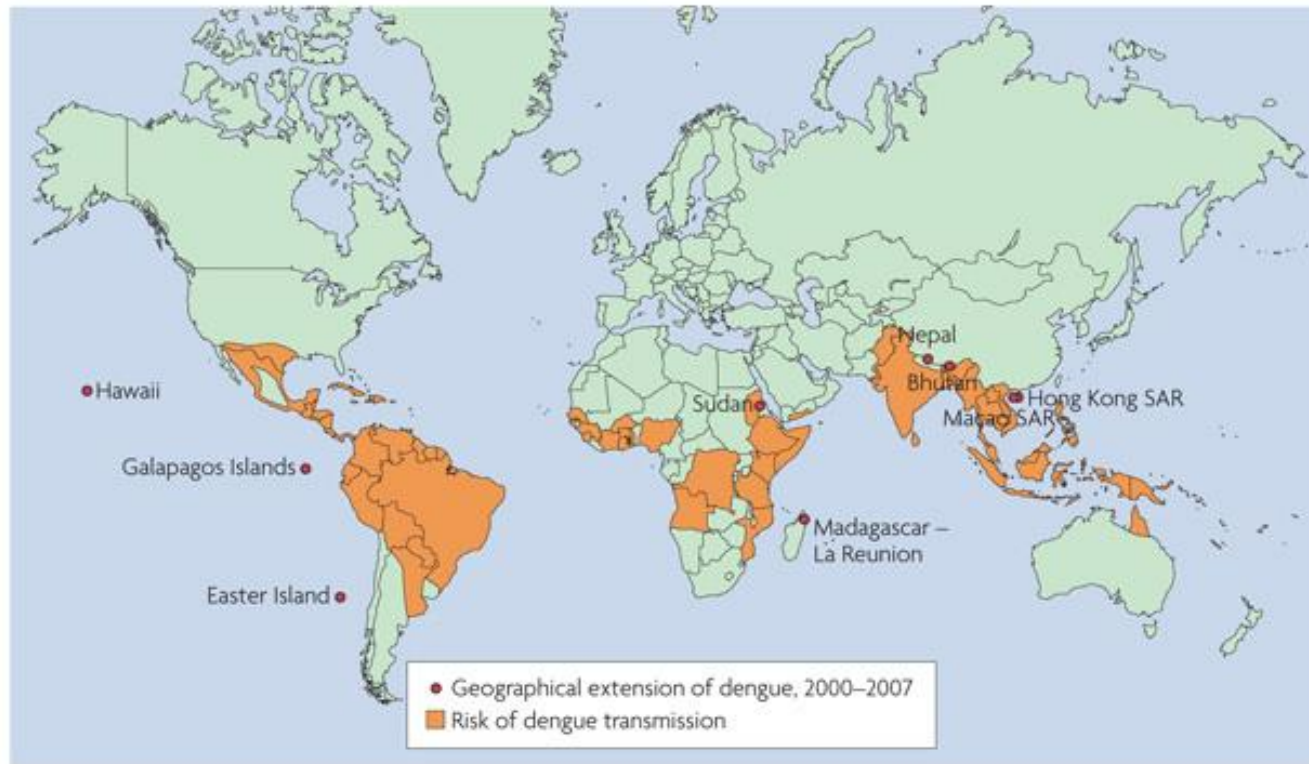# Dengue Fever Prediction
San Juan, Puerto Rico
Iquitos, Perú

JENN HAVENS & MADISON HOBBS

Dengue prediction

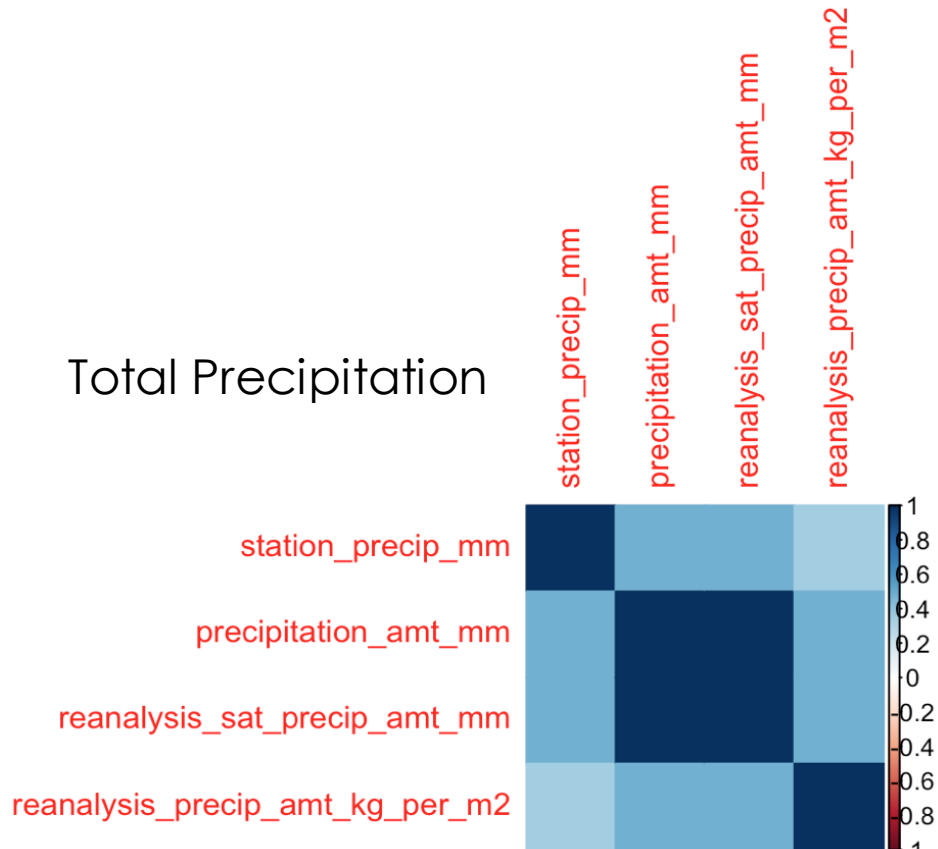- WEATHER
  - TEMPERATURE
  - HUMIDITY
  - PRECIPITATION

- ENVIRONMENT
  - VEGETATION

- SEASON/TIME OF YEAR

- RECENT WEATHER CONDITIONS

Map legend:
- Hawaii
- Galapagos Islands
- Easter Island
- Nepal
- Bhutan
- Sudan
- Hong Kong SAR
- Macao SAR
- Madagascar – La Reunion

- Geographical extension of dengue, 2000–2007
- Risk of dengue transmission

DrivenData - DengAI

- Tidy format

- Data sourced from the NOAA Dengue Fever Prediction Site

- There were missing values, so we used Imputation via Bagging (fits a bagged tree for each predictor as a function of all the others and predicts missing values)
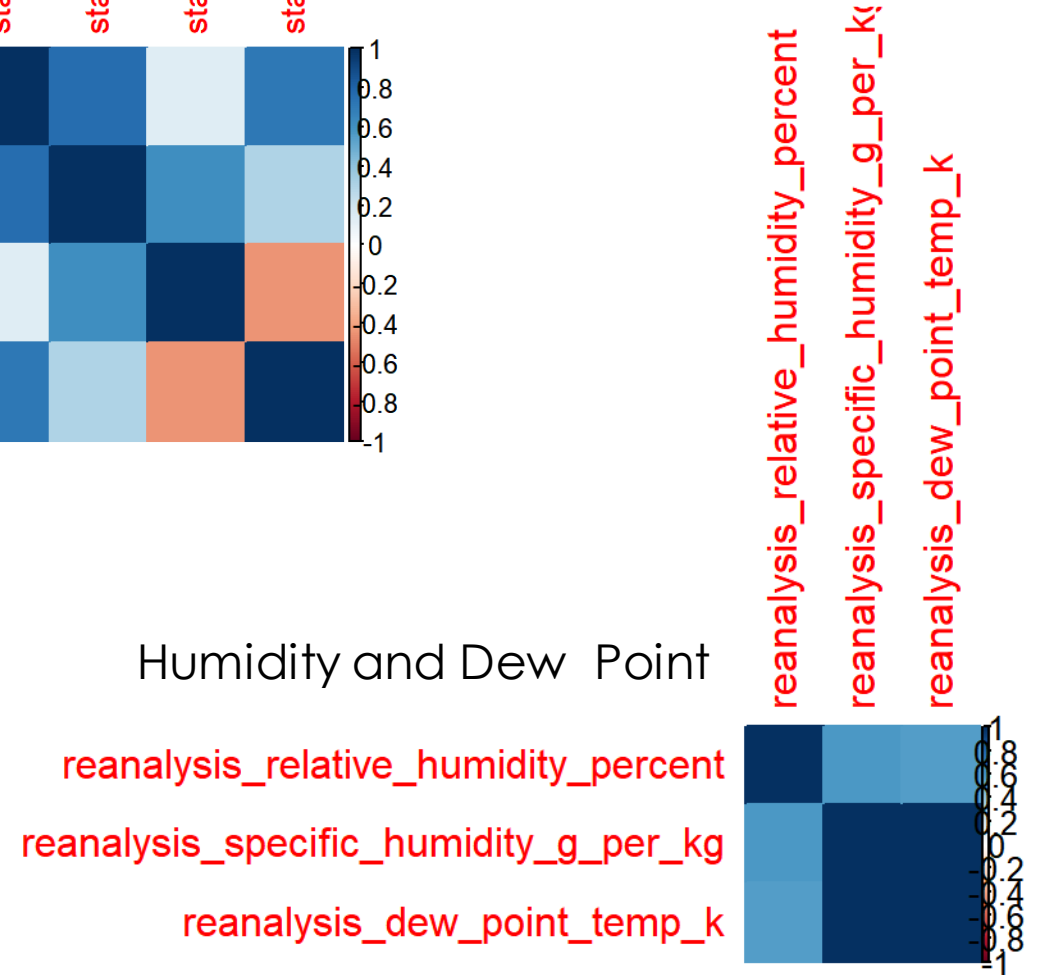
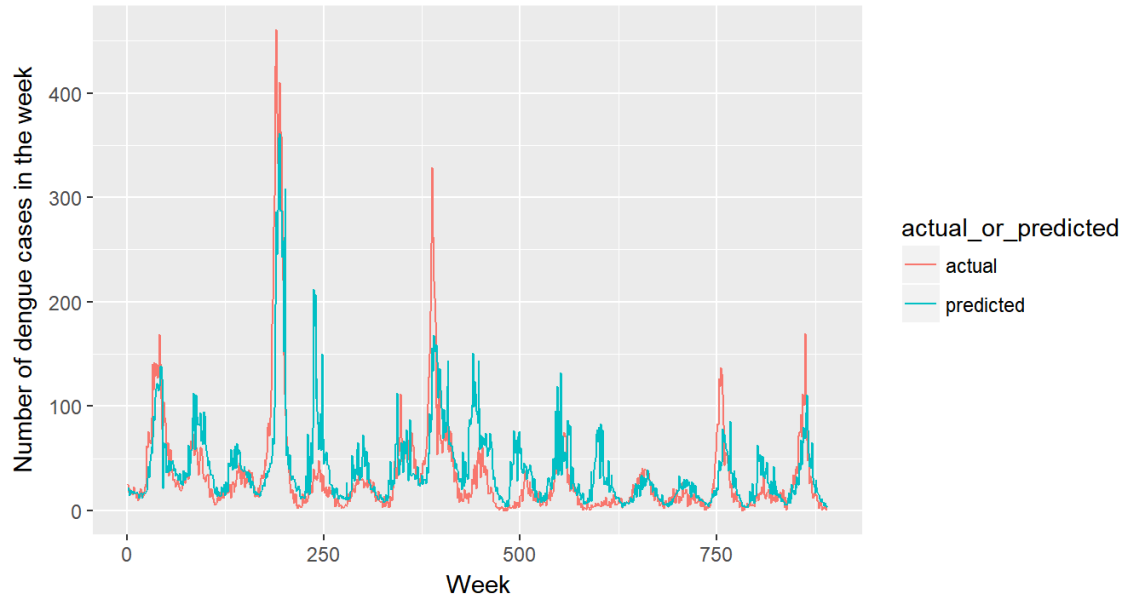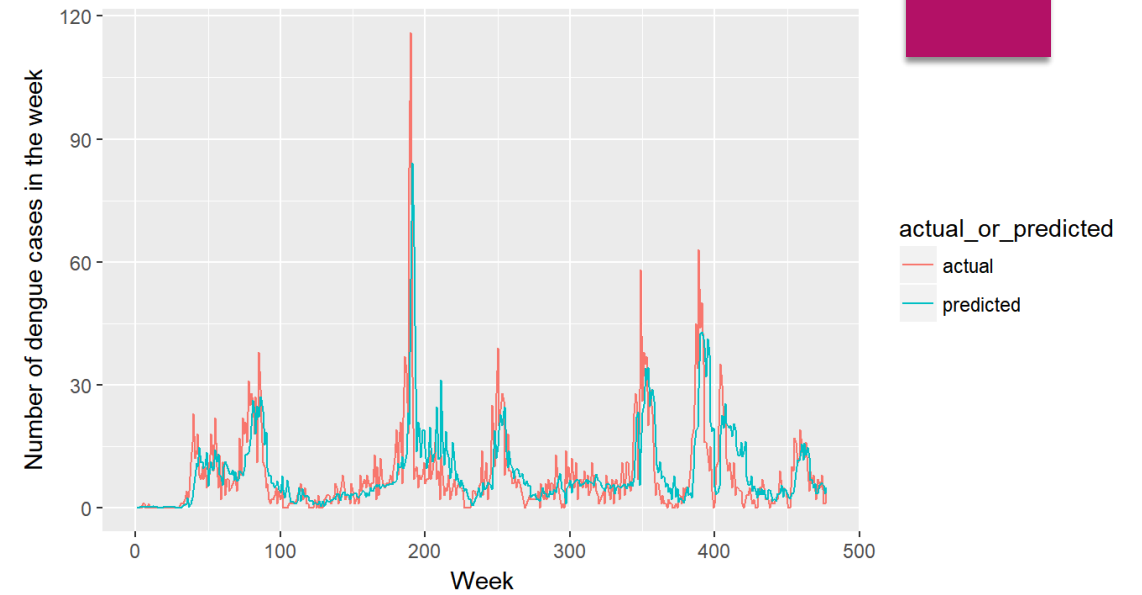Temperature

Total Precipitation
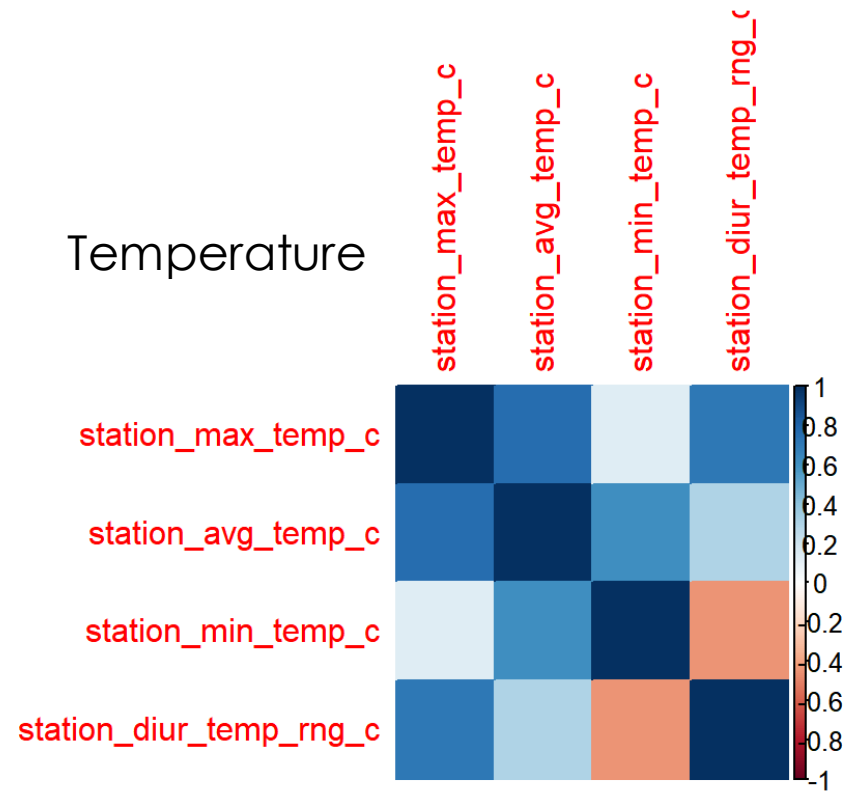
Humidity and Dew Point

Time Lagged Weather Variables

- Literature on dengue fever prediction suggested 2-3 month lag on weather data (precipitation, humidity, temperature)

- We implemented 12-week lagged variables on precipitation, humidity, and temperature
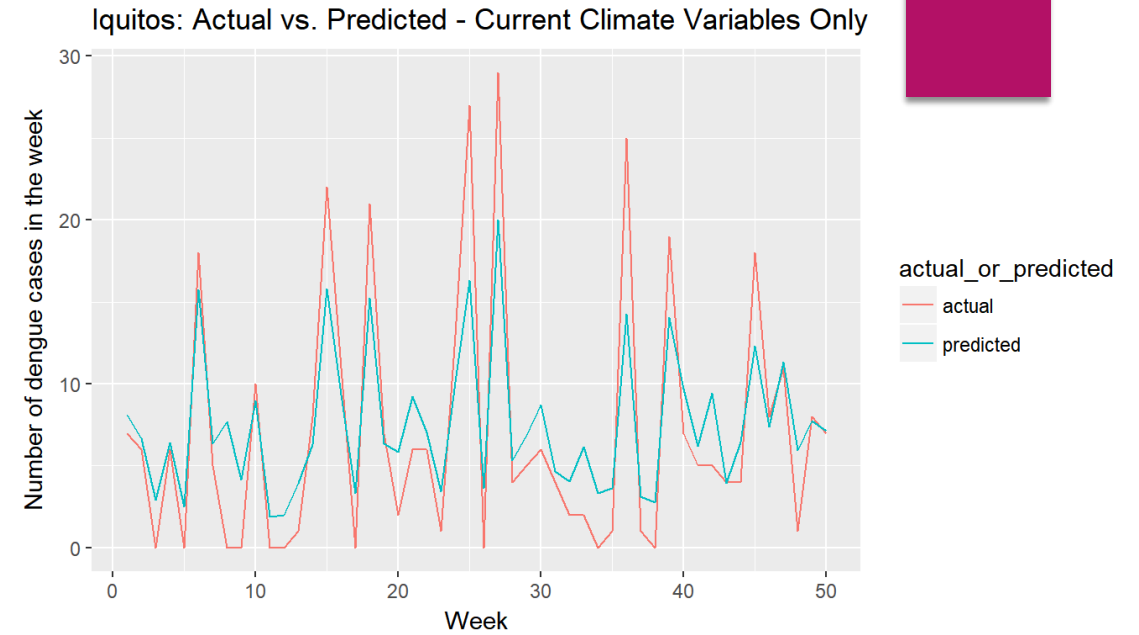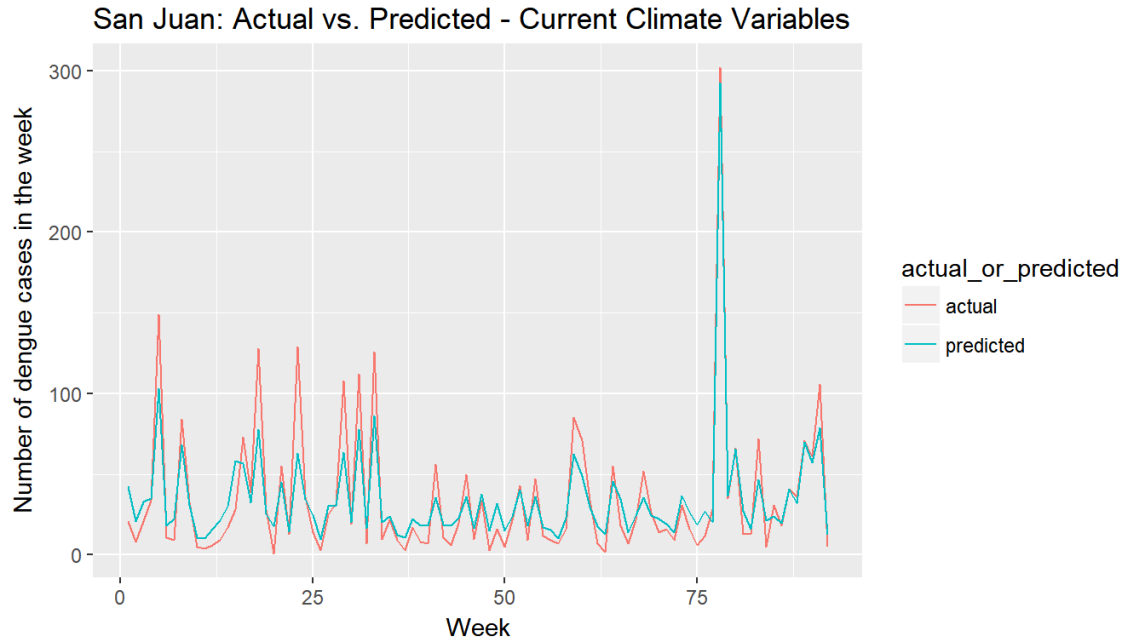
San Juan: Actual vs. Predicted Weekly Dengue Cases

Iquitos : Actual vs. Predicted Weekly Dengue Cases

Random Forest with Time Variables as Predictors

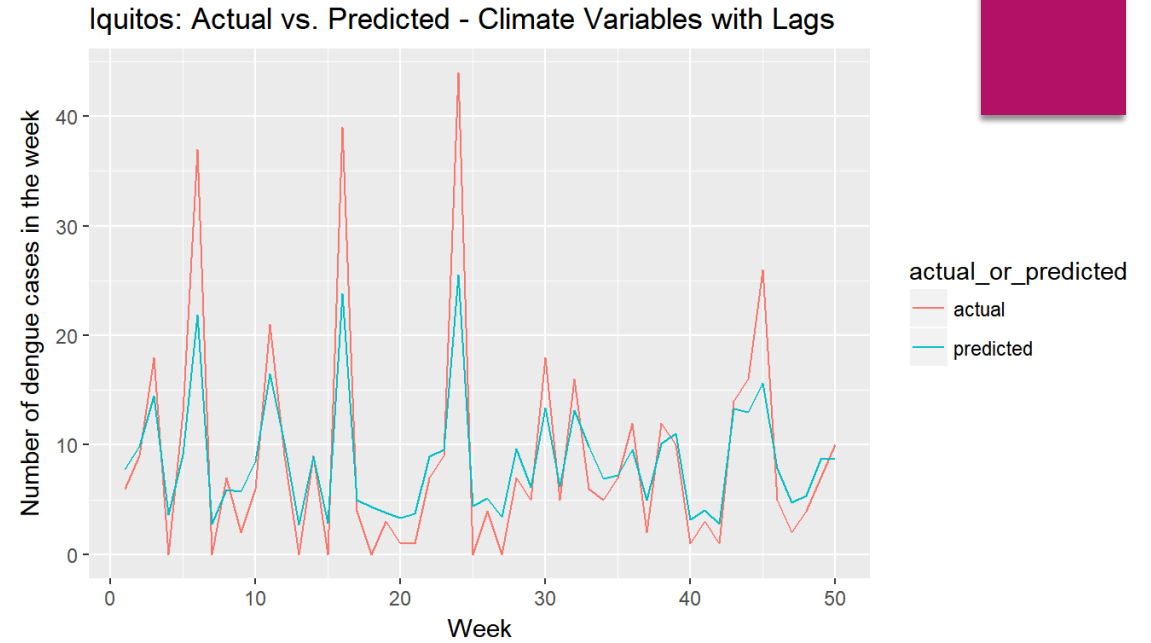SAN JUAN NRMSE - 67

IQUITOS NRMSE - 83

San Juan: Actual vs. Predicted - Current Climate Variables

Iquitos: Actual vs. Predicted - Current Climate Variables Only

Random forest with current environmental variables only

SAN JUAN NRMSE – 36.9

IQUITOS NRMSE – 50.4

SAN JUAN RMSE – 27.5

IQUITOS RMSE – 3.87

San Juan: Actual vs. Predicted - Climate Variables with Lags

Iquitos: Actual vs. Predicted - Climate Variables with Lags
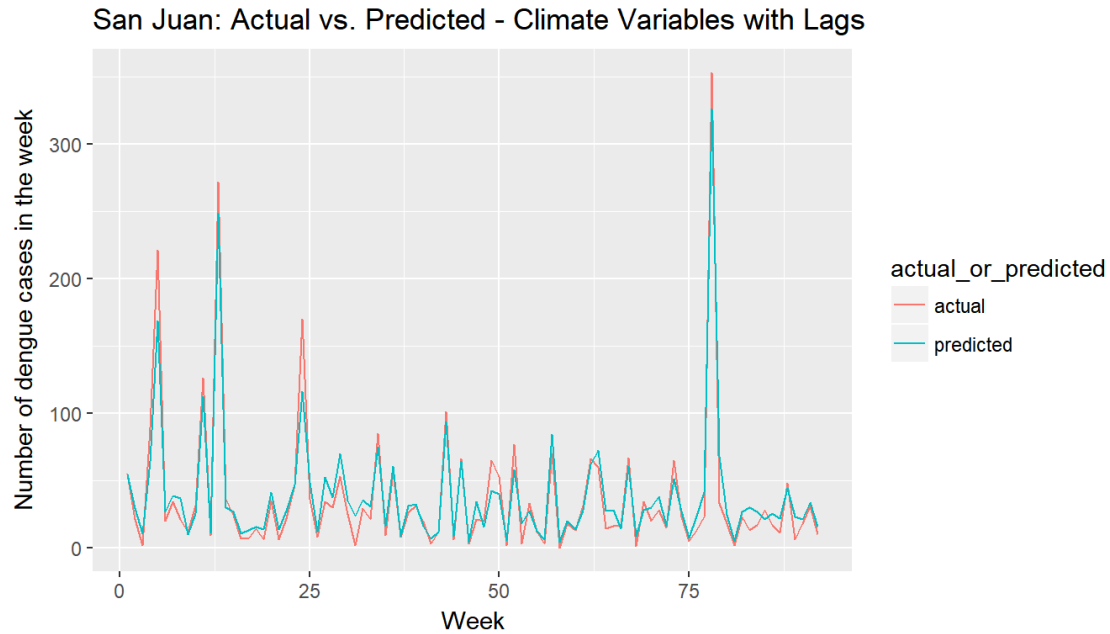
Random forest with current environmental variables and weather time lags

SAN JUAN NRMSE – 32.3

IQUITOS NRMSE – 49.2

SAN JUAN RMSE – 24.1

IQUITOS RMSE – 3.26