

# **Comparison of wintertime and summertime Urban Boundary Layer structure over Toulouse city during the CAPITOUL experiment**

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The experimental campaign CAPITOUL took place in Toulouse over a year (March 2004- March 2005) and was composed of 14 Intensive Observation Periods (IOP). This study is concentrated on the differences of the thermal and dynamical properties of the Boundary Layer during the IOP5 (3rd and 4th July of 2004) and the IOP14 (24th and 25th February of 2005).

During the IOP5, the synoptic situation allowed the development of an anticyclone in the south of the country, with the absence of cloud coverage and a maximum temperature of 33°C in the city center. It corresponds to an extremely dry summer period.

From the analysis of the experimental data, an urban plume was identified on the 3rd July, which was advected by the northwesterly mean flow that was present on that day. The wind was weaker during the night between the 3rd and the 4th of July. This allowed the development of a heat island (UHI) with intensity of 5°C.

During the 4th of July the surface wind was from the SE, creating a region of a weak flow in the transition between the southeasterly flow near the surface to the northwesterly flow at high levels, leading to the development of a deep Urban Boundary Layer (2200m high over the town and 2100m over the countryside). The creation of a positive temperature anomaly centered on the town, and the identification of periods of convergence in the surface layer in late afternoon, suggested that the conditions were appropriate for the development of an Urban Breeze.

To support this hypothesis analyses of high resolution numerical simulations over the city of Toulouse confirm the existence of the urban breeze. The numerical model used is Méso-NH (Lafore et al., 1998) coupled with the urban surface model TEB (Town Energy Balance, V. Masson 2000).

The POI14 correspond a cyclonic winter period with a cloud-less sky and a minimum temperature of -5°C. The differences in the heat island formation and boundary layer development properties will be analysed for the two IOP's.