



Climate change impacts on global water resources – a multi model approach.

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Humans activities can potentially have large impacts on the global water cycle. By developing large dams and irrigation schemes significant amounts of water are diverted from river systems. Additionally, the emissions of greenhouse gases is causing global warming which changes rainfall and evaporation patterns. It is, however, still difficult to quantify future impacts on the global water cycle due to limited data availability, model imperfections and large uncertainties in climate change projections. Due to model uncertainties, the common approach in climate change studies is now to use multiple climate models. Similarly it could be useful to use multiple impact models. Here, we present the results of a multi-model approach to study anthropogenic impacts on the global water cycle. Different global hydrological models (H08, VIC, WaterGAP and LPJml) were forced with a historical climate dataset (Watch Forcing Data) and bias corrected output of different Earth System Models. Results showed that climate change has a considerable impact on the regional and global water cycle. Climate change will make the water cycle more variable. In economically important regions such as, Europe, US and Southern Asia, both the low flows will decrease and the high flow will increase resulting in much higher variability in discharge and water availability. Total water availability is likely to reduce in the Southern US, the Mediterranean, central-east Asia and southern Australia. The gap between water availability and demand is likely to grow in different part of the world but especially of Central, South and East Asia. However, there are significant differences in model estimates of future water availability both in terms of total amounts and seasonal changes. In conclusion, using a multi-model approach gives a more robust quantification of possible future anthropogenic impacts on the global water cycle.