GOYDER INSTITUTE MODEL METADATA TEMPLATE

METADATA REQUIRED	DETAILS
Model Name and version	A non-stationary implementation of the rainfall-runoff model GR4J developed specifically for Project C.1.1
Date of lodgement of Metadata Template. Name of Metadata Provider	November 11 2014 Dr Seth Westra, School of Civil, Environmental and Mining Engineering, University of Adelaide seth.westra@adelaide.edu.au
Goyder Institute Project Number and Name	**GOYDER INSTITUTE FOR WATER RESEARCH** Project No. C.1.1 Development of an agreed set of climate change projections for South Australia
Project Team	Project Leader Professor Simon Beecham, simon.beecham@unisa.edu.au University of Adelaide Task 4 Team Task 4 Leader Dr Graham Green, graham.green@sa.gov.au Project Team Members: Seth Westra, seth.westra@adelaide.edu.au Mark Thyer, mark.thyer@adelaide.edu.au Michael Leonard, michael.leonard@adelaide.edu.au Dmitri Kavetski Dmitri.kavetski@adelaide.edu.au Martin Lambert martin.lambert@adelaide.edu.au
Creator/Developer	Dr Seth Westra, School of Civil, Environmental and Mining Engineering, University of Adelaide seth.westra@adelaide.edu.au
Owner/Contact Person and contact details	Dr Seth Westra, School of Civil, Environmental and Mining Engineering, University of Adelaide seth.westra@adelaide.edu.au ***** SEE IP PERMISSION SECTION FOR ANY SPECIFIC REQUIREMENTS *****
Model Location	*Where is the model archived?* *Provide contact details of individual and unit/group within designated organisation* The model is held at School of Civil, Environmental and Mining Engineering, University of Adelaide. Contact the owner to discuss access. *Is there a version of the model in active further development? Where is this active version located?* *Provide contact details of individual and unit/group within designated organisation* As above.

METADATA REQUIRED	DETAILS
IP or other permission requirements	********* **REFER TO GOYDER INSTITUTE FOR WATER RESEARCH AGREEMENT ********* *Are there any IP issues associated with the model and/or the dependencies that future users need to be aware of?* IP for BATEA software held by University of Adelaide. To access this model contact Mark Thyer, School of Civil, Environmental and Mining Engineering, University of Adelaide mark.thyer@adelaide.edu.au
Licences associated with model and/or dependencies	********* **REFER TO GOYDER INSTITUTE FOR WATER RESEARCH AGREEMENT ********* *Are there any licenses associated with the model and/or the dependencies that future users need to be aware of?* There are no licenses future users need to be aware of.
Confidentiality agreements associated with model and/or dependencies	*Are there any confidentiality agreements associated with the model and/or the dependencies that future users need to be aware of?* There are no confidentiality agreements future users need to be aware of.
Brief outline of model	A version of the rainfall-runoff model GR4J was developed to enable time-varying parameters. The current implementation enables parameter x1 to vary as a function of one or several covariates, although future implementations can be expanded to include other parameters.
Area/region covered	Onkaparinga/ Mt Bold Reservoir catchment, South Australia
Platform and language and version	The model is coded in Fortran, and forms part of the Bayesian Total Error Analysis (BATEA) software that is written and managed by Prof. Dmitri Kavetski, School of Civil, Environmental and Mining Engineering, University of Adelaide dmitri.kavetski@adelaide.edu.au
Dependencies upon: i) other models and/or platforms (including version) and location ii) essential data and data sources and location	This model is programmed in Fortran as part of the BATEA software, which is managed by Prof Dmitri Kavetski School of Civil, Environmental and Mining Engineering, University of Adelaide dmitri.kavetski@adelaide.edu.au

METADATA REQUIRED	DETAILS

How was model used	The model was applied to determine potential changes in flows to Mt Bold reservoir under a range of future climate change scenarios.
	
	   o *Parameterisation/Validation (if applicable; include time period of calibration/simulation)*
	      Summarised in Goyder Institute Technical Report 14/22
	
	   o *Scenarios and outputs from various runs (indicate where these are stored)*
	      Summarised in Goyder Institute Technical Report 14/27
	      Output is stored in ERSA www.ersa.edu.au
	      However, it is not publicly available. Contact owner listed above.
	
	   o *Assumptions behind model (indicate where these are stored)*
	      Summarised in Goyder Institute Technical Report 14/22
	
	   o *Limitations of model*
	      Summarised in Goyder Institute Technical Report 14/22
	
	   o *Peer review process (if applicable)*
	      Reviewed by two external reviewers.
	
	   o *Extensibility of model (can it be run for different time periods)*
	      The model can be run for any time period for which input data is available.
	
	All Goyder Institute Technical Reports are available at http://goyderinstitute.org/

Specificity of data	*Was data sourced from local field sites or literature* Runoff rating curves sourced from Science, Monitoring and Knowledge Branch, DEWNR. Climate data source from CSIRO Data Access Portal. http://dx.doi.org/10.4225/08/54644D99C091A Catchment variables were sourced from the literature and are detailed in Goyder Institute Technical Report 14/22 Available at http://goyderinstitute.org/
Datasets/data products produced	Datasets are summarised in Goyder Institute Technical Reports 14/22 and 14/27 Available at http://goyderinstitute.org/ Details on library entry for the data are given here: http://researchdata.ands.org.au/onkaparinga-catchment-climate-change-modelling/468107

METADATA REQUIRED	DETAILS
Publications (papers and technical reports)	Westra, S., Thyer, M., Leonard, M., Kavetski, D. & Lambert, M., 2014, *Impacts of Climate Change on Surface Water in the Onkaparinga Catchment – Volume 1: Hydrological Model Development and Sources of Uncertainty*, Goyder Institute for Water Research Technical Report Series No. 14/22, Adelaide, South Australia, 106pp. Westra, S., Thyer, M., Leonard, M. & Lambert, M., 2014, *Impacts of Climate Change on Surface Water in the Onkaparinga Catchment – Volume 2: Hydrological Evaluation of the CMIP3 and CMIP5 GCMs and the Non-homogenous Hidden Markov Model (NHMM)*, Goyder Institute for Water Research Technical Report Series No. 14/23, Adelaide, South Australia, 40pp. Westra, S., Thyer, M., Leonard, M. & Lambert, M., 2014, *Impacts of Climate Change on Surface Water in the Onkaparinga Catchment – Volume 3: Impact of Climate Change on Runoff in the Onkaparinga Catchment*, Goyder Institute for Water Research Technical Report Series No. 14/27, Adelaide, South Australia, 56pp. Journal Papers: Westra, S., Thyer, M., Leonard, M., Kavetski, D. & Lambert, M., 2014, A strategy for diagnosing and interpreting hydrologic non-stationarity, Water Resources Research, 50 (6), 5090-5113.
Collaborations and acknowledgements	DEWNR Science, Knowledge and Management staff CSIRO , Catchment Hydrology Group, Hydrology Program, CSIRO Land and Water (Dr Steve Charles, , steve.charles@csiro.au)
Keywords	Climate change, Onkaparinga, rainfall, downscaling, rainfall-runoff modelling, water security, GR4J, NHMM