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*Programas de Actividades de I +
D entre grupos de investigación
de la Comunidad
de Madrid en Tecnologías 2018*



PAIDIR TEC 2018

AIRTEC-CM

EVALUACIÓN INTEGRAL DE LA CALIDAD DEL AIRE URBANO Y CAMBIO CLIMÁTICO

P2018/EMT-4329

4ª Reunión del Comité Científico-Técnico

12 Enero 2023, Facultad de Farmacia UCM. Madrid

Zoom / skype: <https://upm.zoom.us/j/89103271294> / <https://upm.zoom.us/skype/89103271294>

OBJECTIVO 4: SEGUIMIENTO POLEN (Efecto en la vegetación urbana)

Influence of urbanisation on the phenology of evergreen coniferous and deciduous broadleaf trees in Madrid (Spain)

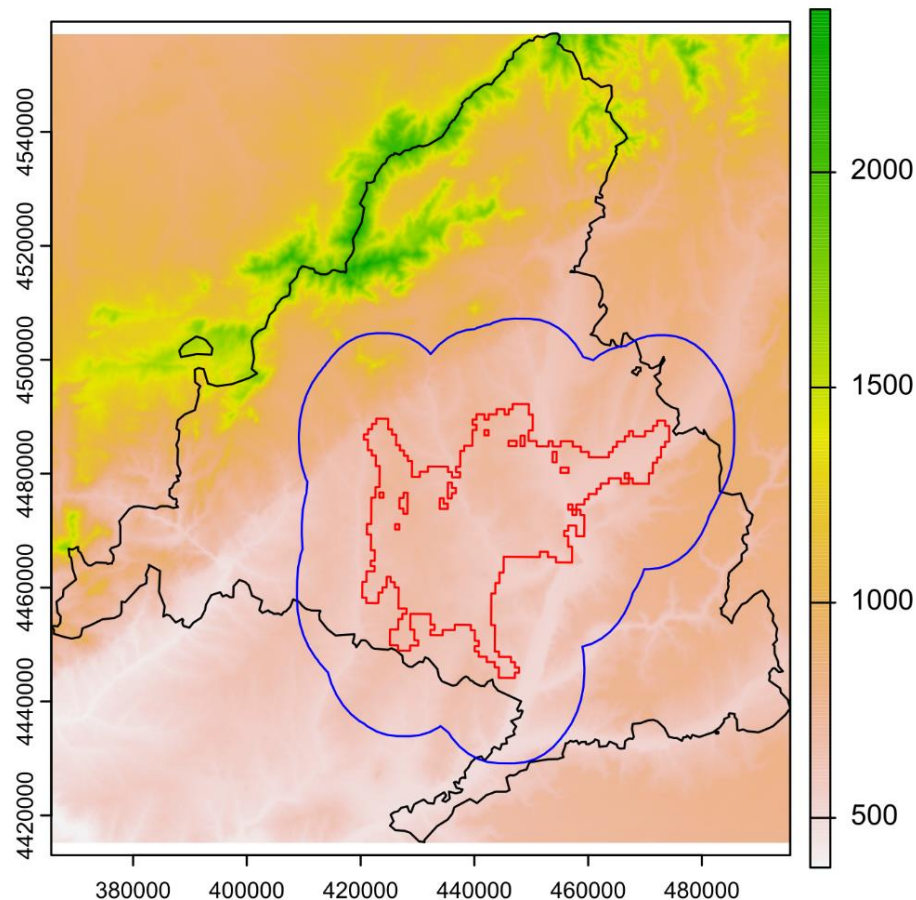
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STUDY AREA

- Madrid's main urban patch delimited by Zhao et al. (2022)
- 15 km buffer
- Minimum and maximum altitude of Madrid's main urban patch

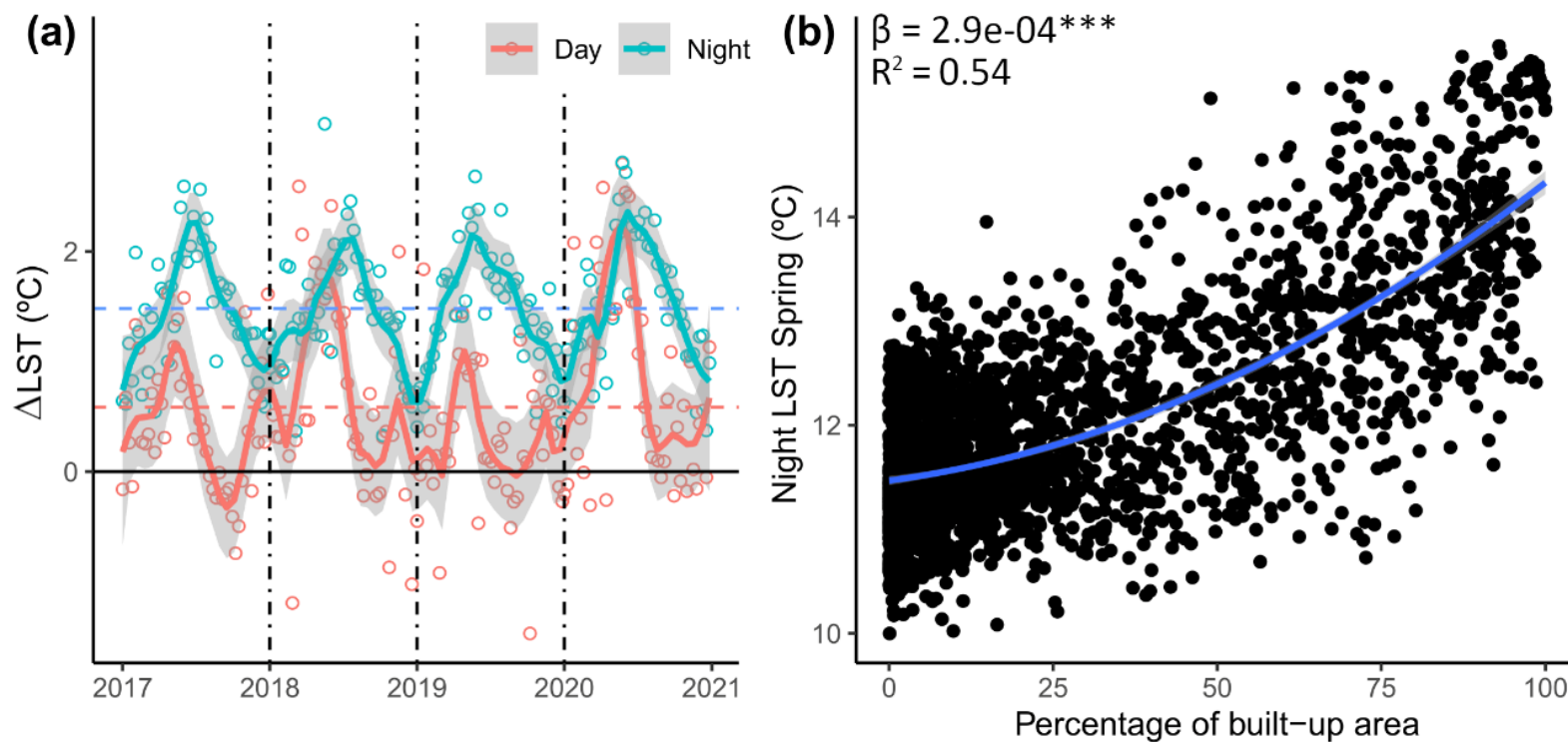
Zhao et al. (2022) doi: 10.5194/essd-14-517-2022



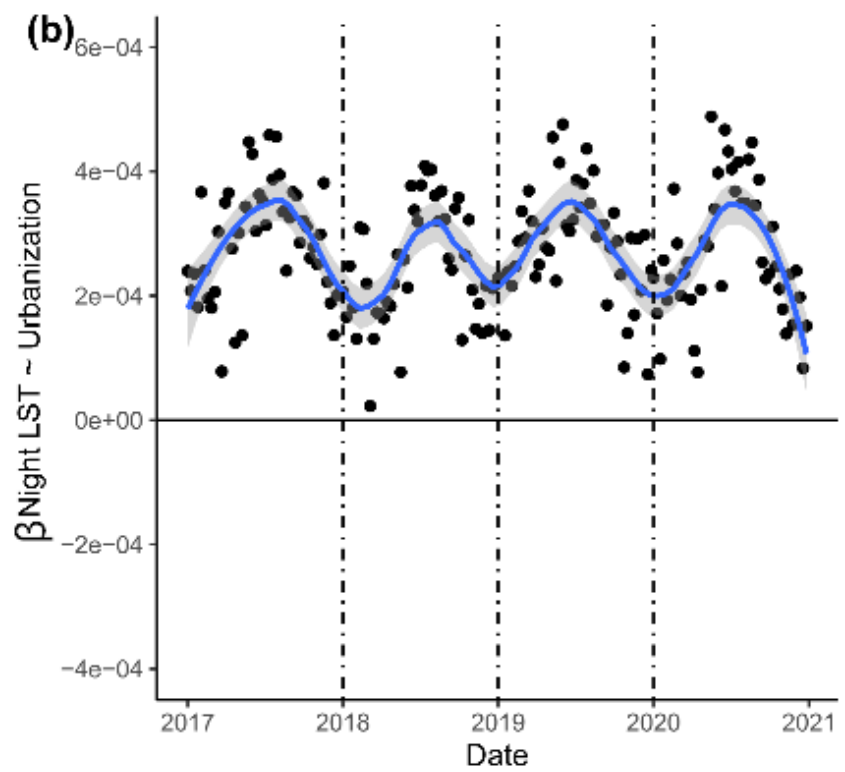
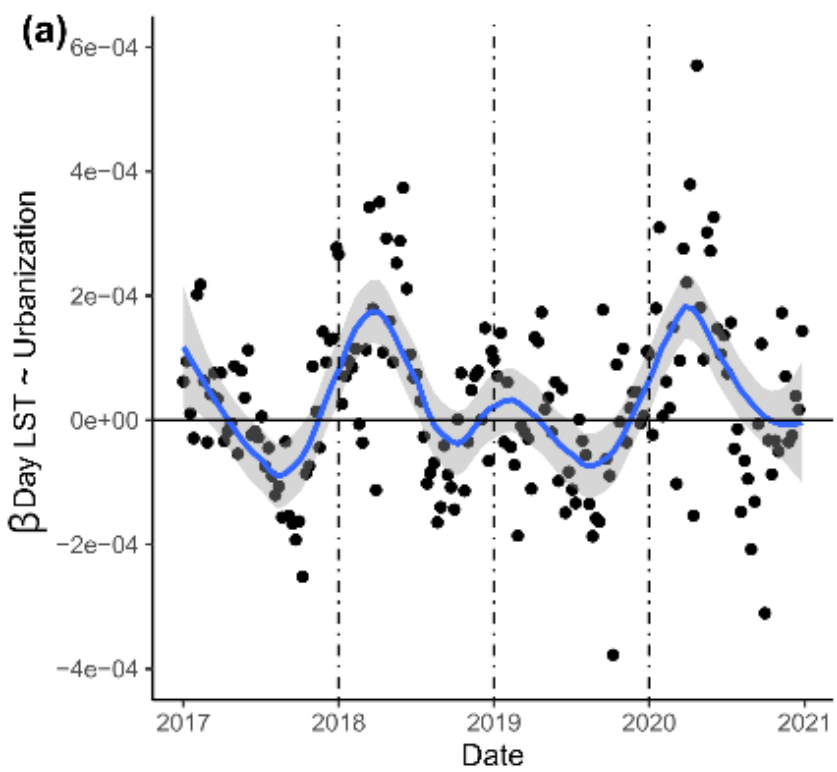
DATA

- MODIS/Terra LST (MOD11A2) – 1 km
- European Settlement Map (Urbanization Intensity) – 10 m
- Dominant Leaf Type (Broadleaf and Coniferous) – 10 m
- Tree Cover Density – 10 m
- Yearly Vegetation Phenology and Productivity Indices (Copernicus Land Monitoring Service): SOS, LES, EOS and TPRO – 10 m

RELATIONSHIP TEMPERATURE - URBANISATION



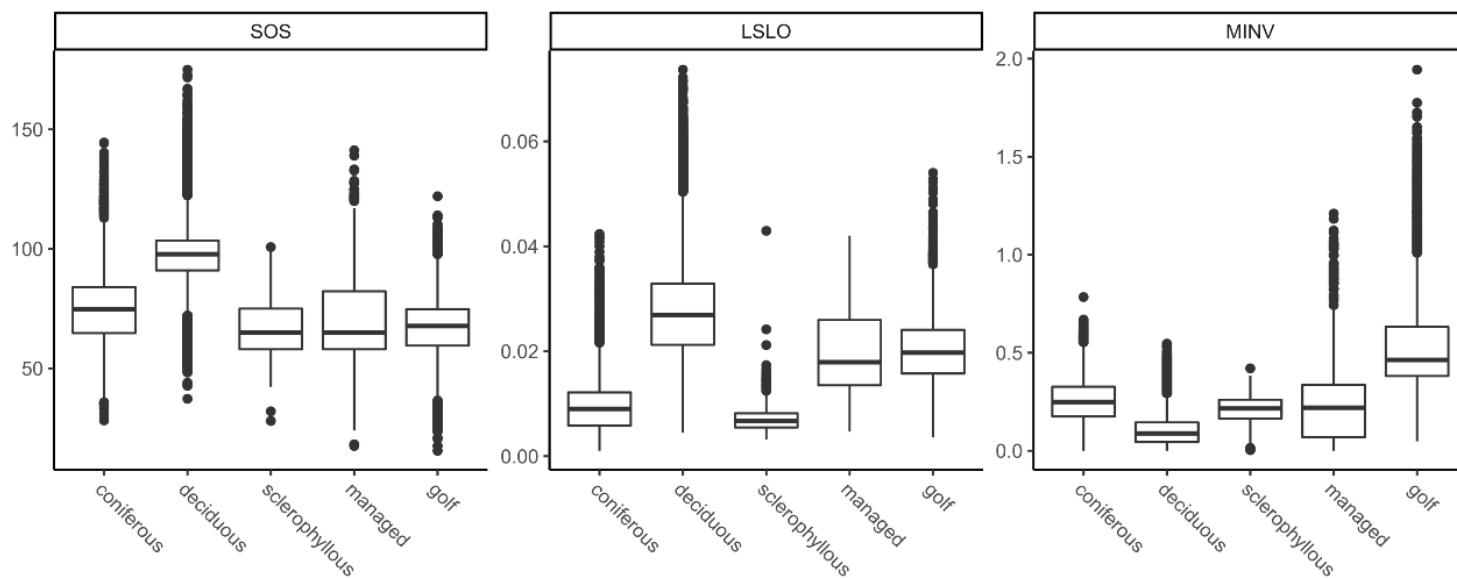
RELATIONSHIP TEMPERATURE - URBANISATION



VEGETATION CLASSES: RANDOM FOREST

- Accuracy = 89%
- Class probability > 80%

	coniferous	deciduous	golf	managed	sclerophyllous
broadleaf	2689	105699	2240	19	4
coniferous	8962	5574	6	1	37



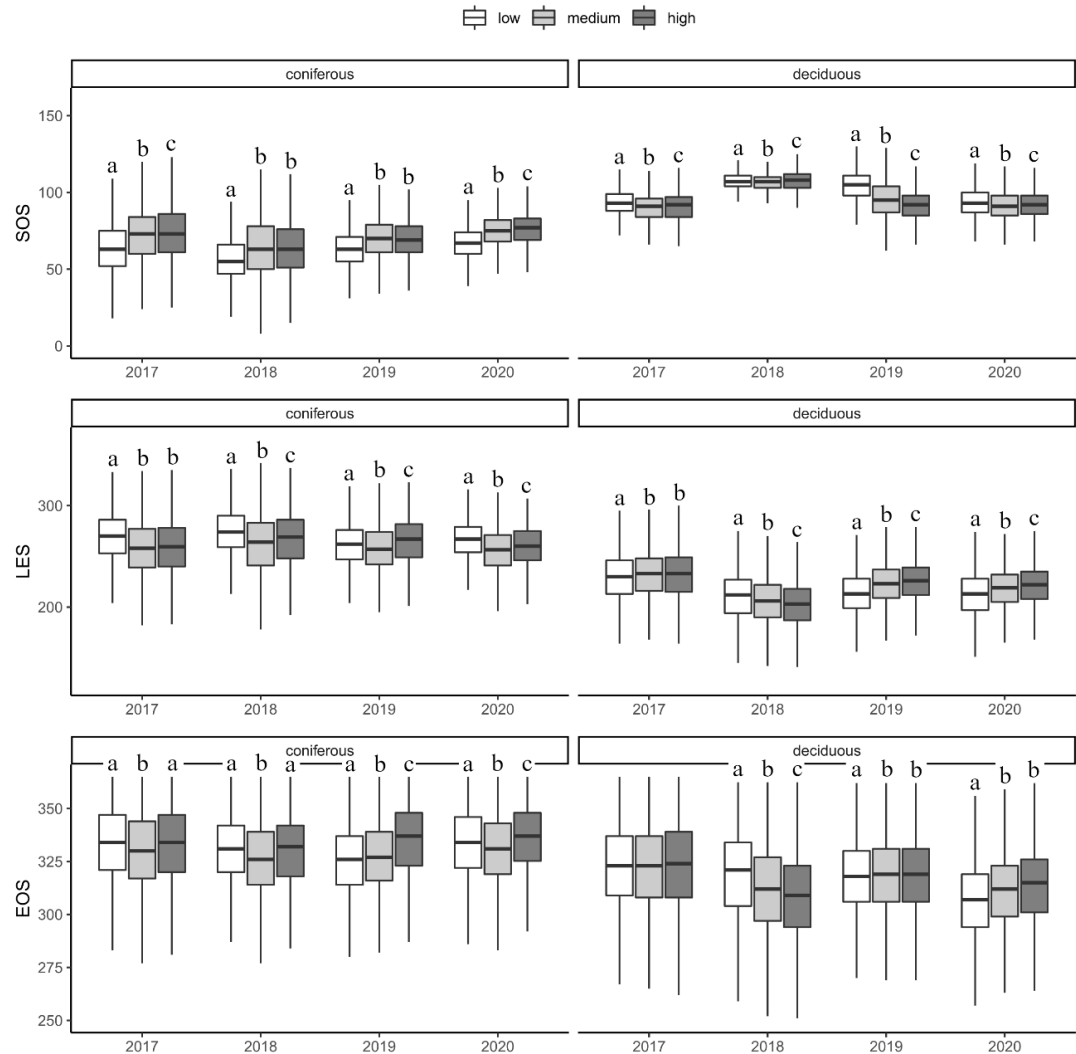
RELATIONSHIP PHENOLOGY - URBANISATION

Coniferous trees:

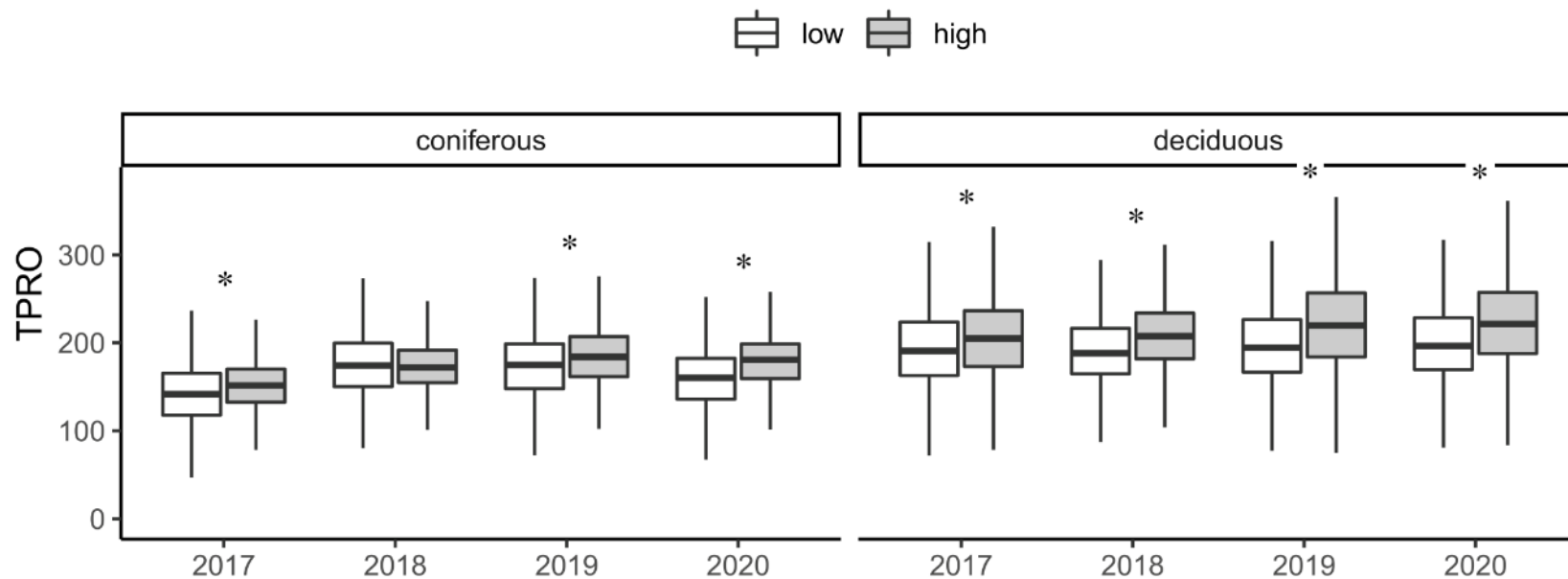
- Delay in the SOS with urbanization (5.77-9.16 days)

Deciduous trees:

- Advancement of the SOS with urbanization (0.79-11.79 days)
- Increase of LES with urbanisation (2.10-11.18 days)



RELATIONSHIP PRODUCTIVITY - URBANISATION



RESEARCH HIGHLIGHTS

- The urban heat island in Madrid was mostly apparent during spring and the night-time
- The average spring temperature (LST) of the urban core was 2.71°C warmer than surroundings
- Phenological response to urbanisation is dependent on the functional vegetation types
- Start of season of deciduous broadleaf trees was strongly advanced with urbanisation
- Interannual variations of the phenological response depend on differences in LST