

## **Quantifying the importance of vegetation in the sensible heat and water vapour fluxes from a mixed district based on footprint**

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As the global climate change and other environmental problems attract more and more attention, scientists and decision - making departments need to understand the balance of water and heat in much larger areas, such as regional and global.

This project is a part of a research program on the role of vegetation in the sustainable urban development; the objective of this thesis is to quantify the importance of vegetation in the sensible heat and water vapour fluxes from a mixed district. To better understand the heat fluxes in an heterogeneous urban area, an experimental campaigns with meteorological measurements was carried out in 2012 on a district of Nantes. The turbulent heat fluxes vary spatially and a relationship between the variability of these fluxes with weather conditions and land occupation is investigated. For this, a geographic data base (BDFluxSAPgéo2) was established on an area of 6.5 km x 6 km located northeast of Nantes. The device of the IRSTV permanent observatory (ONEVU) and experimental facilities set in place during the FluxSAP campaign conducted in June 2012 are located in this area. Modes of soil cover have been obtained from several urban databases and documented by using geographic platform OrbisGIS developed by GIS workshop of the IRSTV. This creates the possibility by evaluating the origin of the fluxes, of separating the contributions of the various land cover modes. The area surrounding this site is really heterogeneous. The turbulent fluxes result not only of surfaces beneath the sensor but also of zones of influence (source area), which are more or less extended depending on wind and the height of the sensor. So, by implementing footprint models, relations between the measurement height and the extent of the representative urban zone has been established and implementing networks of sensors to measure these fluxes and assessing their origin, in order to separate the contributions of different types of land use.