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PREDICTIVE SYSTEM TO FORECAST THE QUANTITY OF EMERGENCY ASSISTANCE FOR RESPIRATORY DISEASES ACCORDING TO AIR QUALITY

GLORIA MILENA HENRÍQUEZ DÍAZ

PhD. Engineering Sciences Mention in Automatics

Master in Engineering Sciences Mention in Electrical Engineering

Master in Clinical Epidemiology

Medical Doctor

Electrical Engineer

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INTRODUCTION

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DATA

EMERGENCY ASSISTANCE

Department of Statistics and Health Information (DEIS)

Ministry of Health of Chile

https://deis.minsal.cl/

[1] Primary Care Emergency Service

[2] Hospital Emergency Service

[3] Others Emergency Services

AIR QUALITY

National Information System on Air Quality (SINCA)

Ministry of the Environment of Chile

https://sinca.mma.gob.cl/

Air quality monitoring station (11 in Metropolitan Area)

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DATA

Data collection

- Variables:
  1. Emergency assistance respiratory diseases
  2. Weather
  3. Particulate material
  4. Polluting gases
- Enough data per variable

Reduce bias

- Air quality monitoring station **and** primary care emergency service → in the same municipality

Selection

- Fulfill the requirement: Cerrillos, Cerro Navia, El Bosque y Quilicura
- Selected: El Bosque Municipality

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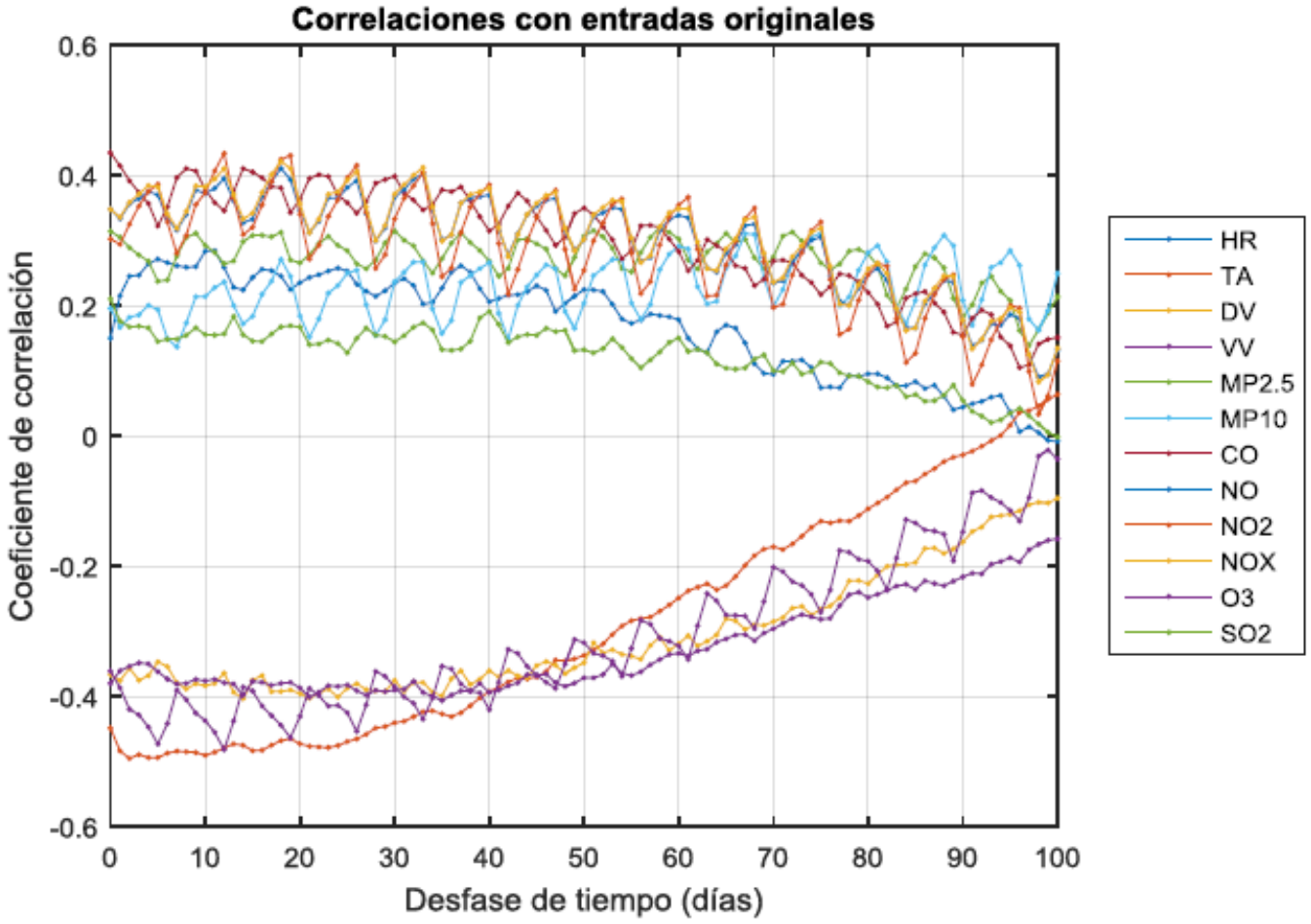
CORRELATIONS

Respiratory diseases v/s:

- Original variable (example)
- $\ln(variable)$
- $e^{(variable)}$
- $(variable)^2$
- $(variable)^3$
- $\frac{1}{(variable)}$



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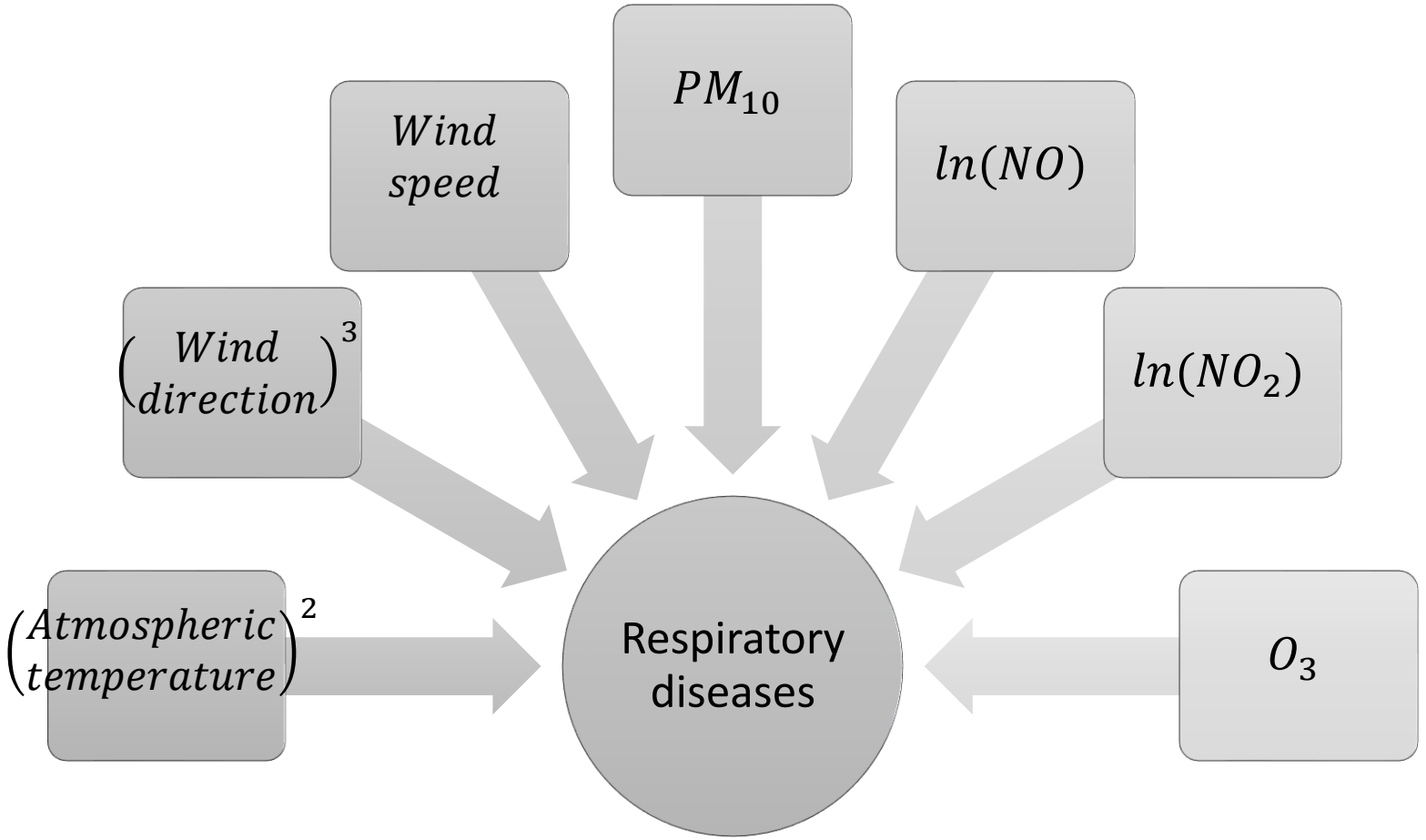
SELECTED VARIABLES



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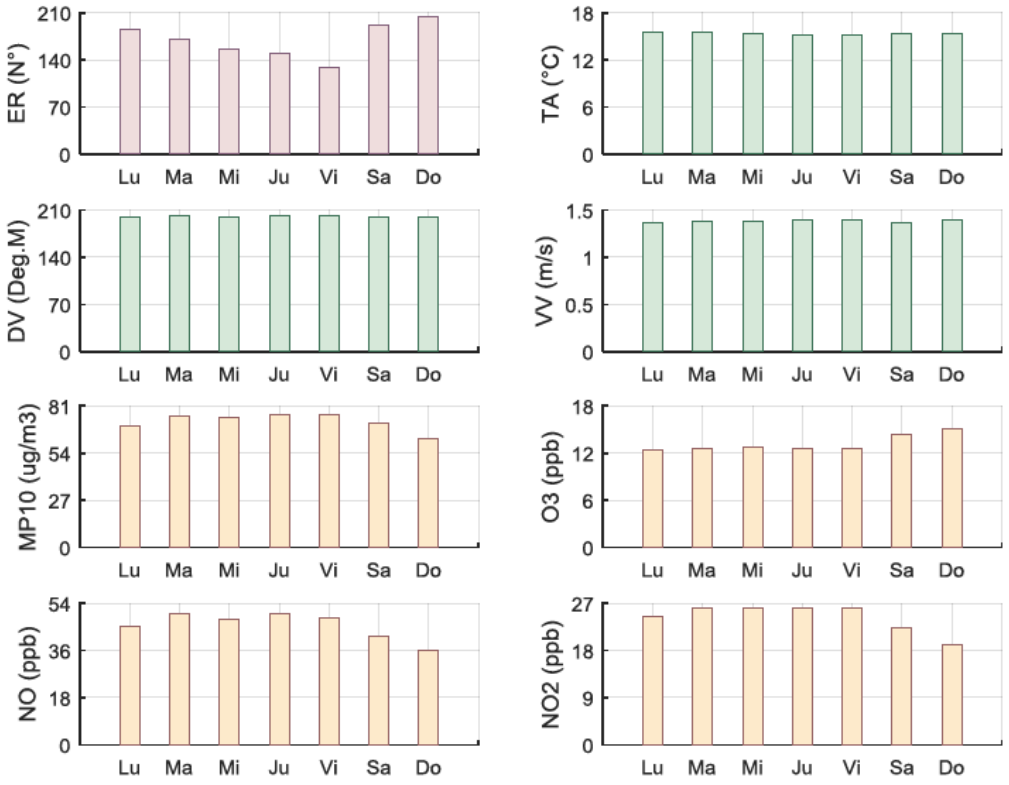
ADJUSTMENT

AVERAGES ACCORDING TO DAYS OF THE WEEK



FUZZY LOGIC

- Respiratory diseases
- PM_{10}
- $ln(NO_2)$

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FINAL DESIGN

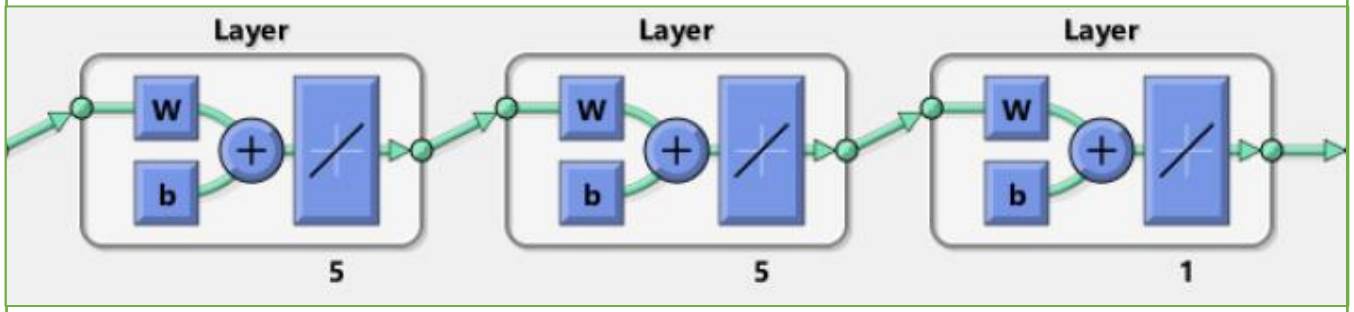
INPUT

1. $(Atmospheric\ temperature)^2$
2. $(Wind\ direction)^3$
3. $Wind\ speed$
4. PM_{10}*
5. $ln(NO)$
6. $ln(NO_2)$*
7. O_3
8. Respiratory diseases**

* Post fuzzy logic

** Only training

NEURAL NETWORK



OUTPUT

Prediction of respiratory diseases 10 days in advance

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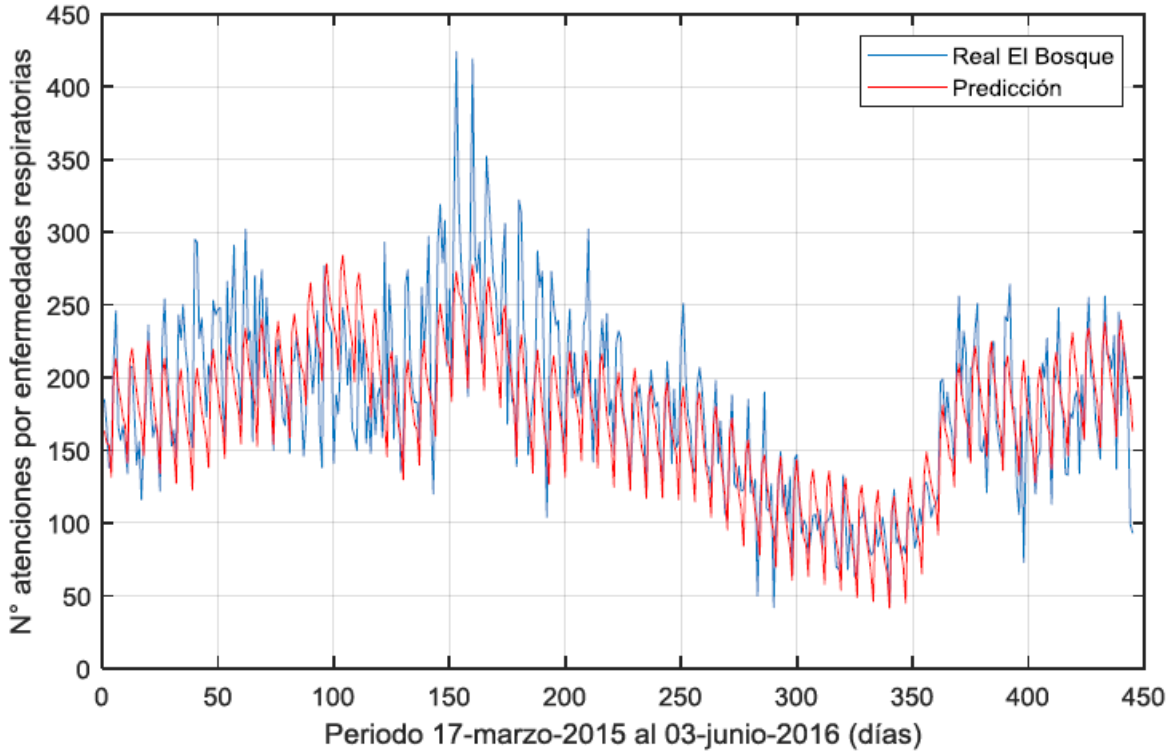
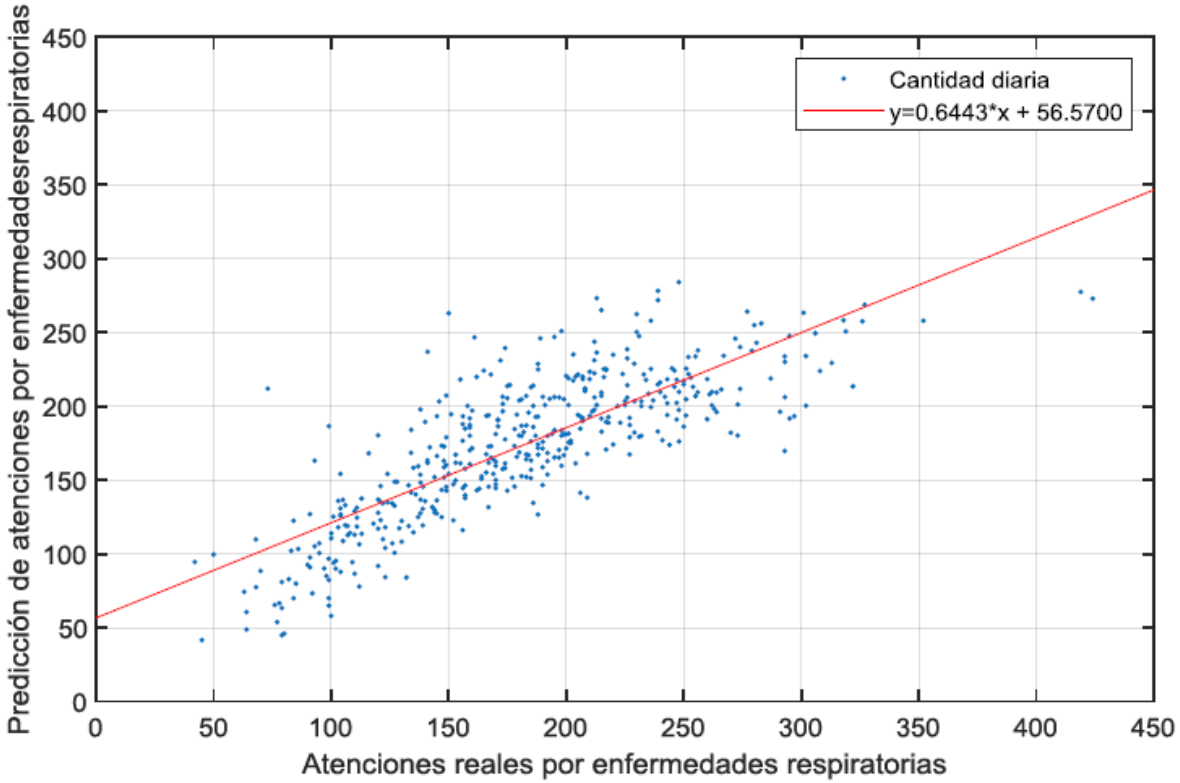
RESULTS





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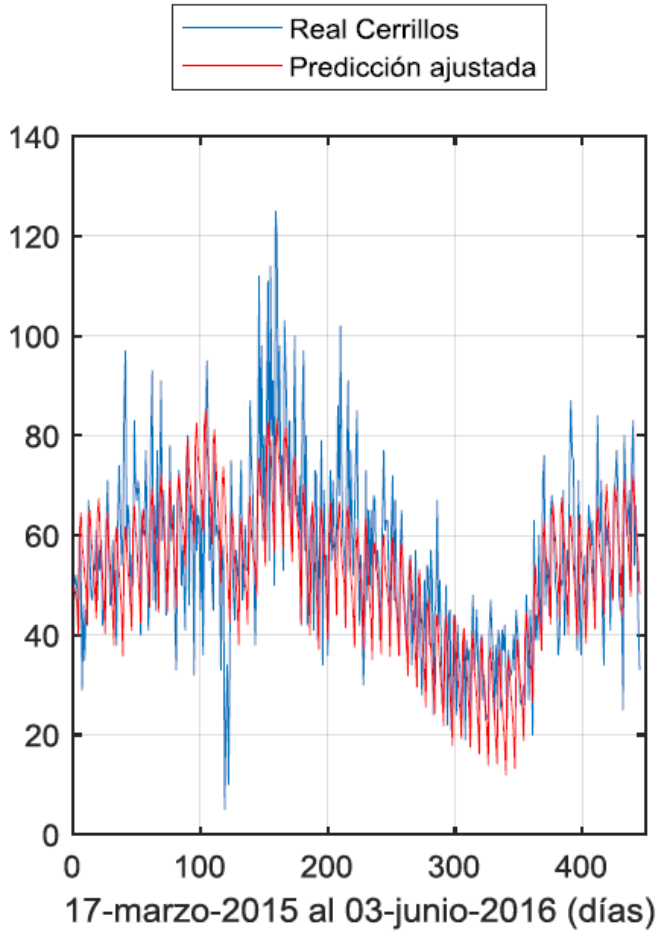
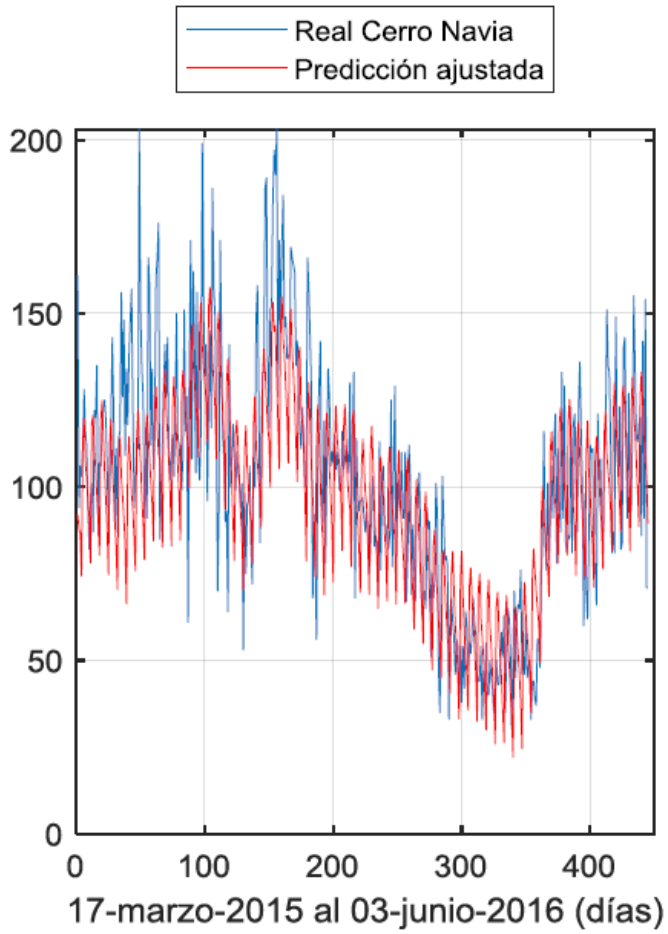
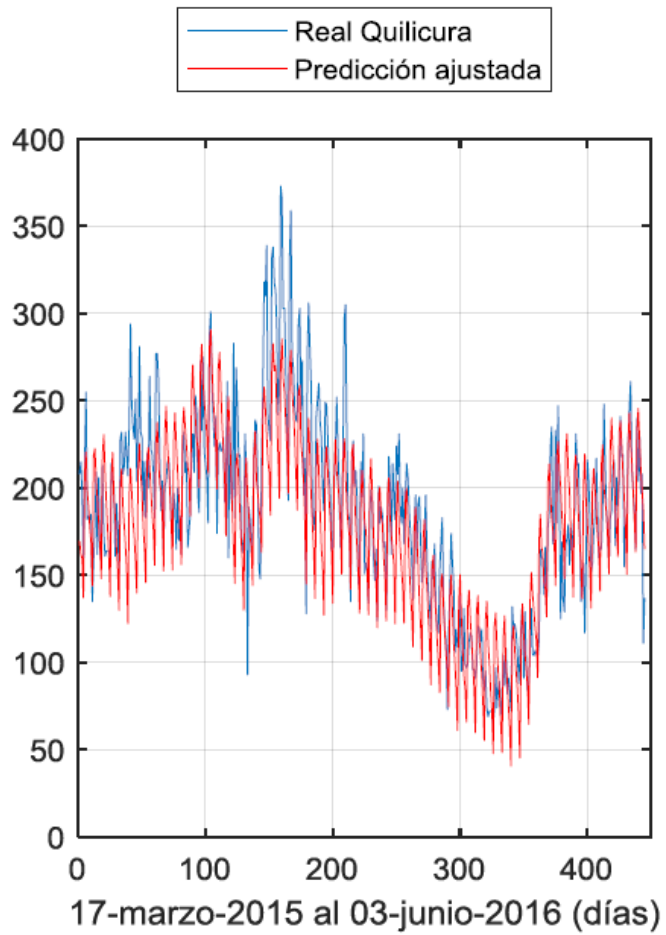
ASSESSMENT IN DIFFERENT GEOGRAPHICAL ZONES







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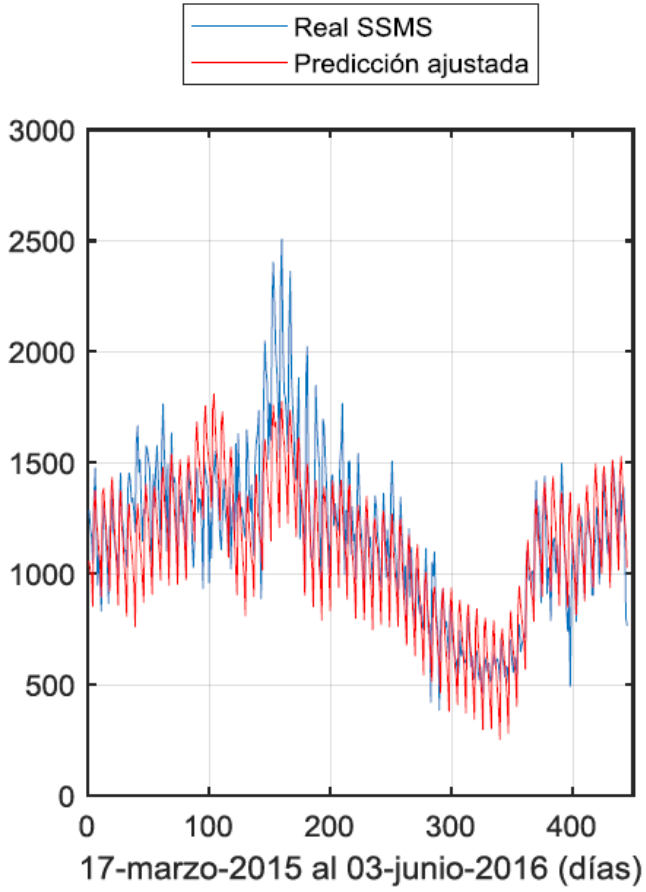

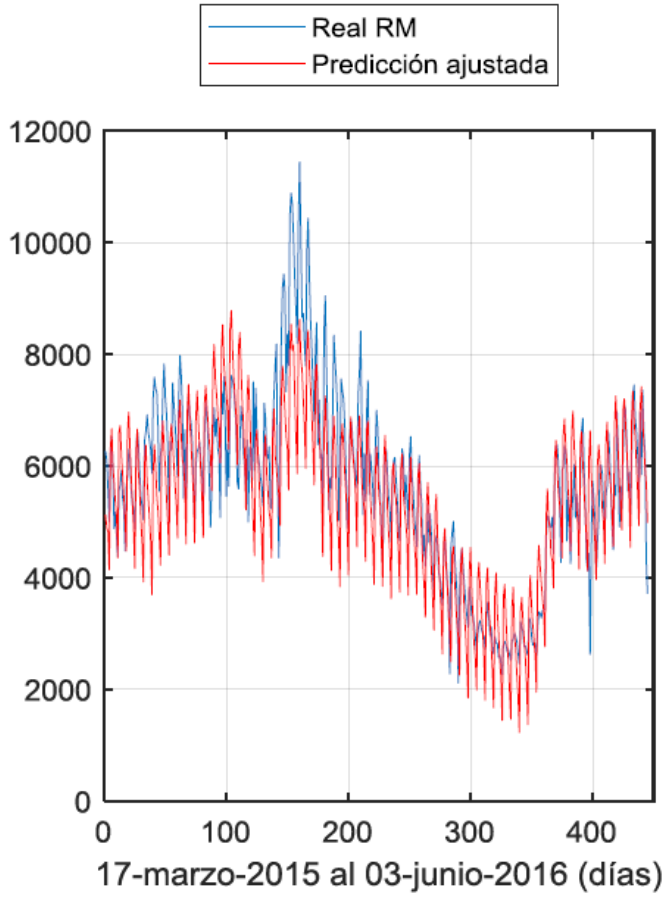

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Thank you