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General update

We are glad to report you that by now, all our researchers are well on track with their projects, the case studies are defined with our stakeholders and the measurement equipment has been installed. First results within the programme were already shown at the second CPC Yearly Event in September. In December the CPC Yearly Report will be published with the current state-of-affairs regarding climate adaptation in cities. We look forward to this first programme overview!

CPC Measurement Strategy

For the development of effective measures and strategies within Climate Proof Cities, a better understanding of the urban climate characteristic in the Netherlands is essential. Therefore, representative meteorological data in Dutch cities are needed. These data can be used for modelling the impact of future climate and to calculate the effectiveness of adaptation measures. All CPC related measurements that will be done in the coming years are described in the CPC '*Meetstrategie*' document (in Dutch), that is available on our [website](#).

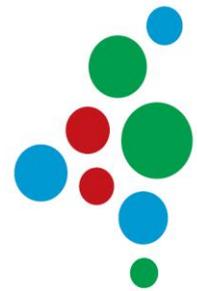
CPC Yearly Event 2011

On September 1st the second CPC Yearly Event was held in Utrecht, hosted by the University. Researchers and stakeholders from all work packages and case studies gathered to catch up on the latest news in the consortium. The day kicked off with several presentations on the first (preliminary) research results that have already been generated within the programme, such as:

- Regional climate models predict a 14% increase in extreme precipitation (more than previously assumed).
- Almost 19% of the elderly being interviewed suffered from the heat waves in 2010.
- Detached houses appear most sensitive to interior heat development with increasing outdoor temperatures.
- A strong relation exists between the albedo of a dwelling and the inside temperature.

Besides these results, links with external parties were illustrated, all project plans were shown on posters and work sessions were held to discuss the relations between the projects in the cases. All in all we may say that the CPC Event 2011 was successful in creating a clear image on the coherence between the different research projects and on the promising results we can expect from this consortium! For more information, please see our [website](#).





CPC Case Studies

The CPC programme uses a multi-scale approach for which it formulated four cross-cutting case studies that are based on a set of policy questions for a particular scale level. These policy questions are translated into research projects at carefully selected locations in close cooperation with various Dutch cities among which Rotterdam, The Hague, Amsterdam, Noord-Brabant, Arnhem/Nijmegen and Utrecht.

Buildings & Streets

The Case “Sustainable Buildings and Streets” focuses on climate adaptation at the micro-scale level including the outdoor environment (streets) and the indoor environment of buildings, with specific attention to outdoor and indoor heat stress. The projects in this case include the development of a classification of buildings and streets, measurements, numerical simulations and governance issues. The classification of buildings and streets will allow generalizing research results and will ensure applicability to similar situations at other locations. Measurements will only be performed at a few specific locations and they will primarily be used to validate the numerical simulation models. These models can subsequently be employed for simulating the effect of adaptation measures at other locations.

Neighbourhoods

The case of “Neighbourhoods” focuses on the issues of climate adaptation in neighbourhoods and districts of cities, with a main emphasis on heat, as water problems are already tackled in the case “Integral Water management”. Projects in this case include measurements, vulnerability characterization and the development of neighbourhood typologies, adaptation measures related to green, water and urban design, and governance issues.



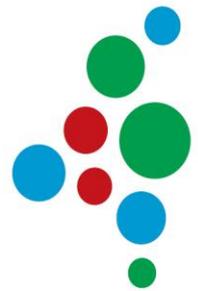
Integral Water Management

Expected climate change has significant consequences for water management of urban areas. The scope of the case Integral Water Management includes the increased frequency and intensity of heavy rainstorms due to climate change, but touches also on the frequency and intensity of droughts and heat waves since the impact of heat and drought is partially caused by reduced evapotranspiration.

Initially, there is a strong focus in this case on measurements (including the effects of vegetation and surface water on the air temperature) and modelling. In general, the projects in this case aim at getting more insight in the damage sensitivity of the urban system for extreme weather, the identification of the most vulnerable parts, and the effectivity of measures to reduce risk and damage. Furthermore, research is included on the applicability of the water surplus due to excessive rainfall and of the water distribution system as carrier of thermal energy – heat and cold.

Regional Buffers / Metropolis

The main topics of the Metropolitan area/Climate buffer case concern the regional dimension of climate change, the options available to adapt to the impacts of climate change and the ways that regions and regional developments can implement these options in urban design, urban planning and spatial planning. The main regional dimensions of climate change in this case are urban heat and extreme precipitation. Other topics that are relevant depending on specific locations include air pollution, river flooding, drought, salinisation (polder areas) and sea level rise.



The scintillometer

Since the end of May, in Rotterdam, over a length of 3.5 km between two high buildings a Large Aperture Scintillometer (LAS) measures continuously the heat fluxes of the urban area. A scintillometer analyses the fluctuations in the intensity of a lightbeam. These fluctuations are a measure for the turbulence of the atmosphere, and can be related to fluxes of sensible and latent heat. As the radiation and energy balance are essential parts of meso-scale models, scintillometer measurements are important for adjusting these models for simulating urban climate. Through the fluxes of latent heat, the measurements provide additional information on the urban water balance.



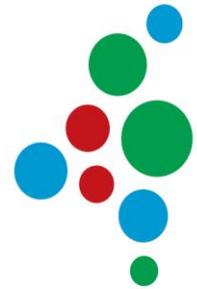
Knowledge Assembly and Problem Analysis

CPC has strong connections with one of the sub-programmes of the Delta Programme: New Urban Developments and Restructuring (by the Ministry of Infrastructure and the Environment). As a consortium, we conducted two studies for this programme in the past months.

- In the "*Kennismontage Hitte en Klimaat in de Stad*" we brought together the current knowledge in the field of heat in the city that is relevant for practical implementation by municipalities. The Kennismontage covers all aspects of urban heat including the Urban Heat Island effect, heat stress, urban climate maps, heat measures and adaptation (policy) strategies. The final report can be found on our [website](#).
- In the "*Probleemanalyse*" for the New Urban Developments and Restructuring Programme, we have systematically described the physical challenges for maintaining a good living quality in the Netherlands in 2050 and 2100. The coverage of topics was wider than we deal with in Climate Proof Cities, including for instance also soil subsidence, groundwater nuisance and flooding by sea and rivers. The project thus linked with other themes in the Knowledge for Climate programme. The "Probleemanalyse" concluded that the most challenging topics for New Urban Developments and Restructuring are:
 - Flooding (marine and riverine); not surprising in a delta
 - Flooding (pluvial)
 - Water supply to cities
 - Urban heat stress.

Participating CPC partners were Deltares, Alterra, TU-Delft and TNO. The '*Probleemanalyse*' is not released yet. As soon as it is published we will place a link on the CPC-website.

Kennis voor Klimaat Knowledge for Climate



Climate Proof Cities

Case studies

- Amsterdam**
Nieuw West
Watergraafsmeer
- Haaglanden**
Den Haag - Rotterdam R
Heesterbuurt
- Utrecht**
- Arnhem/Nijmegen**
J.P. van Muilwijkstraat (Arnhem)
- Rotterdam**
Oude Noorden
Lijnbaan
- Brabantstad**
Tilburg
Rijk van Dommel en Aa R

Wateroverlast

- zeer robuust
- robuust
- matig robuust
- kwetsbaar
- zeer kwetsbaar

Integrated water management
 Building and street
 Neighbourhood
 R Regional

Climate Proof Cities News Letter

The news letter keeps you updated twice a year on the developments within the Climate Proof Cities consortium. CPC is one of the eight themes within the research programme Knowledge for Climate (KfC). The objective of this consortium is strengthening the adaptive capacity and reducing the vulnerability of the urban system against climate change and to develop strategies and policy instruments for adapting our cities and buildings.

The consortium gathers engineers, designers, natural scientists, physical planners and political scientists to interact in work packages. Research will be executed in a number of cross-cutting case studies that link research projects in the work packages with research questions in the hotspots. In this way, the programme aims to provide the Knowledge for Climate stakeholders with factual and targeted information that can be used in developing urban adaptation policies.

www.knowledgeforclimate.org/climateproofcities

Consortium partners



Foreign research partners: Univ. of Manchester, Univ. Kassel, Albert-Ludwigs-Universität Freiburg

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