



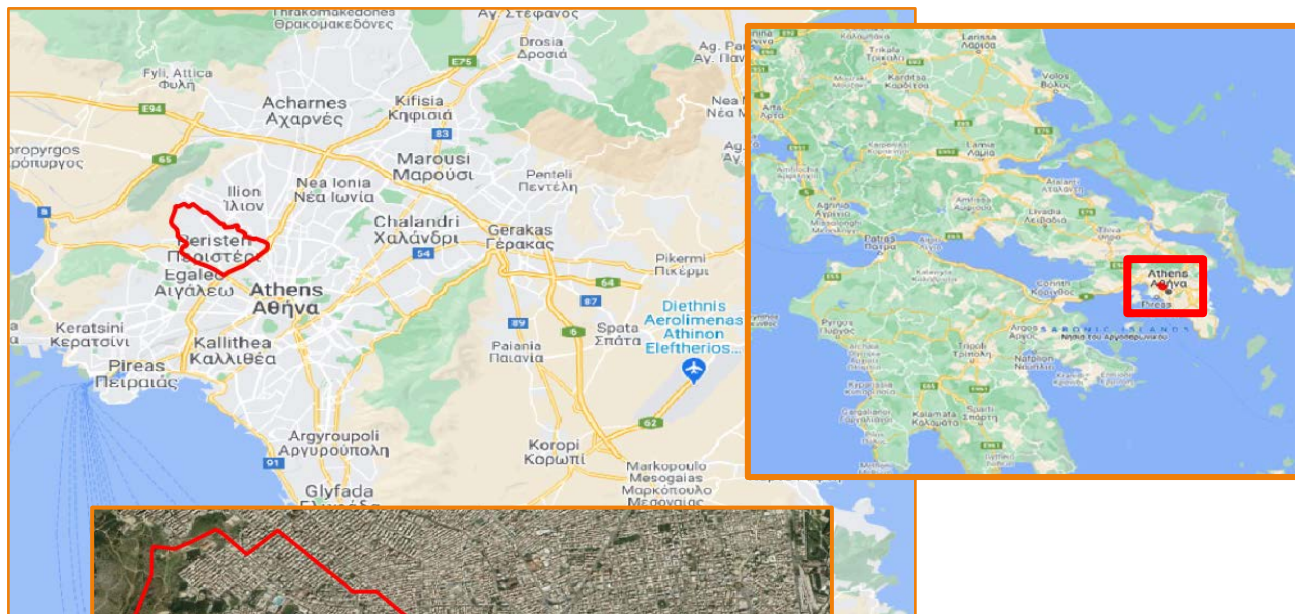
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# Mapping of the Urban Heat Island (UHI) effect in the Municipality of Peristeri, Greece

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# Municipality of Peristeri, Greece

- Suburban municipality in the western part of the Attika Region, Greece
- Very densely populated urban area with a densely build environment (14,000 inhabitants / km<sup>2</sup>),
- Only  $\approx$  4.5% of the city area is covered by green spaces and municipal recreation areas (squares, playgrounds)



# Mapping of the UHI effect in Peristeri – Station Network

We aim to provide information about the UHI effect in the Athens' Municipality of Peristeri, by analysing data from a number of meteorological stations installed in different locations. We investigate relative changes in surface temperatures and perceived thermal discomfort (HUMIDEX), thus identifying hot and cool spots at the local scale.



UHI effects were observed in four months. A total of 28 days exceeded the threshold of 34°C consecutively.

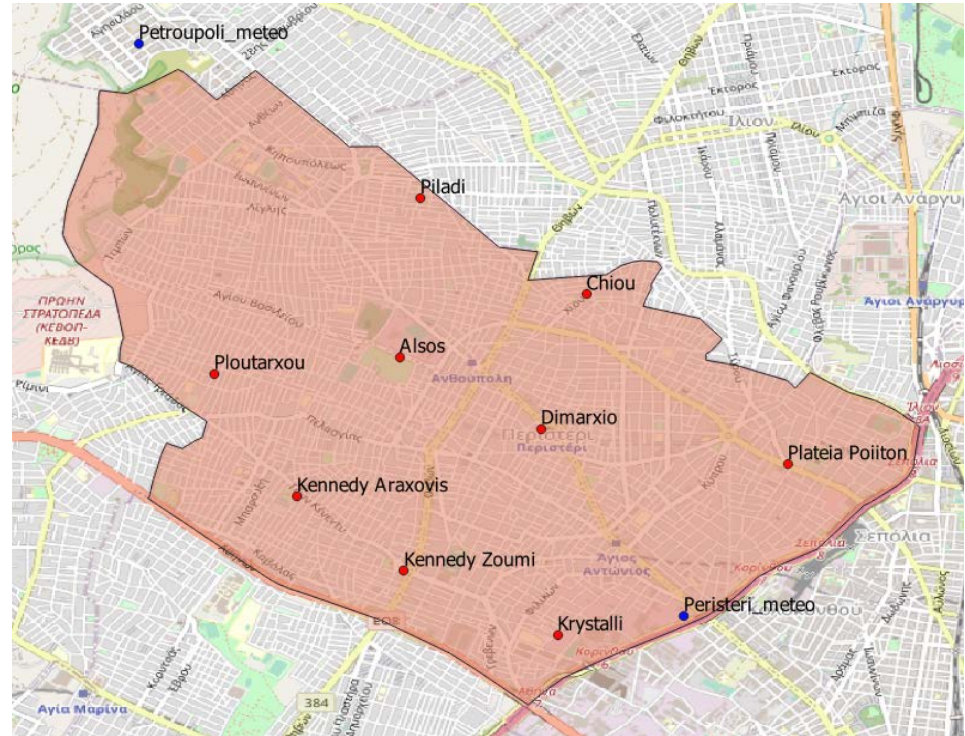
Heat event	Date (2020)	Daily average Tmax (°C)
H1	16-May	36.7
	17-May	37.6
	18-May	34.6
H2	29-Jun	34.8
	30-Jun	35.6
	01-Jul	36.6
	02-Jul	36.2
	03-Jul	35.8
	04-Jul	35.7
	05-Jul	34.2
H3	28-Jul	34.5
	29-Jul	35.8
	30-Jul	36.8
	31-Jul	38.3
	01-Aug	38.5
	02-Aug	34.3
H4	28-Aug	34.8
	29-Aug	35.6
	30-Aug	34.1
	31-Aug	37.7
	01-Sep	35.3
	02-Sep	34.9
	03-Sep	34.1



# Mapping of the UHI effect in Peristeri – Station Network

The UHI magnitude was calculated during the four heat events (H1-H4) at all stations.

As the four heat events are evenly spread throughout the summer period, and the stations have a good spatial coverage, the analysis provides a good representation of the UHI effect by identifying hot and cool spots.

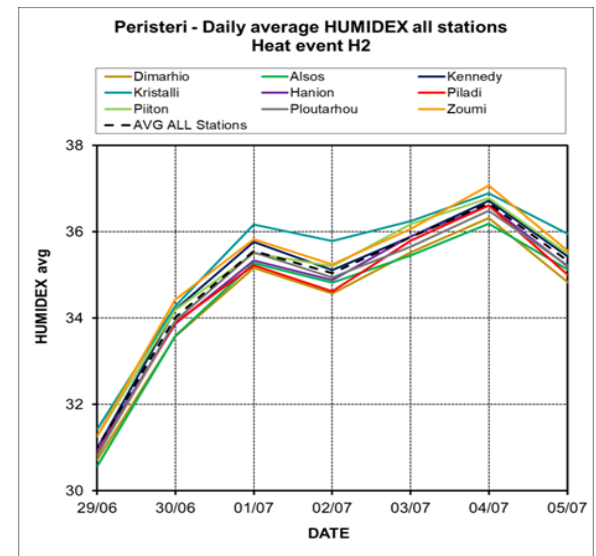
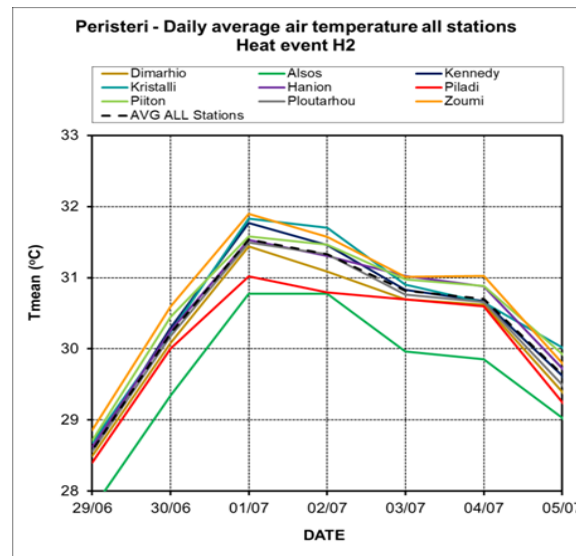


Map of Peristeri Municipality showing the locations of the nine stations used in the UHI mapping as well as the two stations of Meteo network, NOA

# Mapping of the UHI effect in Peristeri – Results

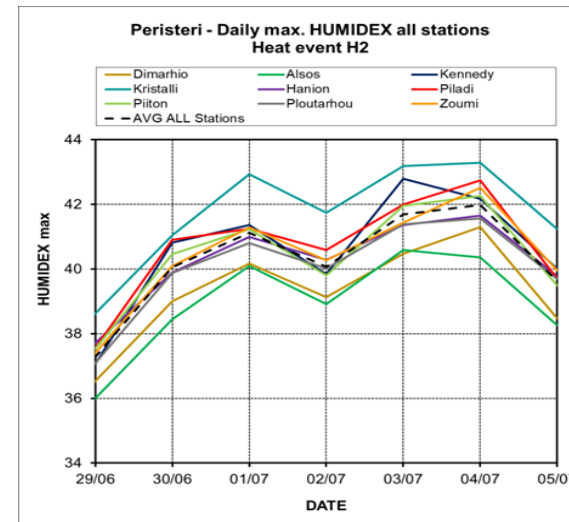
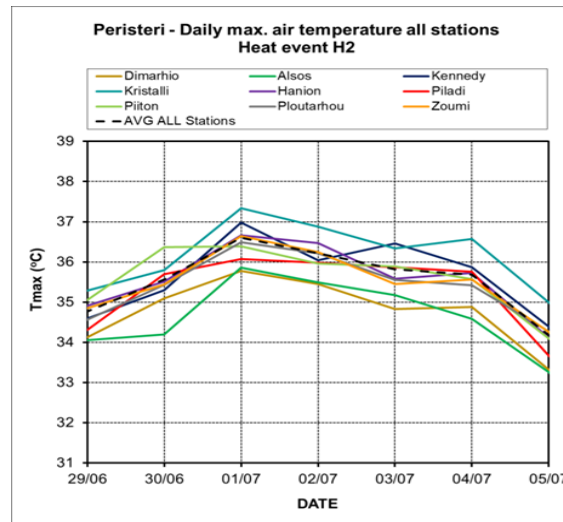
- Taking H2 as an example, Station 2 (Alsos) exhibits significantly lower daily average temperatures (-1°C approx.) compared to the average. This is attributed to the station's location inside a park, where the combination of vegetation and better air circulation lowers the ambient temperature.
- With regards to the daily average HUMIDEX, a similar trend is observed, although the spread of values is narrower thus, demonstrating a low degree of variation between stations.

Heat Event	Day (2020)	Avg Daily Tmax (°C)
H2	29-Jun	<b>34.8</b>
	30-Jun	<b>35.6</b>
	01-Jul	<b>36.6</b>
	02-Jul	<b>36.2</b>
	03-Jul	<b>35.8</b>
	04-Jul	<b>35.7</b>
	05-Jul	<b>34.2</b>



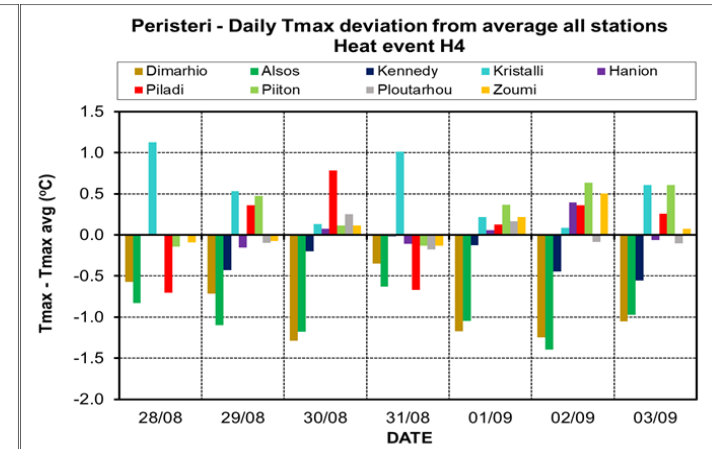
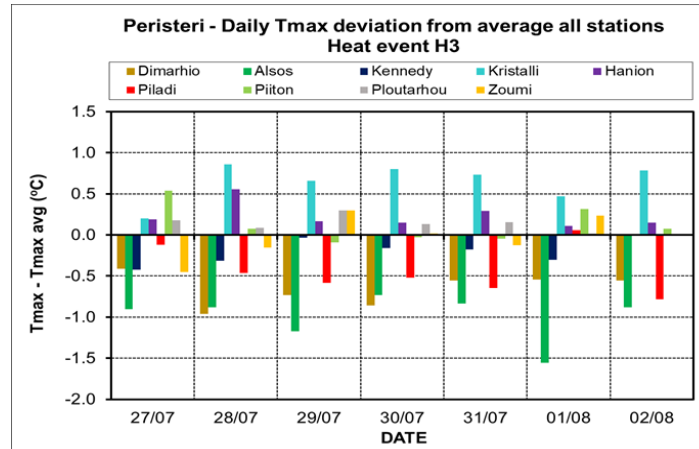
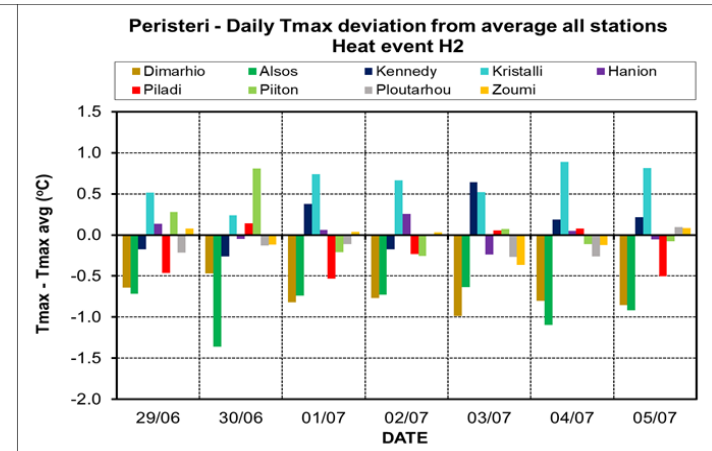
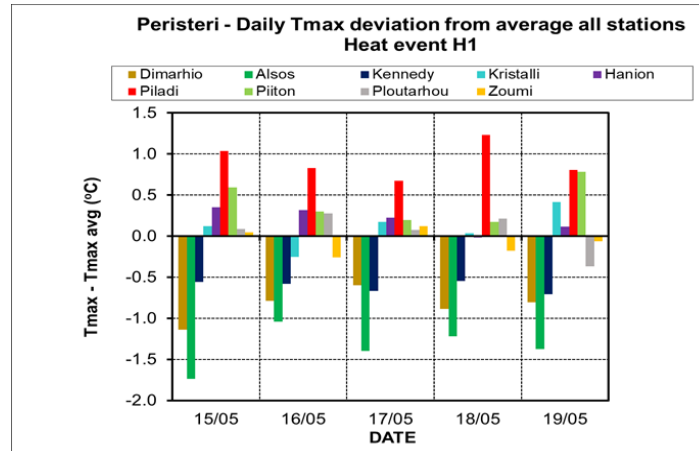
# Mapping of the UHI effect in Peristeri – Results

- Tmax shows a higher degree of variation between stations. Tmax in Stations 2 (Alsos) and 1 (Dimarhio), is lower than average. The highest Tmax values are recorded in Station 4 (Kristalli), about 0.5°C higher than average.
- Daily maximum HUMIDEX, indicates clear differences between certain locations of the perceived heat stress during the hottest hours of the day. HUMIDEX max at Stations 1 (Dimarhio) and 2 (Alsos) is lower (<1-1.5) than the average of all stations, while on the other end, perceived heat stress is higher at Station 4 (Kristalli).



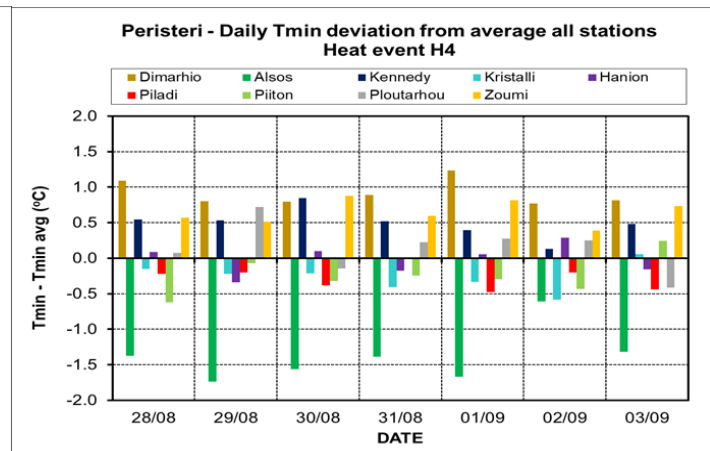
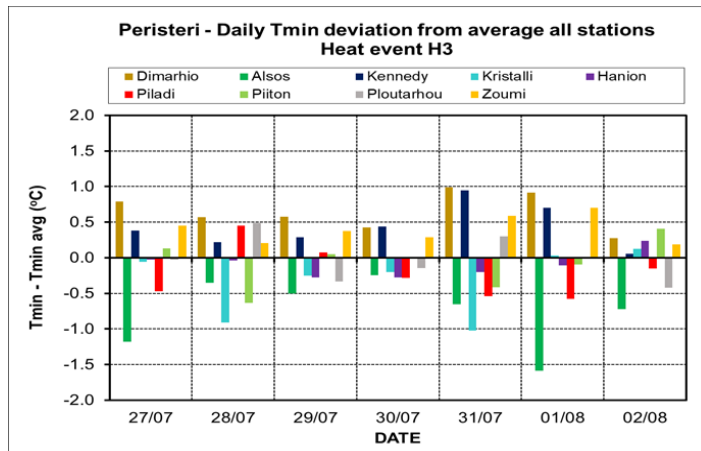
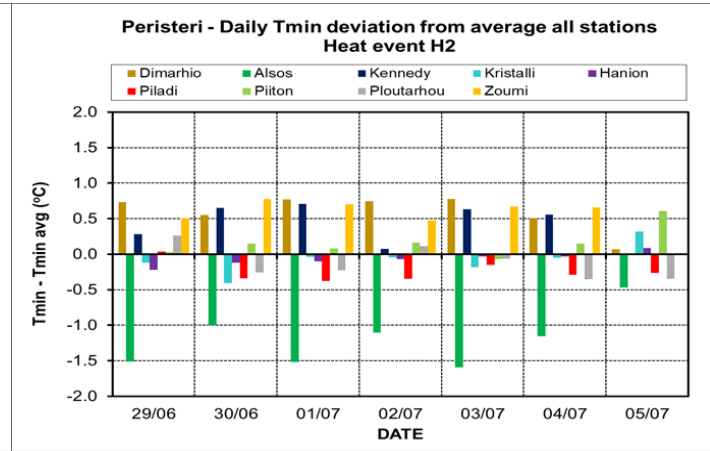
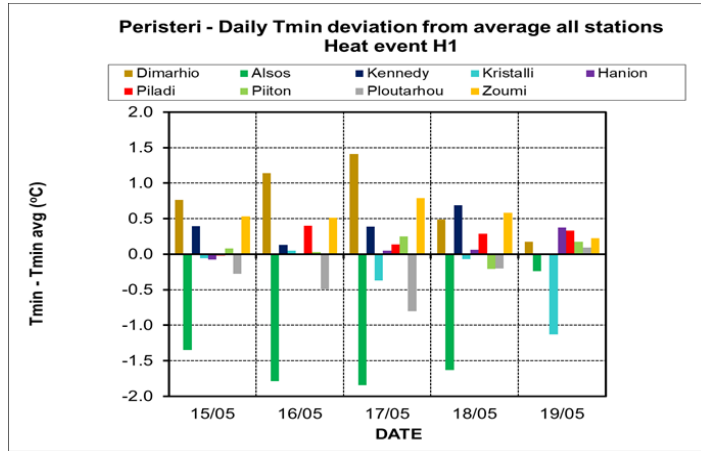
# Mapping of the UHI effect in Peristeri – Results

- During the hottest part of the day Stations 1 (Dimarhio) and 2 (Alsos) present characteristics of a “cool spot” having significantly lower Tmax and HUMIDEX max than average.
- Station 4 (Krystalli) can be described as a local “hot spot” having consistently higher Tmax and HUMIDEX max than average.
- “Mixed” signals are observed at other stations.



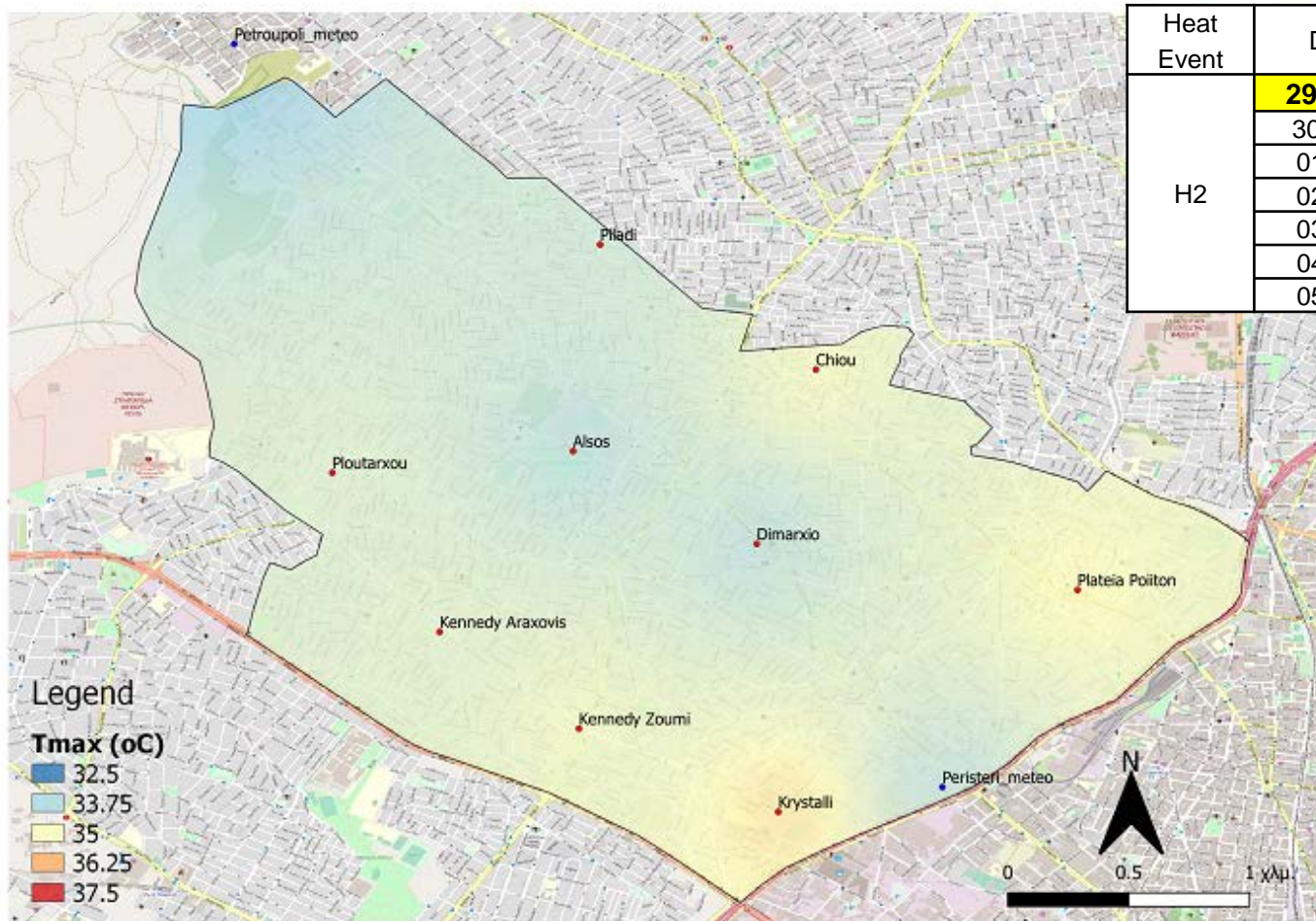
# Mapping of the UHI effect in Peristeri – Results

- Heat stress characteristics are different at some stations during nighttime. Station 2 (Alsos) still behaves as a “cool spot”, but the same is not true for Station 1 (Dimarhio), where Tmin is consistently higher. This station is located in an open built area, which during nighttime emits radiative heat that has been absorbed by building materials during the day.
- The same pattern is observed at Stations 3 (Kennedy) and 9 (Zoumi), both having higher Tmin than average. Station 4 (Kristalli) on the contrary changes from being a “hot spot” during the day, to a “cool spot” during nighttime, although not on the same magnitude.



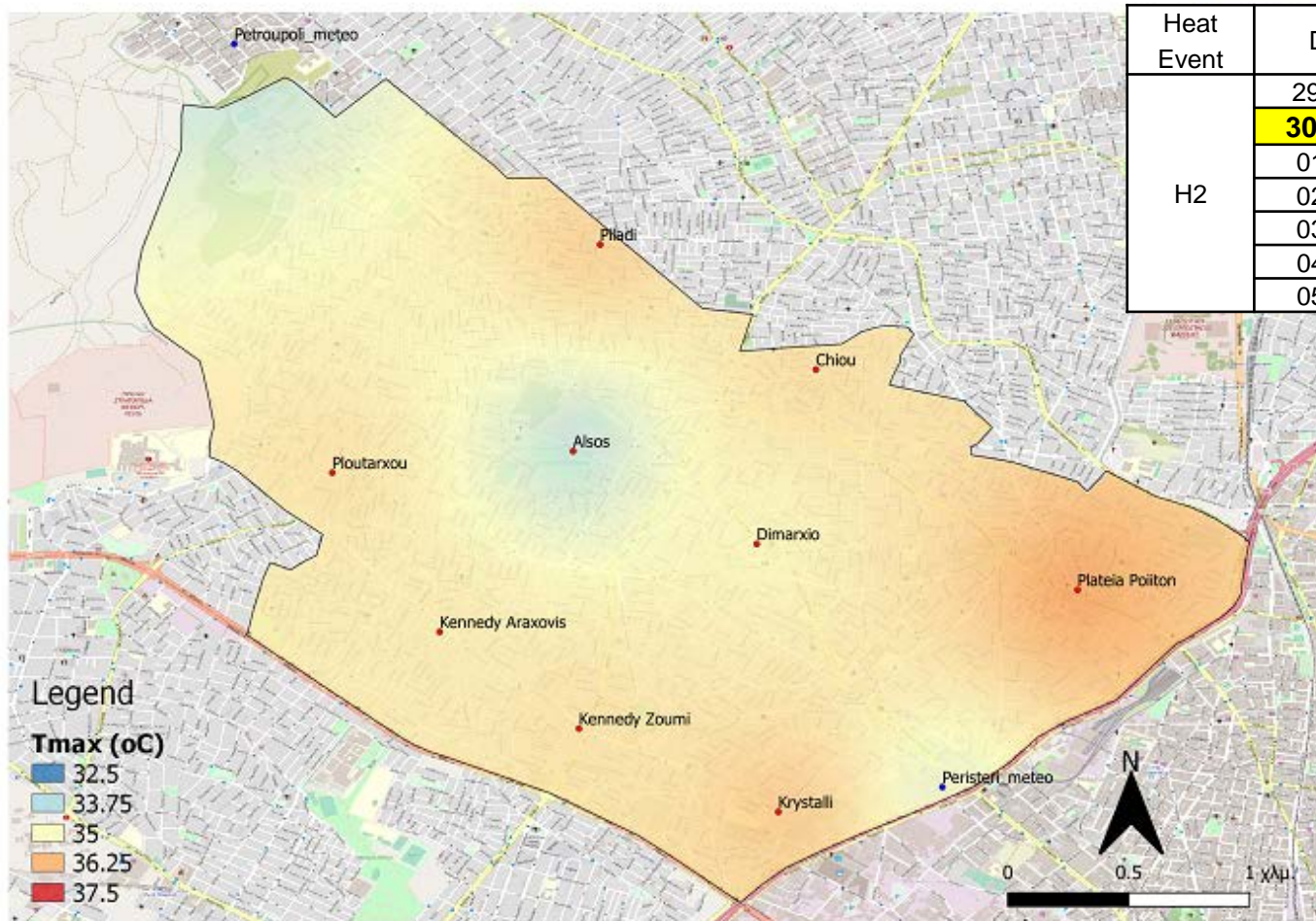


# Mapping of the UHI effect in Peristeri – Results (H2)



Heat Event	Day	Avg Daily Tmax (°C)
H2	<b>29-Jun</b>	<b>34.8</b>
	30-Jun	35.6
	01-Jul	36.6
	02-Jul	36.2
	03-Jul	35.8
	04-Jul	35.7
	05-Jul	34.2

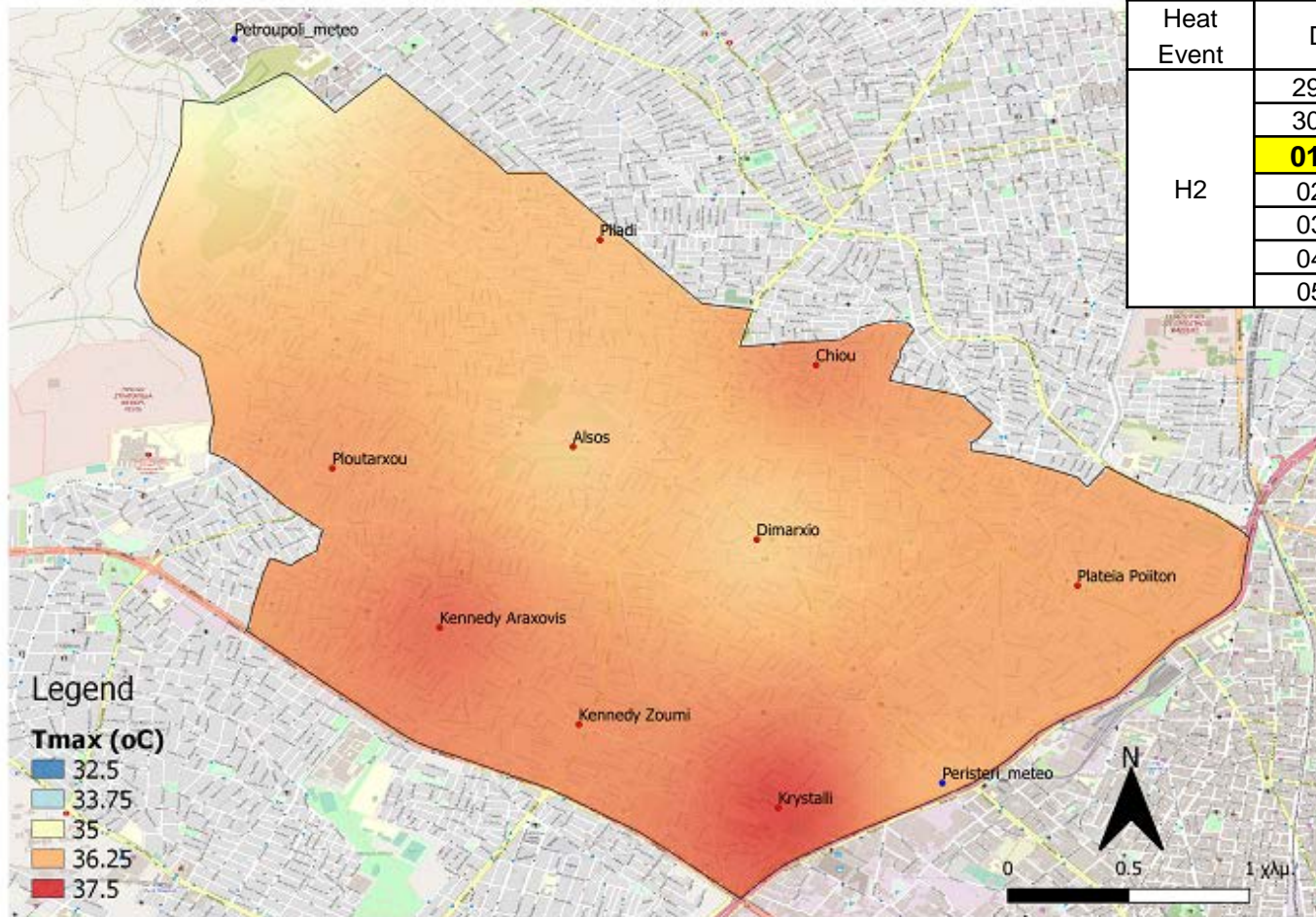
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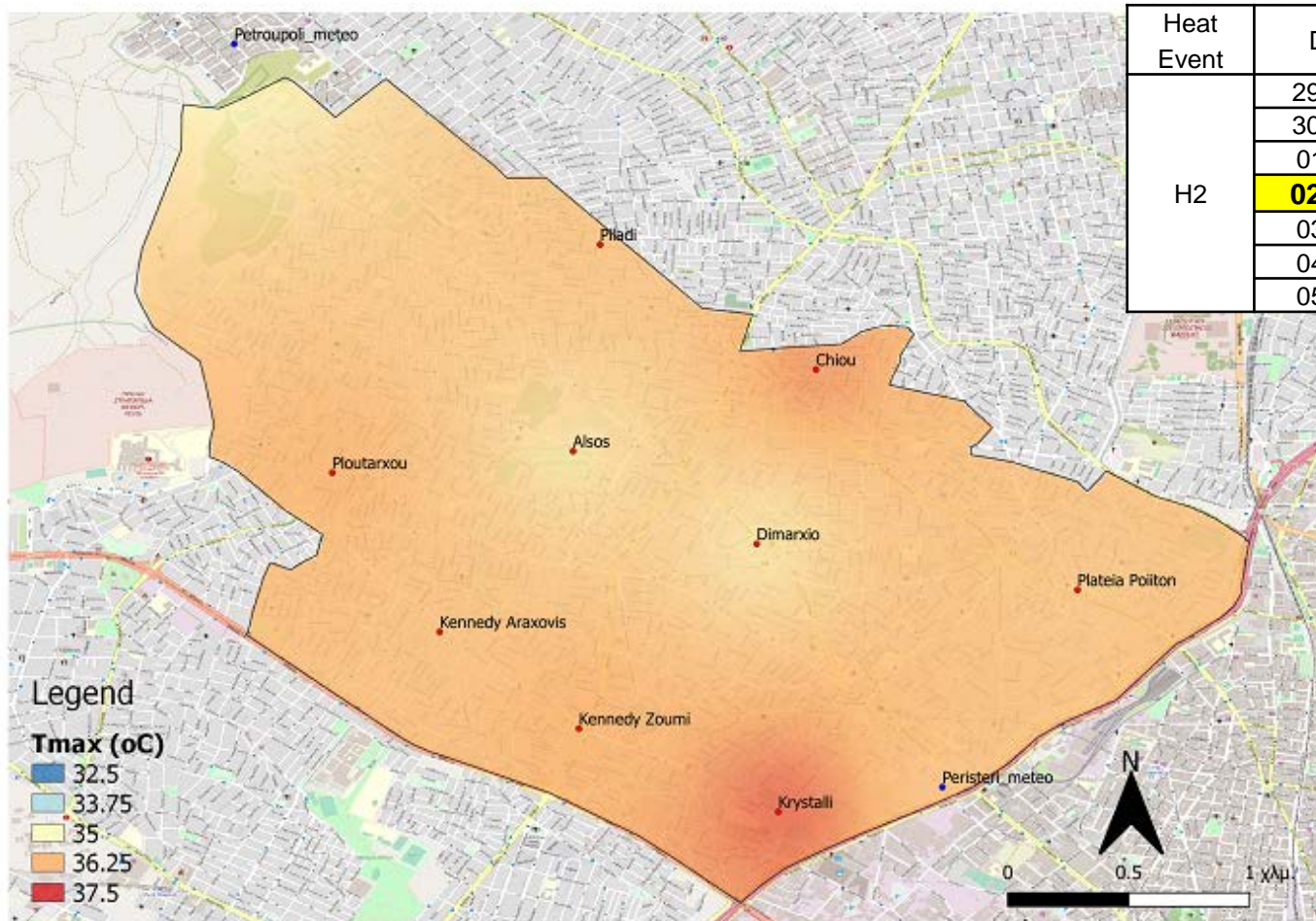
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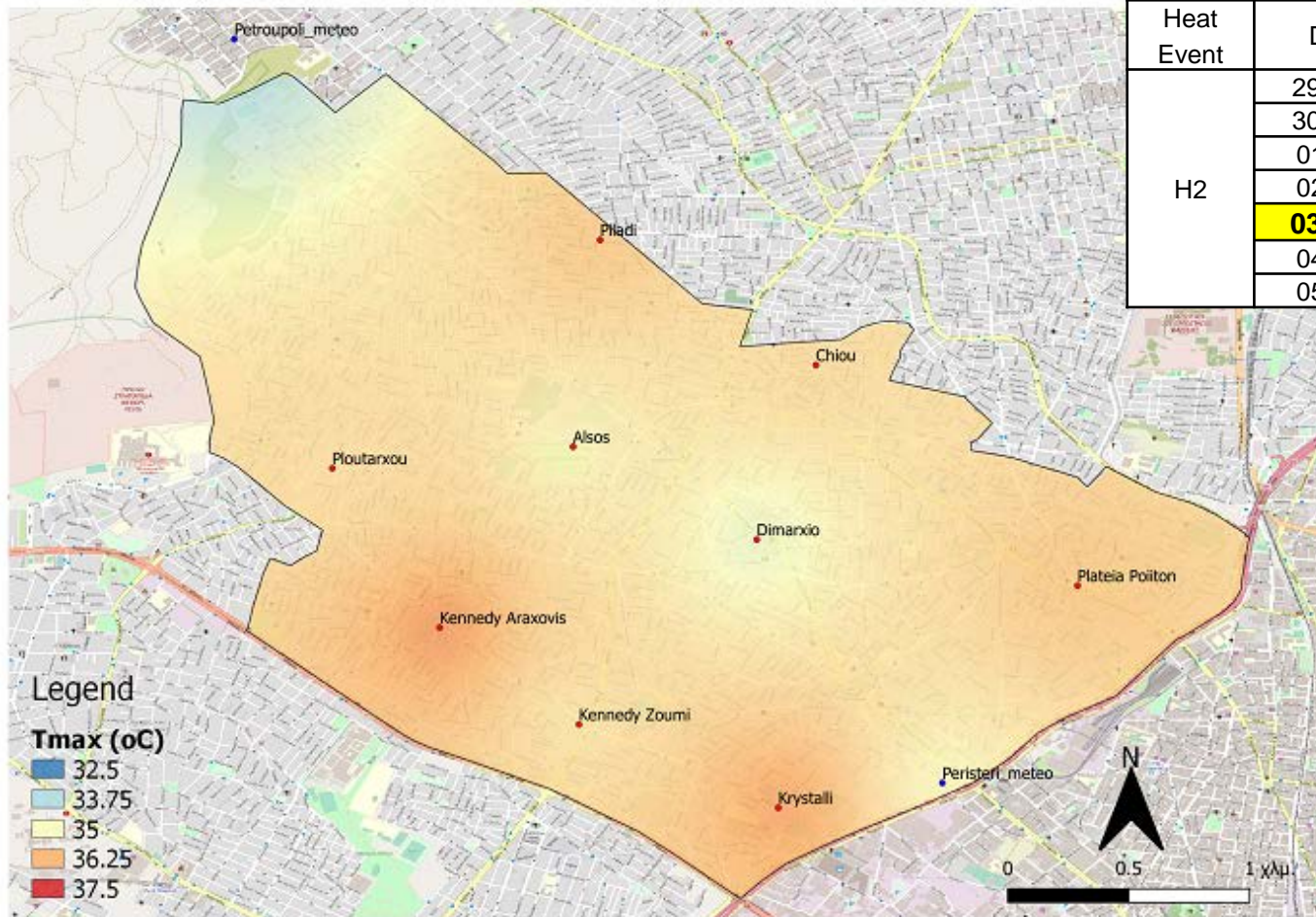


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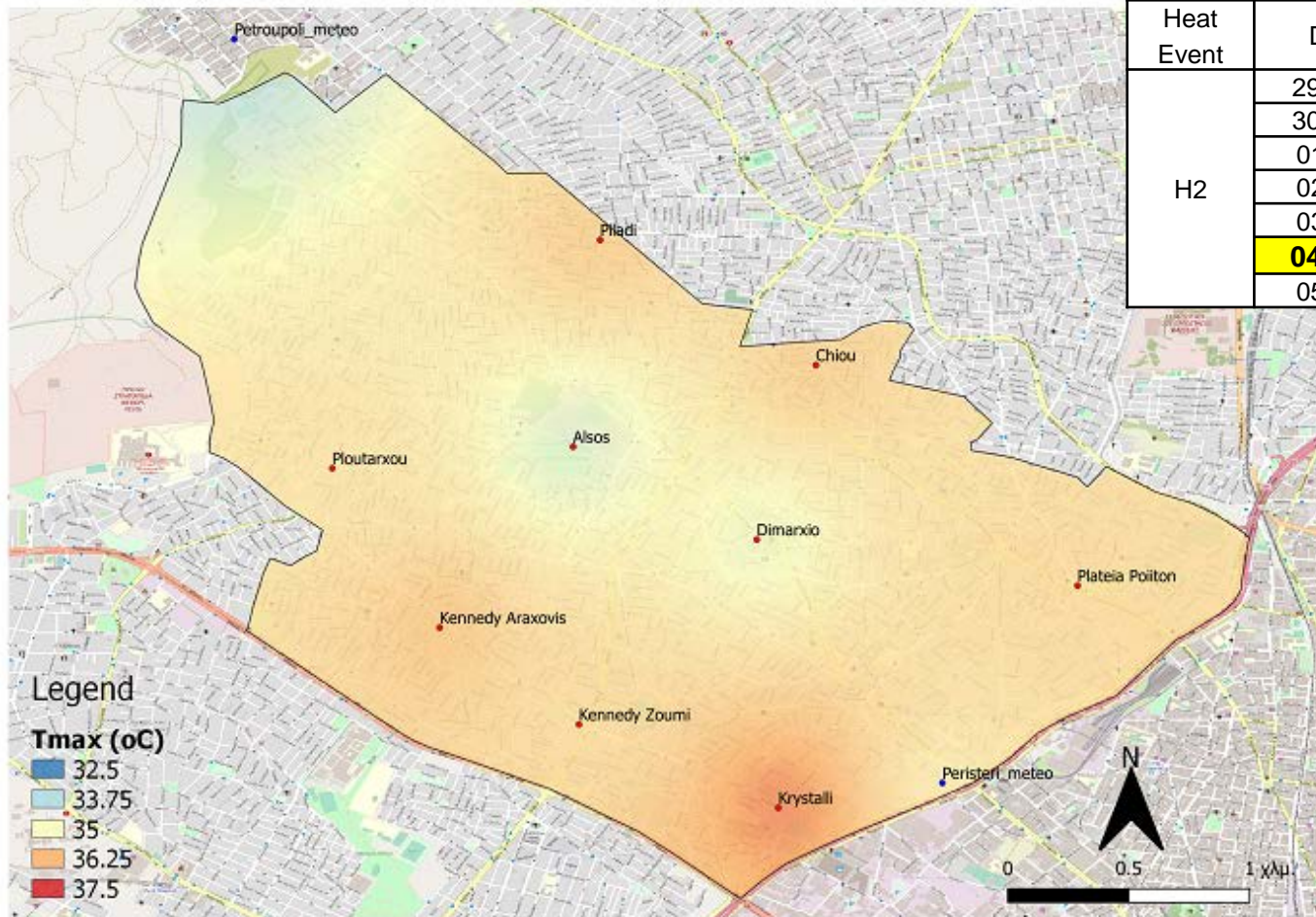




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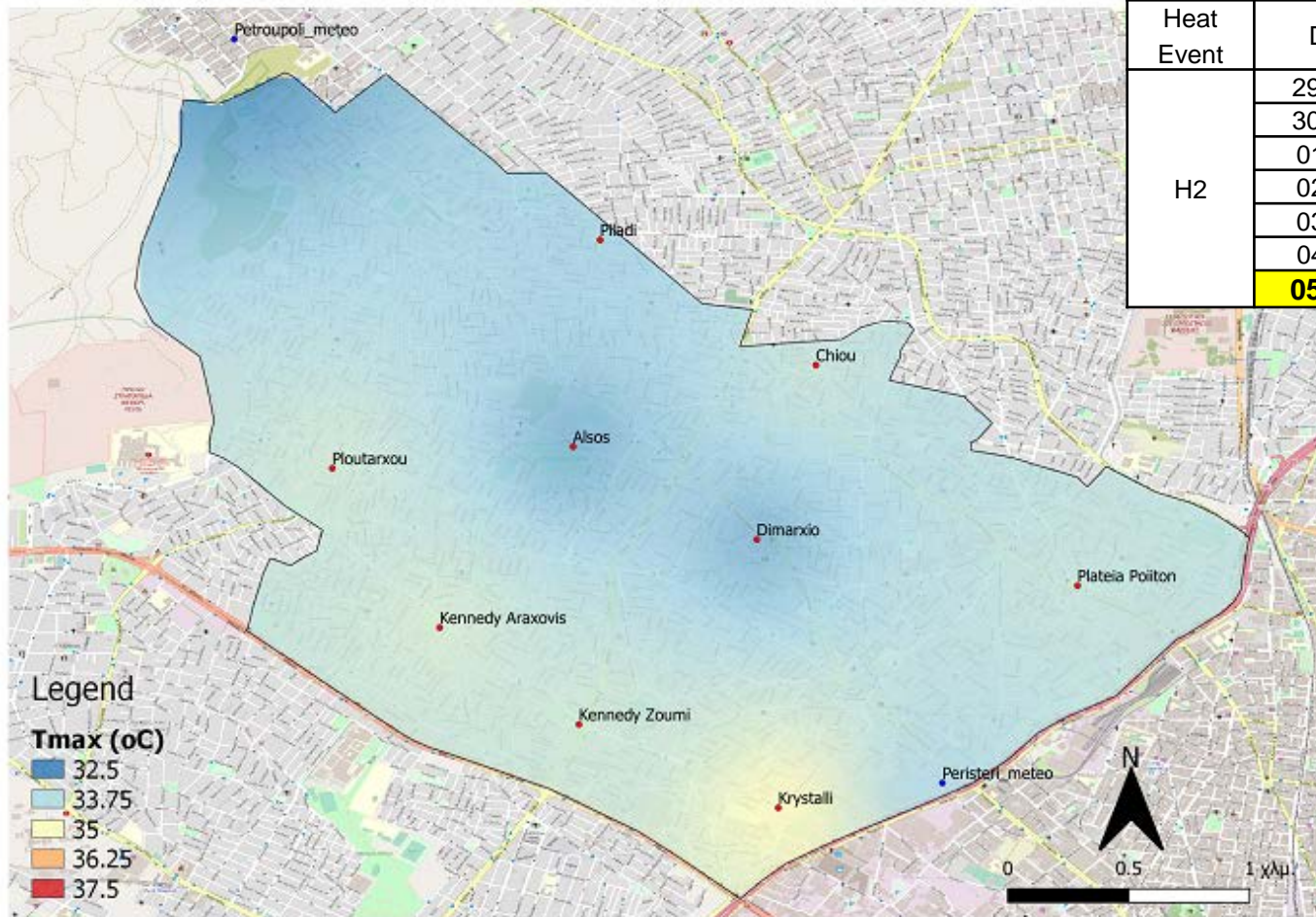


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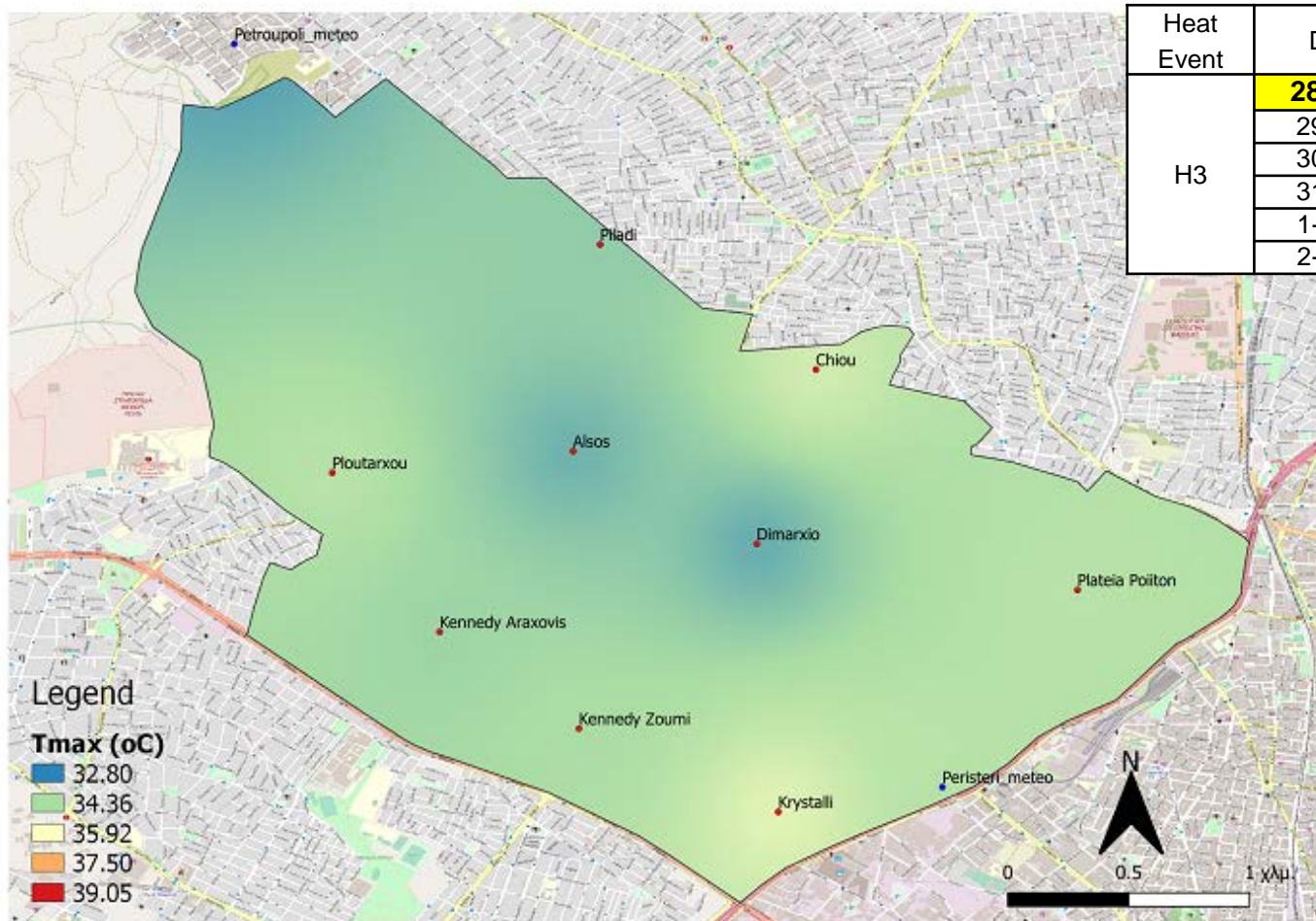




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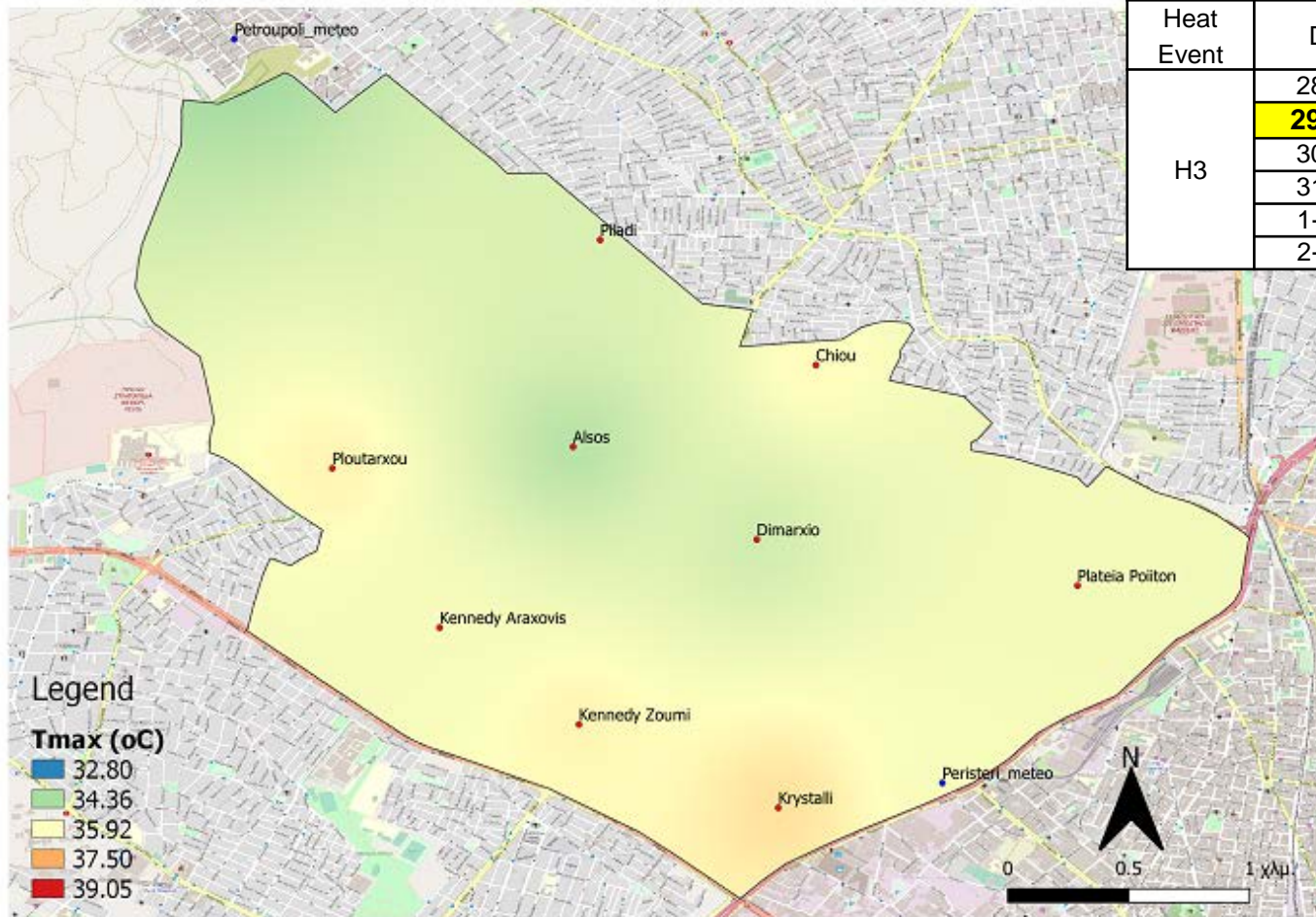


# Mapping of the UHI effect in Peristeri – Results (H3)

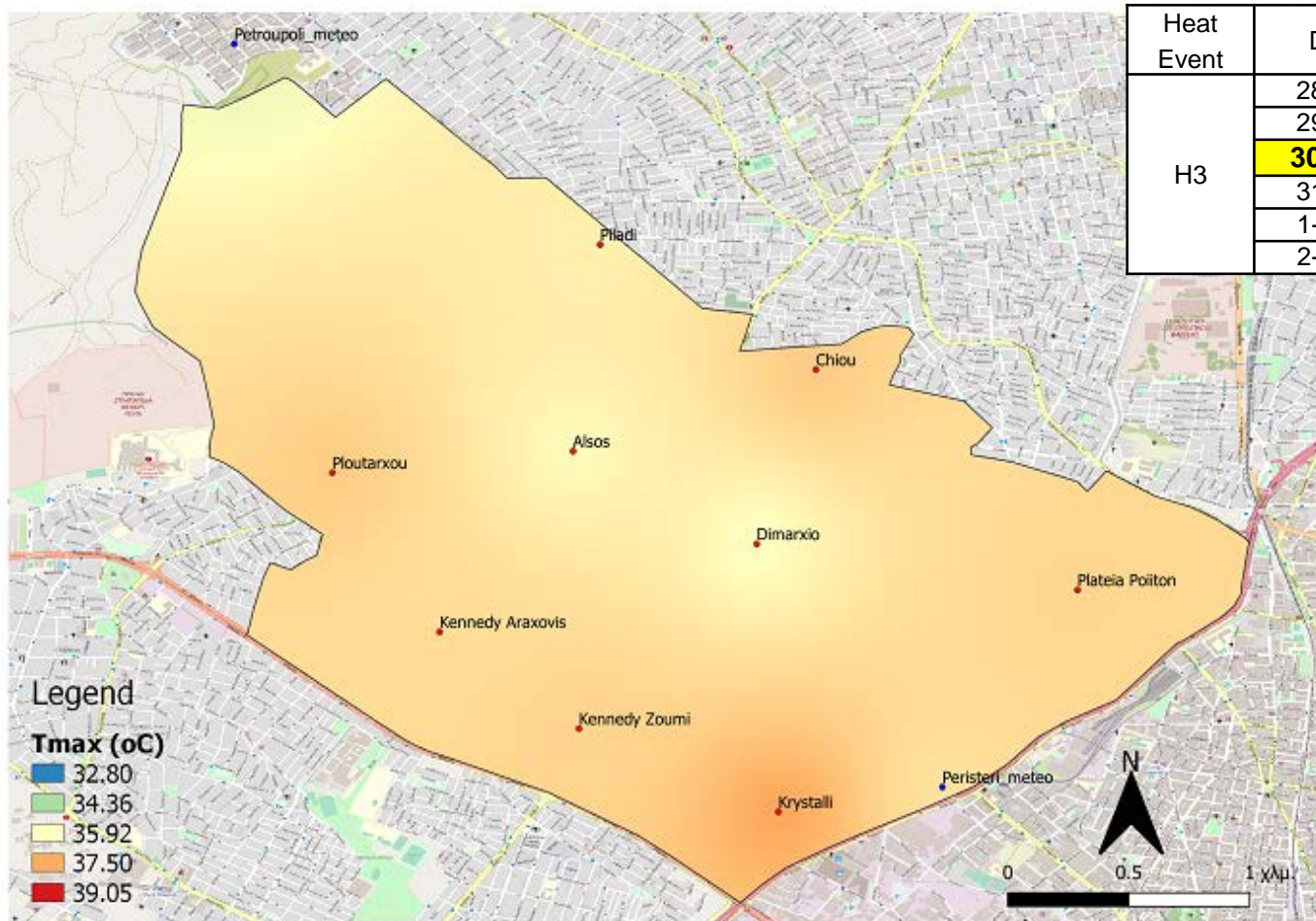




# Mapping of the UHI effect in Peristeri – Results (H3)

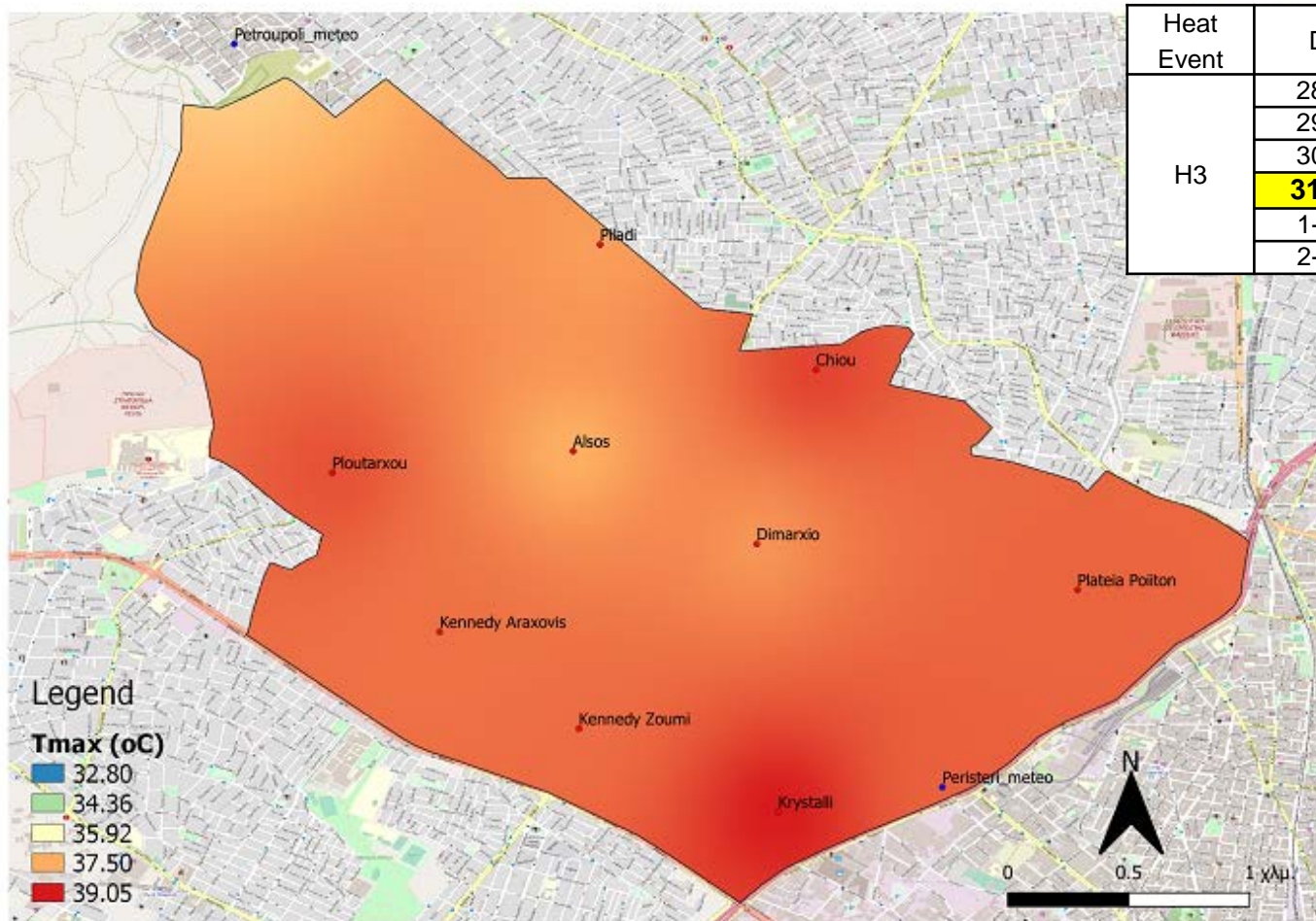


# Mapping of the UHI effect in Peristeri – Results (H3)

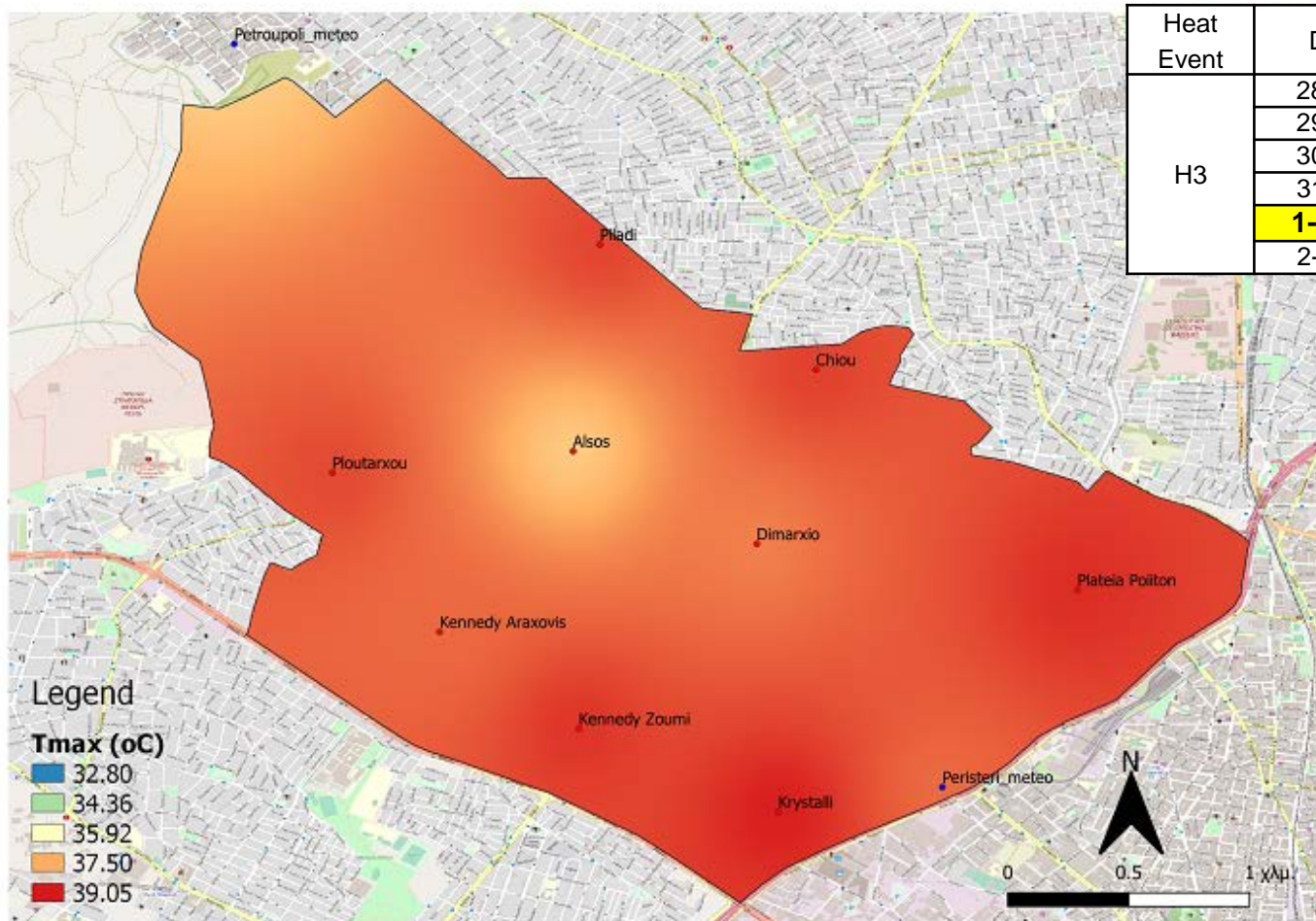




# Mapping of the UHI effect in Peristeri – Results (H3)

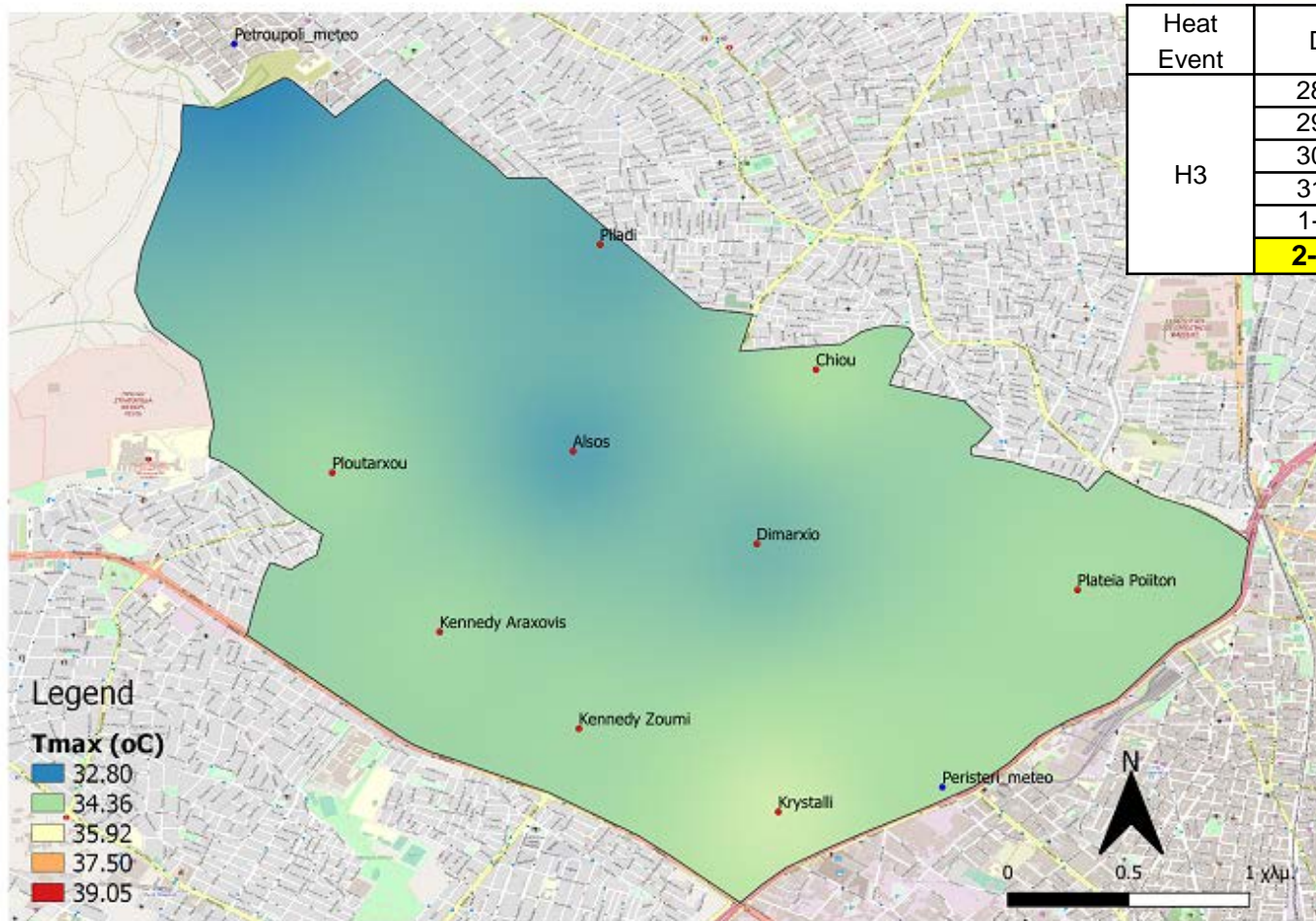


# Mapping of the UHI effect in Peristeri – Results (H3)





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*Thank you for your  
attention!*

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