Climate Adaptation Tools for Participatory Decision-Making

- Climatescan.nl webtool
- Quickscan Heat Map
- Design Example
- International Exchange
Website Development
climatescan.nl
Website Development

climatescan.nl
Website Development

climatescan.nl

WOLK Flood Map (TAUW)
Amar Tursic
Administrator

Profile

User ID 2

Account Created at 2016-05-15 02:51:30

Name
Amar Tursic

Email
Tursicamar@gmail.com

User Role
Admin

☐ I want to change my password

Save

Click here if you want to delete your account
**Constructed wetland (Helofytenfilter): Oude Diep, Hoogeveen**

This constructed wetland has a surface of 7 ha.

**Description**

In het beeld is een oppervlakte van 7 ha beplant met riet, grootste helofytenveld in Nederland

**Downloads**

- [abstract constructed wetlands in The Netherlands (pdf)](#)
- [webtool presentation (pdf)](#)
- [STOWA rapportage zuivering regenwater helofytenvelden (pdf)](#)

**Measurements in Hoogeveen**
Quick-scan Heat Map of Groningen

Data used:
- Ground use (building, paved, unpaved)
- Digital Elevation map showing buildings, trees
- Satellite images - greenery
Groningen Heatwave July 2015

climatescan.nl link
Measuring Mean Radiant Temperature

\[ T_{mrt} = \left[ (T_g + 273.15)^4 + \frac{1.335 \times 10^8 V_a^{0.71}}{\varepsilon D^{0.4}} (T_g - T_a) \right]^{1/4} - 273.15 \]

(Thorsson et al., 2007)
Groningen Centre Heat Map

Grote Markt

Herenstraat

Martini Kerkhof

Climate Study Route
Mean Radiant Temperature °C/
Air Temperature °C
Mean Radiant Temperature ºC/
Air Temperature ºC

64.5/34.5
39.9/33.7
69.7/35.1
Suikerbuurt (Hoogkerk) Climate Resilience Study
Case Study Project Area
From City to Square

- Student research on designing public inner-city space for climate resilience: Case study: Grote Markt, Groningen
Spatial Analysis

Land Use

Underground Infrastructure
4. MOST ATRACTIVE ALTERNATIVE FOR GROTEMARKT (From 1 to 5)

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Score</th>
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<tbody>
<tr>
<td>No Change</td>
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<tr>
<td>Fountains</td>
<td>3.48</td>
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<tr>
<td>Water Square</td>
<td>3.18</td>
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<tr>
<td>Tree-lined Grass</td>
<td>3.86</td>
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<tr>
<td>Park</td>
<td>3.02</td>
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<tr>
<td>Green Walls</td>
<td>2.9</td>
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</table>
Climate Modelling using open source program Envimet

13 days per simulation!
Envimet Groningen Centre (pre-Forum)

Buildings, Green/Blue Infra

Surface material

3D representation
Preliminary Results

Surface Temperature

Wind Speed
Concept ‘Green’ Designs for Grote Markt
Analysis of Designs
Comparing land size:

Netherlands: 41,500 km², 16,800,000 ppl

Taiwan: 36,200 km², 23,300,000 ppl

Urbanisation in the west: Netherlands vs. Taiwan
International Knowledge Exchange: Groningen and Tainan

The integration of storm water flooding and thermal stress potential in Tainan (Taiwan) and Groningen (Netherlands)

Project Description
Storm water flooding and thermal stress are two important issues for most of the developed area in cities. Due to the climate change, these two issues may contribute to serious problems in dense urban areas. Therefore, the increase for public health and disaster management should be able to assess the vulnerability to storm water flooding and thermal stress. To achieve this goal, two cities in different climate regions with various urban contexts have been selected as the pilot areas, i.e., Tainan, Taiwan and Groningen, Netherlands. Storm water flooding and thermal stress issues will be discussed in both studies for further comparison. The flooding map indicates vulnerable low lying areas, whereas the thermal stress map indicates high Physiological Equivalent Temperature (PET) value or thermal comfort in open areas without shading. The combined potential map indicates the possible areas of flooding and thermal stress which should be improved and can be used by urban planners and other stakeholders to improve their livability environment.

Methodology
- Study area: Tainan is a highly developed city with a population of approximately 2.5 million. It is the largest city in the south of Taiwan in terms of area. The area of Tainan is 178 square kilometers. Groningen is also a large city with a population of approximately 62,000. It is one of the oldest cities in the Netherlands and has been a center for education and research.
- Flooding map: The tool CLOUDE (Climate Lysis of Urban Drainage Systems) has been used as a digital surface model to simulate storm water flooding. CLOUDE is based on a 2D model that simulates the water flow from the higher to the lower areas. The model is based on the following key parameters:
  - Type of soil: The soil types have been used to assess the thermal stress.
  - Type of model: The model can be used to simulate thermal stress on a large scale and is a pragmatic model on the small scale.
- Measurement survey validation: The risk assessment survey method was used to validate the results of the simulations.

Results
- Flooding map: The simulation results show the areas prone to flooding.
- Thermal stress map: The simulation results show the areas with high thermal stress.
- 3D visualization: The results were visualized using 3D modeling software.

Conclusions
- Challenges and further development: Combining thermal stress and flooding and even more climate issues in dense urban areas the streets are getting bigger and research and customers get more demanding and finds fast and good results. 3D digital elevation maps are becoming more common and better improving the quality with higher resolutions.
- The comparison of the models will indicate us what level of quick scan mapping is sufficient and when the more accurate and complex modeling is needed. The choice between coarse and fine modeling will vary within each situation, depending on the needs. The more accurate and complex models may be costly to perform on a large scale. This will be solved by using our High Performance Computing facilities, running the model on the high performance cluster of simulations.
Tainan City, Taiwan
Tainan City, Taiwan

Legend
- Water
- Buildings
- Green (low)
- Trees
- Streets
International Knowledge Exchange: Groningen and Tainan

- Measurement survey validation

- 3-D visualization
Heavy rain floods Tainan, Kaohsiung

WHEN IT RAINS: Greater Kaohsiung Mayor Chen Chu said the city had bad luck lately, citing the rain and rumors as hindering efforts to recover from the blasts

By Shelley Shan / Staff reporter, with CNA

A moist air current dumped torrential rain on southern Taiwan yesterday, prompting the closure of schools and offices in Greater Tainan and Greater Kaohsiung, where sporadic flooding has been reported.

The Water Resources Agency issued a Level 1 flood warning for the two municipalities and a Level 2 warning for Pingtung County.

Government agencies and schools in Greater Tainan were closed yesterday morning, while Greater Kaohsiung authorities suspended classes and work in

Weblink
Sorry, but does this model represent real temperatures and heat stress?