INTRODUCTION.
In the context of global climate change the term urban heat island (UHI) is a phenomenon that has been observed in recent years (Oke 1982). UHI have a negative influence on the water cycle and on human health. Within the same city important differences in temperature can be observed. These differences depend to a high degree on the type of ground surface (e.g. impermeable and permeable surfaces, waterbodies, parks, etc.) (Kustas 2000).

The goals of the project THER-SOL were to 1. Categorize significant types of urban ground surfaces, 2. Quantify the impact of the identified surface types on urban microclimate, 3. Identify strategies to decrease the appearance of UHI through the identification of potential surfaces where the type of surface can be changed.

STUDY SETTING.
The sectors Mail-Jonction and Acacias in the city of Geneva had been chosen. Within the limits of these sectors different types of impermeable and permeable surfaces can be found. Compared to other Swiss cities the city of Geneva is rather flat and less subjected to the influence of the relief, which may allow for an extrapolation of the results to other cities. Furthermore a rich collection of geographical data layers (e.g. surface types, solar radiation, etc.) is publicly available (SGOI 2016).

In the middle of the two sectors, within the uncovered Plainpalais-area, three very different surface types were identified. On these three sites experimental stations were set-up to measure different energy fluxes between the atmosphere and the surface (see Figure 1). Thermocouples and thermometers were placed at 8 cm depth to evaluate heat flux in the soil and at 3 m height to evaluate sensible heat flux and net radiation. Data was collected during ten consecutive days in summer 2015.

RESULTS.
Significant differences were identified between the three surfaces. Sensible heat was slightly higher for the gravel-surface than for the lawn. The heat flux in the soil was more reactive on the gravel that warms up and cools down faster. Net radiation is significantly higher on the lawn, where more energy is transformed even if the gravel is darker than the lawn. This evidence suggests that permeable surfaces help decreasing heat in urban areas. Additional measures made with a backpack equipped with thermometers enabled us to quantify the thermal comfort experienced by citizens and to highlight that the areas covered by vegetation indeed are important in the context of UHI. Based on the available land-use layers we identified current permeable surfaces. We calculated that only 4% of the total surface are currently covered by vegetation (see Figure 2; 1st map). By transforming existing surfaces, such as roads, car parks, crossroads, pavements and tram tracks, an estimated 9-10% of the total surface of the study area could be made permeable. (see Figure 2; 2nd map).
CONCLUSIONS AND PERSPECTIVES.
This project demonstrated the significance of permeable surfaces regarding UHI. The Plainpalais area is an interesting area since very different surface types can be found here. According to our results, the ideal surface has a high soil retention capacity (storage). The cooling potential of a surface is mainly linked to its evaporation potential. It would be interesting to consider the influence of trees on UHI as well. Another possibility is to analyze the orientation and the shape of urban canyons in order to refine the results. Finally as this project focused on lawn, gravel and asphalt, it would be interesting to include other ground surface types as well.

REFERENCES
SGOI (Service de géomatique et de l’organisation de l’information). 2016: Le territoire genevois à la carte (SITG), http://ge.ch/sitg/.