Deltas in Depth scientific sessions		
Deltas in Depth 5.5 Managing urban water under changing climate conditions		
Chair	Dr. Cynthia Rosenzweig, Colombia University/NASA, USA	
Presentations	•	Keynote: Dr. Cynthia Rosenzweig, Columbia University, USA
	•	Edgar Westerhof, ARCADIS U.S. Inc, USA
	•	PhD Claudia Agudelo-Vera, KWR Watercycle Research Institute, the Netherlands
	•	PhD Rutger de Graaf, DeltaSync/Hogeschool Rotterdam, the Netherlands
	•	MEng MA Kalliopi Ntanou, INTRAS, France

"Cities are the nexus between both scientists and businesses, and governments and citizens."

Cynthia presents the Urban Climate Change Research Network (UCCRN) and the book they have published lately. One thing UCCRN does is provide detailed consistent downscaled predictions for all cities around the world. All cities are projected to see temperature increases between 1 to 4 degrees C, in addition some cities will be subjected to drought, extreme precipitation and sea level rise. Cynthia invites everyone in the audience to become part of the UCCRN network.

Edgar Westerhof presents on protection of critical infrastructure in New York. After hurricane Sandy the Mayor of New York (NY) launched plaNYC, a agenda with 275 measures to make NY more resistant. ARCADIS made flood model maps of the city with and without measures. Several (individual stakeholder) measures are presented, for example: (removable flood) walls, berms and levies, open green space and swing gates.
During the discussion is it made clear that hurricane Sandy was a "gear shifter" of climate adaptation measures in NY.

Claudia Agudelo presents on drinking water distribution network temperature. There is a guideline that drinking water may not be distributed over 25^{o}C. This threshold may be crossed more often under climate change. Temperatures in urban centres are higher because of heat storage, anthropogenic sources of heat and relatively high sand content in urban soils. KWR developed a soil temperature model and predicts drinking water temperature in the future. The number of days at which drinking water will be over 25^{o}C increases from 0 to 7 on average and can be over 80 days in hot-spots. Adaptation measures are for example: deeper drinking water pipes and treatment of the water at the customers. Health danger because of salmonella growth is only proven in water over 28^{o}C for more than 7 days.

Rutger de Graaf presents on ground water management and urban water demand. The (ground) water situation of the Netherlands is explained both spatially and schematically. The groundwater table is for example important for the pole foundation of houses. In the Netherlands we already manage surface water levels and under climate change we should also actively manage groundwater. The urban water demand is calculated for an average Dutch city, the minimal external demand is calculated as the difference between precipitation and evaporation, the maximal as the cumulative difference between evaporation and precipitation. The supply-able water strongly depends on the storage capacity. Even under extreme climate change, on a national scale, the external water demand is quite low. On local scale in dry years is can be important and costly, however, and the technology is not in place yet.

Kalliopi Ntanou presents on a sustainable urban water cycle. Many eco-city projects fail because of the complexity of the system, long-term planning is difficult and business models are hard to define. INTRAS has taken a more holistic approach, they use an urban sustainability nexus based on the interactions between landscape, water, energy and transport. The urban metabolism model is used for experiments to learn about the sustainable urban water cycle.