Editorial

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In November 2012 the World Meteorological Organization issued its latest greenhouse gas bulletin (WMO, 2012). Unfortunately it does not make for happy reading. Recent analysis of observations shows that levels of carbon dioxide, methane and nitrous oxide all reached new highs in 2011, and the average growth rate of atmospheric carbon dioxide in 2011 was similar to that over the past 10 years. Anyone reading this may start to think about what this means for us in terms of adapting to climate change. For those in our field, it is likely to make us think about the potential impacts of climate change on both our water environment and our water resource infrastructure. This issue of *Water Management* again presents a collection of very interesting and high quality papers on a diverse set of topics. However, they could all be said to touch on issues around environmental change, whether in relation to the 'carbon footprint' of wastewater treatment, the mitigation of changing urban flood risk, or to future changes in water quality and quantity. I hope you enjoy reading the issue as much as I did. It is a pleasure to introduce it to you.

The first paper in the issue (Breul *et al.*, 2013) presents a methodology for characterising the physical properties and performance of wastewater sand filters with vertical drained flow (SFVDF). These on-site domestic systems are reported to be receiving renewed interest in areas where centralised public wastewater treatment is not cost effective. A key parameter associated with the performance of SFVDFs is the saturated hydraulic conductivity (K_s) of the sand, which controls the contact time between the effluent and the filtering material, affecting the retention of suspended solids and the reduction in biological oxygen demand. A number of non-destructive techniques are proposed for the determination of parameters of operational SFVDFs, including the processing of optical images from a geoendoscope to determine K_s and the degree of sand clogging.

It is now more than 4 years since Sir Michael Pitt undertook his review of the UK summer 2007 floods for the UK government (Pitt, 2008). The report stated clearly that 'Public sewers do and will continue to have a key role to play in minimising surface water flooding and it is essential that we have the right framework to best target investment in construction and maintenance programmes' (Pitt, 2008: p.97). The second paper (Romanova *et al.*, 2013) presents the application of a technology for the detection of sewer pipe defects that could enhance such a framework. This is based on a novel low-cost acoustic sensor system, which is inserted from ground level into a sewer manhole. The equipment emits an acoustic signal along the sewer pipe composed of a range of frequencies. The analysis of the reflected signal enables the identification and location of a number of standard in-sewer

features and defects: connections, obstacles, joints, cracks and junctions. The equipment is tested and validated through comparison with features identified by a visual inspection of more costly CCTV surveys of parts of two Austrian sewer networks. It is shown to identify most of the defects detected by CCTV.

In the third paper in this issue (May and Sivakumar, 2013), the capability of different measures of central tendency of site mean concentration to predict long-term total phosphorous loads is evaluated. This is based on long-term monitoring of phosphorous loads in 17 urban catchments in the USA. Site mean concentrations are derived from event mean concentrations calculated using five measures of central tendency: the arithmetic mean, geometric mean, median, harmonic mean and flow-weighted mean. Overall the flow weighted mean is shown to be the most accurate.

The final paper (Jamali *et al.*, 2013) addresses the impacts of climate change on the hydrology of the Karkheh River Basin in western Iran. This basin, which contains alpine regions in the north and semi-arid plains in the south, is currently exploited for hydroelectric power generation but may offer the potential for further hydropower development. To assess potential future impacts a parsimonious conceptual rainfall run-off model (IHACRES) is used to simulate river flows in five sub-catchments of the basin. These simple models reproduce well both the seasonal and inter-annual variability in the observed flows. The models are then driven by downscaled global climate model (GCM) projections of future climate. It is well known that uncertainty in climate projections, associated with both GCM model structure and greenhouse gas emissions (GHGE), is significant (e.g. Rowell, 2006). Consequently, in this study, projections based on two different GCMs and three GHGE scenarios are applied. Percentage changes in annual mean river flows are presented for three time-slices: the 2020s, 2050s and 2080s. In addition to simulated decreases in mean annual flows during the coming century, seasonal flows are also modified: the impacts of the projected increases in temperature, which are relatively consistent across the GCMs, results in earlier snowmelt, and higher winter and lower spring flows. The northern alpine catchments are shown to be more sensitive to a changing climate.

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