Climate Change Impacts on Catchment Hydrology

HYDRA
HYDROSCIENCES RESEARCH ASSOCIATION

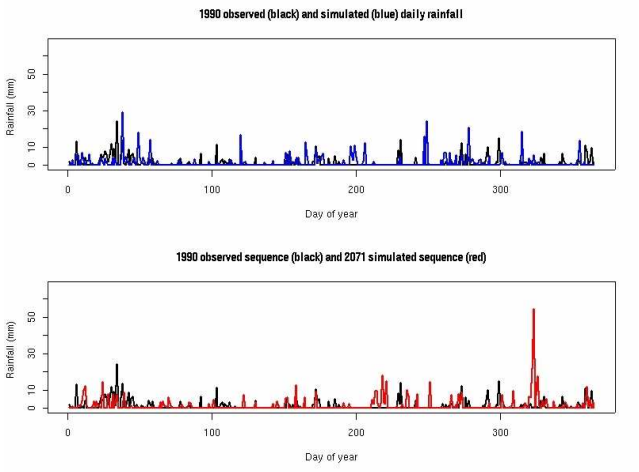
The challenge

- Anthropogenic climate change presents mankind with the biggest challenge it has yet had to face. The Stern Review argues that international action is required now to avoid the “risk of major disruption to economic and social activity, on a scale similar to those associated with the great wars and economic depression of the first half of the 20th century”.
- Hydrology is important because:

  Hydrological feedbacks affect water and energy exchange at the earth’s surface and are an essential component of earth system models

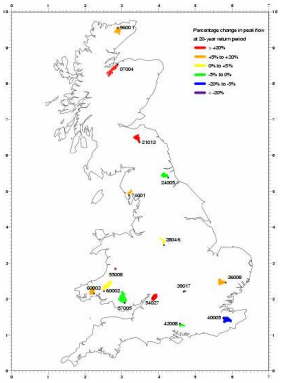
  Impacts of climate change on catchment hydrology must be quantified to manage floods, water resources, water quality and ecological protection

Quantifying future rainfall



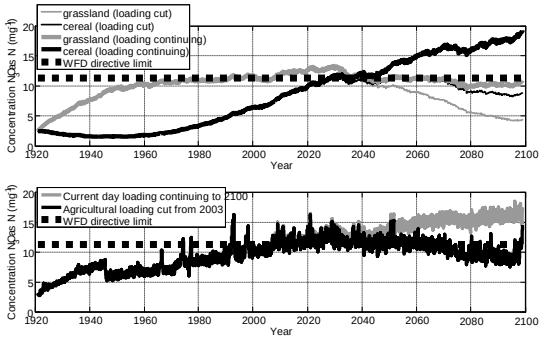
Global Climate Models are poor at representing rainfall at catchment scale. HYDRA researchers have developed improved methods to simulate future precipitation sequences and their associated uncertainty, using data from Global and Regional Climate models. Results above are from recent research at UCL and Imperial, funded by Defra.

Quantifying impacts



CEH research is quantifying national impacts on floods e.g. estimates of % change in 20-year return period flood flows (left) based on RCM data

Joint research at Imperial, Reading, CEH and BGS has evaluated impacts of land use, fertilizer application and climate change on nitrates in chalk rivers (below)



Research in progress

Climate change will be a key theme of HYDRA research, including floods, droughts and water quality.

HYDRA researchers have funding from Imperial’s new Grantham Centre for Climate Change Research to improve estimates of future climate for flood and drought applications and from Defra/EA to pursue national-scale flood impacts assessment. HYDRA is also playing a leading role in NERC’s Flood Risk from Extreme Events (FREE) programme. Imperial, CEH and BGS are developing new methods to evaluate flood risk from groundwater flooding under climate change. CEH researchers are working on a linked system of rainfall, hydrological, defence performance and flood inundation models for flood risk assessments under current and future climate.

Find out more..www.hydra.uk.net