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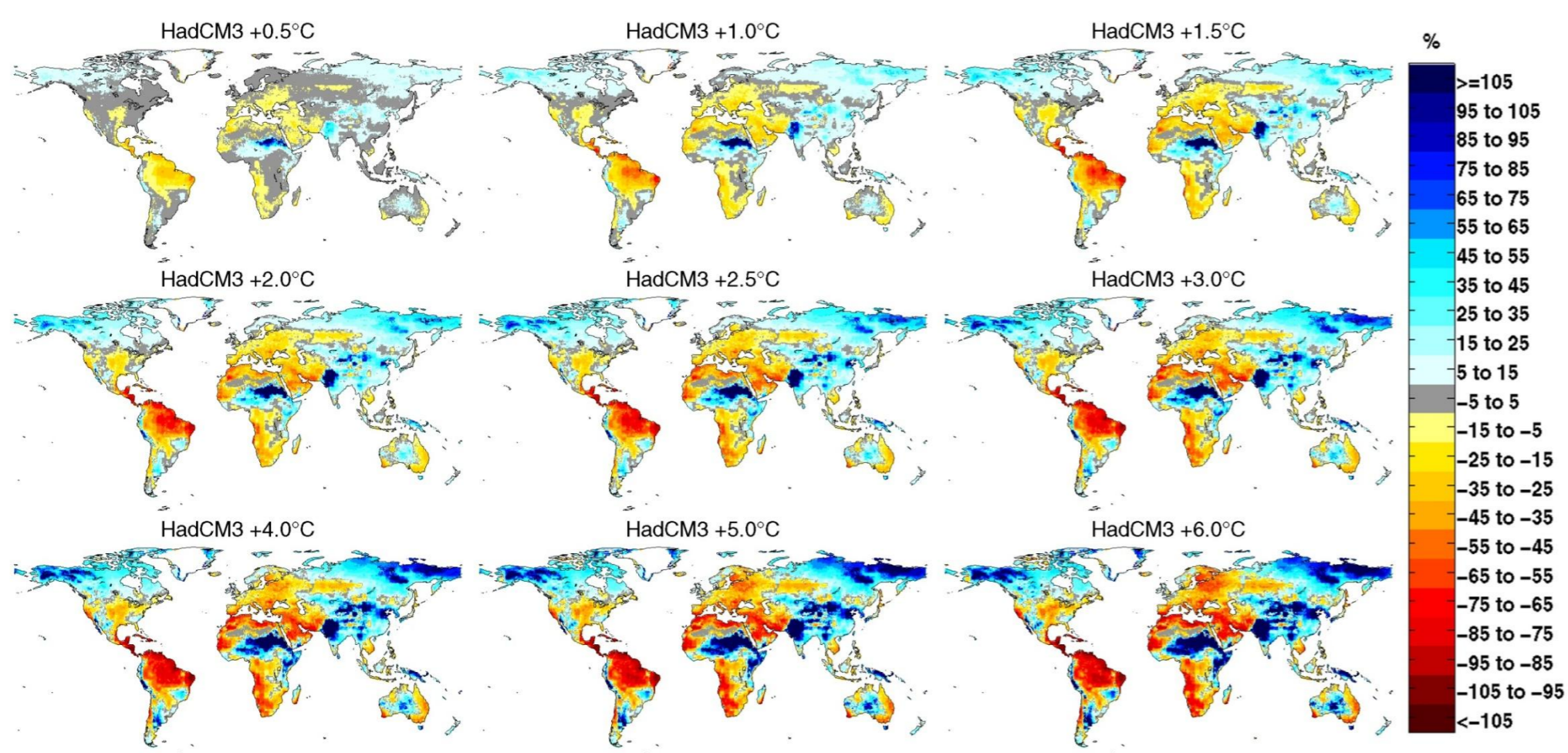
Key messages

- Changes in average annual runoff increase in magnitude and coverage with climate change.
- Climate change also affects the pattern of global water resources stresses.
- Changes in climate and land-use management are affecting aquatic ecosystems.
- Water is at the centre of global ecology, economics and politics – understanding how that resource will change is crucial.

Climate affects runoff

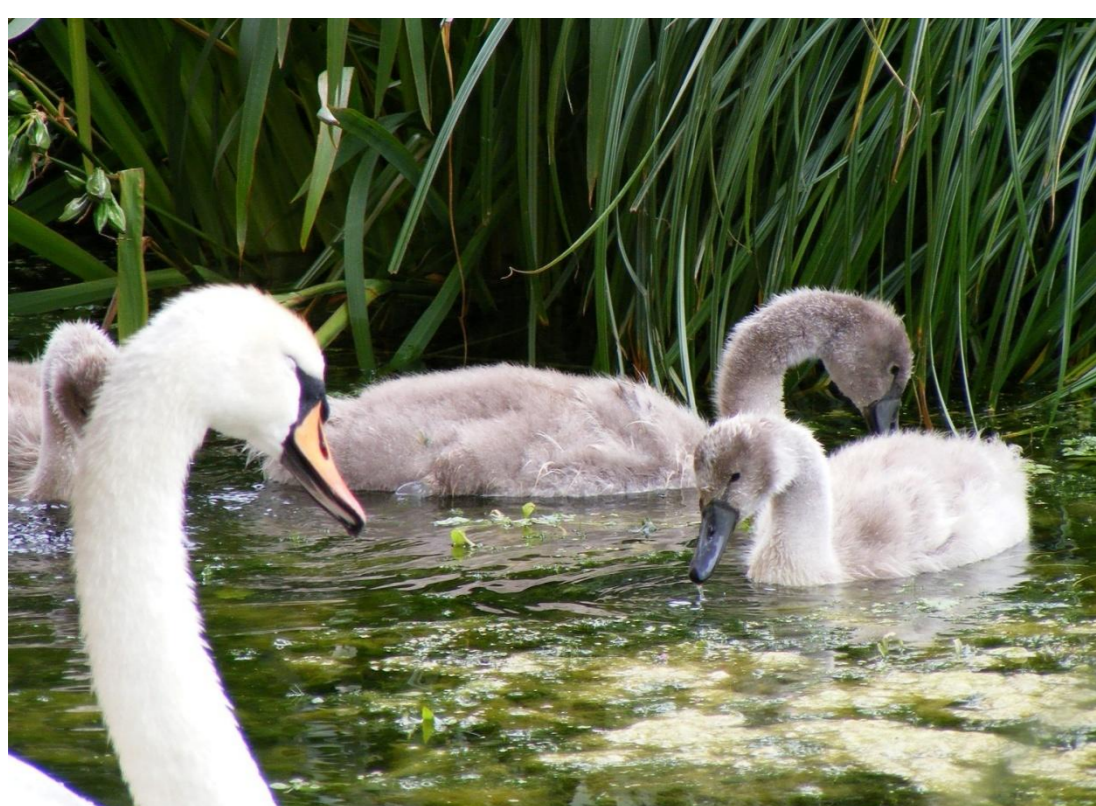
Hydrological simulations with climate change scenarios demonstrate substantial changes in average annual runoff.

The figure below illustrates how average annual runoff changes relative to present (1961-1990) for different degrees of mean global temperature rise. The climate data is from the HadCM3 GCM.



Climate change and freshwater ecosystems

We have developed a suite of water quality and ecological models to help understand how changes in climate and land-use management integrate to affect aquatic ecosystems.

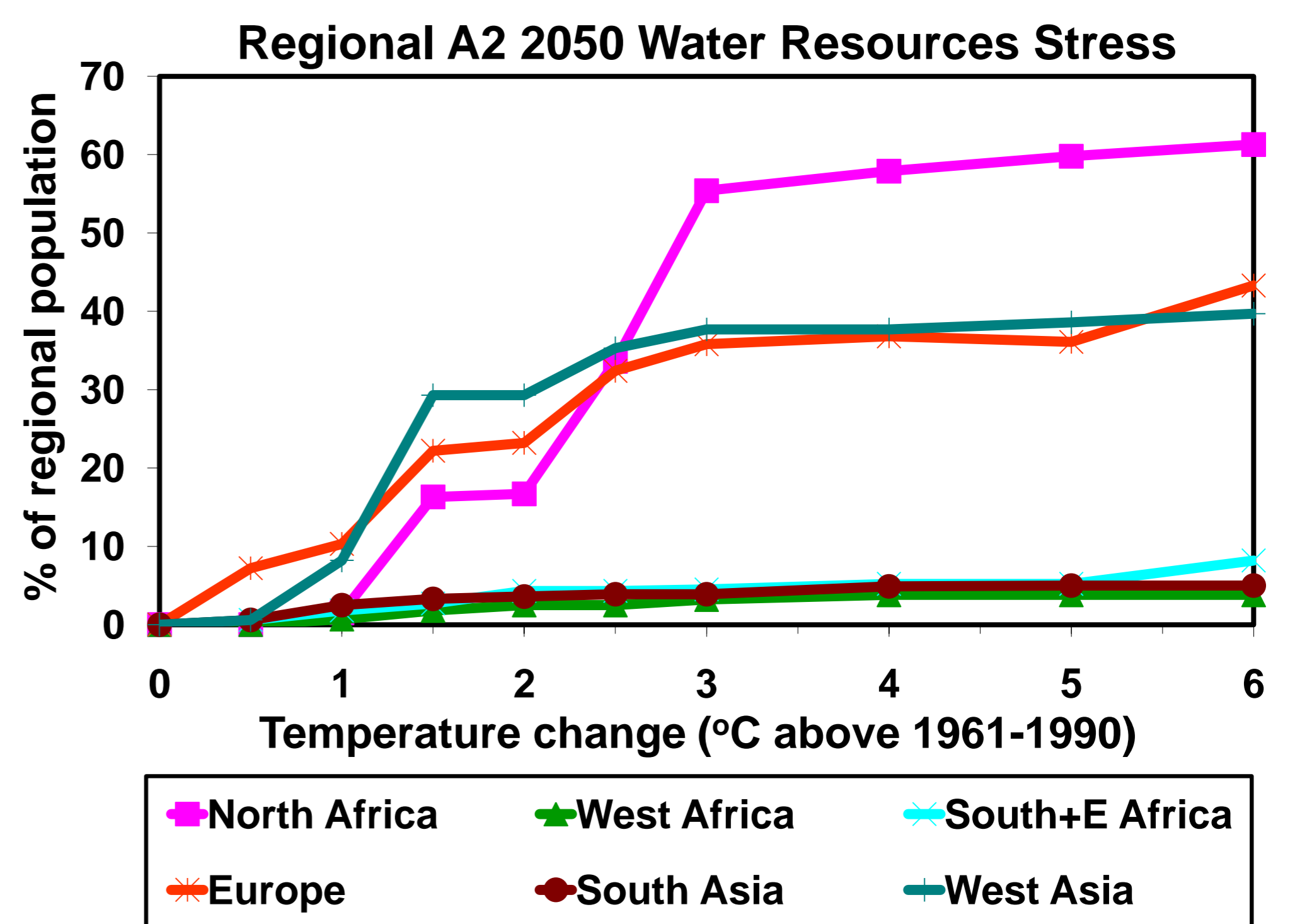


In lowland, permeable UK catchments, the combined effects of climate and land use change will be to reduce nitrate and ammonium concentrations. This is due to projected reductions in fertiliser input and changes in the way individual land uses metabolise nitrogen under the influence of a changing climate.

Global water resources stresses

Changes in average annual runoff with climate change will be associated with changes in the populations exposed to water resource stresses.

By considering factors such as future population change, thresholds of freshwater availability and freshwater withdrawal, projections of changes in water resources stresses can be made. The figure below shows the percentage of the various regional populations exposed to water resources stress in 2050, for different mean global temperature rises from present.



Water, life and civilisation

The inter-play between climate and water availability has been fundamental to human activities in the past and will continue to be so into the future, nowhere more so than in the semi-arid regions of Middle East and North Africa (MENA).

We are assessing the changes in the hydrological climate in the MENA region and its impact on human communities with a team that includes meteorologists, hydrologists, geologists, archaeologists and geographers. The project is contributing to policy formation regarding economic development and planning.



Find out more...

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