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# Changes and uncertainty in river flow under climate change in a GCM

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Realistic representation of river flow is an important component of Global Circulation Models for several reasons. Firstly, reliable estimates of the contribution of freshwater to the ocean are necessary for accurate prediction of the thermohaline circulation. Secondly, fully integrated models of the earth system are also the only way in which water cycle feedbacks in the climate-land-ocean continuum can be truly analysed. In addition, climate change may alter the availability of freshwater resources for human consumption, and coupled climate-hydrological models can assist in assessing likely impacts. The latest version of the Hadley Centre Global Circulation Model, HadGEM1, includes a detailed land surface water and energy balance scheme, MOSES. HadGEM1 uses the TRIP dynamic river routing scheme, which advects runoff from the MOSES land surface scheme along prescribed river channels at embedded 1 degree by 1 degree resolution. We will present results from transient runs of HadGEM1 under the IPCC SRES A1B and A2 scenarios to demonstrate potential changes in river flow predicted by TRIP for different climate change scenarios. We will also investigate two sources of uncertainty in future river flow. Firstly, we will use multi-member ensembles (the QUMP project) to investigate the impact of climate model parameter uncertainty on predictions. Secondly, we will use climate model runs with dynamic vegetation to investigate the influence of plant responses to elevated carbon dioxide on future river flow.