

# Cooling artificial turf through evaporation from a subsurface water storage unit

Marjolein van Huijgevoort & Gijsbert Cirkel KWR Water Research Institute

Increased pressure on available sport facilities means a transition to more fields with artificial turf. Downsides of these artificial turf fields are the increase in surface temperature and the decrease in infiltration of precipitation resulting in faster discharge. Artificial turf can reach very high surface temperatures leading to unplayable fields and health risks, but also contributing to the urban heat island effect. In this study, a system to store precipitation below the fields and to enable evaporation to cool the artificial turf was tested. The system consists of water-storing units below the field, a capillary shockpad that enables water transport to the artificial turf and a natural infill from where water can evaporate.



Figure 1 Test sites in Amsterdam, The Netherlands



Figure 2 System to store precipitation in subsurface storage units and enable evaporation

## Test sites

- Natural grass
  - Conventional artificial turf
  - Cooled artificial turf (standard)
  - Cooled artificial turf (non-infill)
- All sites were equipped to measure evaporation, surface temperature, net radiation and water levels below the fields.

## Results

On days with a maximum air temperature around 30°C:

- Surface temperature at the cooled standard artificial turf was around 25°C lower than at the conventional artificial turf
- Surface temperature for cooled standard turf was less than 2°C warmer than at the natural grass site

Evaporation from the cooled artificial turf reached maximum values around 4 mm/d during the summer and was about half of the evaporation from natural grass.

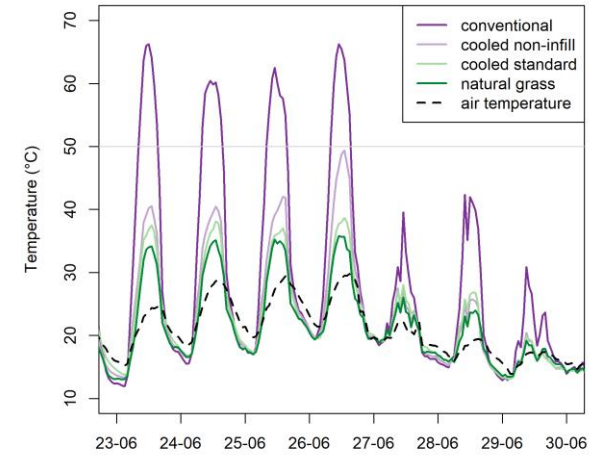


Figure 3 Surface temperature at the test sites

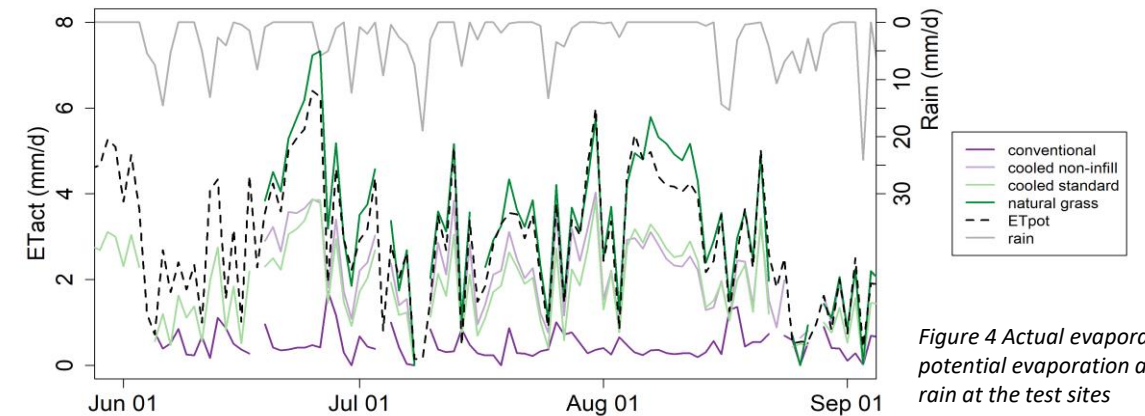


Figure 4 Actual evaporation, potential evaporation and rain at the test sites

The system is successful in lowering the surface temperature by evaporation. This reduction in surface temperature is important to maintain playable conditions. In addition, the water storage below the fields reduces peak discharges during high-intensity precipitation. By combining these functions, these fields can help cities to adapt to climate change.