WATER RESOURCES SECTION
FACULTY OF CIVIL ENGINEERING AND GEOSCIENCES
DELFT UNIVERSITY OF TECHNOLOGY

Recent Advances in Water Resources

55th Colloquium

The colloquium series Recent Advances in Water Resources is organised by the Water Resources Section of the Faculty of Civil Engineering and Geosciences, Delft University of Technology. It serves as a forum for presenting results of up-to-date research in hydrology and water resources management. The series is a continuation of the Recent Advances in Subsurface Hydrology series that was organised by the former Section of Hydrology and Ecology from 1997 to 2004. The following talks are scheduled for the fifty-fifth colloquium in the series.

LOCATION, DATE AND TIME:

Thursday, November 18, 2010, 15h00

Room 4.98

Faculty of Civil Engineering and Geosciences,
Stevinweg 1, 2628 CN Delft, The Netherlands.

SPEAKER 1:

Dr. C.A. Katsman

KNMI – Global Climate Division
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TITLE:

Scenarios for local sea level rise along the Dutch coast

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SPEAKER 2:

Dr. Ir. E.O.J. Schrama

Faculty of Aerospace Engineering TU Delft
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TITLE:

Observation and modeling changes in the Greenland ice sheet with NASA's GRACE system

INFORMATION:

Please turn over for abstracts.
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ABSTRACTS:

Scenarios for local sea level rise along the Dutch coast

Dr. C.A. Katsman

For a low-lying country like the Netherlands, possible changes in sea level induced by climate change are a major concern. Contrary to what is often assumed, sea level is not expected to rise uniformly over the globe in response to a warming atmosphere. So in addition to scenarios for global mean sea level rise over the twenty-first century, like the ones published in the IPCC Fourth Assessment Report, scenarios for local sea level change are required. In this presentation, the physical processes that result in non-uniform sea level changes will be discussed, together with recent results on the development of local scenarios for the Netherlands and other locations around the globe.

Besides these scenarios for the likely sea level change, a low-probability / high-impact scenario was developed recently at the request of the new Delta Commission ('Commissie Veerman') to evaluate whether the country's flood protection strategy is capable of coping with extreme future climate conditions. Together with projections for changes in storm surge height and peak river discharge, these scenarios depict a possible complex, enhanced flood risk for the Dutch delta.

Observation and modeling changes in the Greenland ice sheet with NASA's GRACE system

Dr. Ir. E.O.J. Schrama

Since early 2002, the GRACE twin satellite mission provides monthly snap shots of the Earth's gravity field. Observed changes are primarily related to variations in the distribution of mass at the surface of the Earth, which now are globally mapped at a ~300 km resolution for the first time. This has lead to great advance in our understanding of the various components of the Earth's water cycle, and their mutual interaction. In this presentation, we will focus on Greenland, one of the major players in the present-day sea level budget. A technique has been developed that allows the retrieval of ice mass changes at a regional scale. Comparing the GRACE data to a combination of a regional climate model (RACMO/GR) and glacier flow speed measurements shows a remarkably good match and enables us to quantify the individual components of recent Greenland mass loss. In the last few years, changes in surface processes (runoff and precipitation) and ice dynamics have been equally important. Initially, GRACE observes ice losses mainly occurring along the southeastern coast of Greenland, induced by a speed-up of the glacier flow. In the last few years, we observe a different behavior, with ice loss migrating to the high north. These changes are attributed both to an acceleration of the glaciers in this region and changes in surface processes. In total, the Greenland Ice Sheet contributed about about 0.5 mm/yr to sea level rise in the period 2003-2009. However, an acceleration is observed. Whereas roughly 120 cubic kilometers of ice was shed each year in the early period of the GRACE mission (2003-2005), this has increased to more than 270 km^3/yr in the warm years of 2007 and 2008. The mass losses have a significant effect on the gravity field of the ocean and as a consequence the melt water will not spread uniformly over the ocean. As a consequence, the sea level rise associated with Greenland ice loss is reduced by about 80%.