

A 439-year daily discharge dataset (1861 - 2299) for the upper Yangtze River, China

Data for storage were used four GCMs (GFDL-ESM2M, HadGEM2-ES, IPSL-CM5A-LR and MIROC5), changes in temperature and precipitation in the upper Yangtze River basin were analyzed from 1861 to the end of 23th century under conditions with anthropogenic climate change (the four RCP scenarios) and for a scenario without human-induced climate change (abbreviated as the piControl scenario), and the scenarios were compared. The discharge at the Cuntan station in the period 1861 - 2299 was simulated by four hydrological models (HBV, SWAT, SWIM and VIC) that were driven by the four GCMs, and changes in discharge in a warming world were compared with those in the piControl scenario.

The datasets include two daily discharge time series under (1) Scenario without anthropogenic climate change (piControl) and (2) Scenarios with anthropogenic climate change, which include 16 combinations of outputs of four hydrological models that were driven by four GCM simulations (total 64 combinations under the RCP scenarios). We list the availability of climate scenarios from four climate models for different periods (Tab. 1), the short description of the four hydrological models (Tab. 2) and the two datasets of discharge time series under the piControl scenario and scenarios with anthropogenic climate change effects simulated by the four hydrological models (HBV, SWAT, SWIM, and VIC) (Tab. 3).

Table 1: Availability of climate scenarios from four climate models for different periods

Climate scenario	CO ₂ concentration	GFDL-ESM2M	HadGEM2-ES	IPSL-CM5A-LR	MIROC5
piControl	286 ppm	1861-2099	1861-2299	1861-2299	1861-2299
Historical	Recorded CO ₂	1861-2005	1861-2005	1861-2005	1861-2005
Future	RCP2.6	2006-2099	2006-2299	2006-2299	2006-2299
	RCP4.5	2006-2099	2006-2099	2006-2299	2006-2099
	RCP6.0	2006-2099	2006-2099	2006-2099	2006-2099
	RCP8.5	2006-2099	2006-2099	2006-2299	2006-2099

Table 2: Short description of the four hydrological models

Model	Institution	Spatial disaggregation	Representation of soils	Representation of vegetation	Routing method
HBV	Swedish	Sub-basins,	1 soil layer,	Fixed	A simple
	Meteorological	10 elevation	2 soil	monthly plant	time-lag
	and Hydrological	zones & land	parameters	characteristics	method
	Institution	use classes			
SWAT	United States	Sub-basins and	Up to 10 soil	A simplified	Muskingum
	Department of	hydrological	layers,	EPIC approach	method
	Agriculture	response units	11 soil parameters		
SWIM	The Potsdam	Sub-basins and	Up to 10 soil	A simplified	Muskingum
	Institute for	hydrotopes	layers,	EPIC approach	method,
	Climate Impact		11 soil		reservoirs
	Research, based		parameters		and
	on the SWAT and MATSALU models				irrigation
VIC	University of	Grid of large	3 soil layers,	Fixed	Linearized
	Washington,	and uniform	19 parameters	monthly plant	St. Venant's
	University of	cells with sub-		characteristics	equations
	California, and	grid			
	Princeton University	heterogeneity			

Tab.3: The two datasets of discharge time series under the piControl scenario and scenarios with anthropogenic climate change effects simulated by the four hydrological models (HBV, SWAT, SWIM, and VIC)

model	dataset		GFDL-ESM2M	HadGEM2-ES	IPSL-CM5A-LR	MIROC5
HBV	piControl	piControl	1861-2099	1861-2299	1861-2299	1861-2299
	Historical	Historical	1861-2005	1861-2005	1861-2005	1861-2005
		RCP2.6	2006-2099	2006-2299	2006-2299	2006-2299
		+Feature RCP4.5	2006-2099	2006-2099	2006-2299	2006-2099
		RCP6.0	2006-2099	2006-2099	2006-2099	2006-2099
		RCP8.5	2006-2099	2006-2099	2006-2299	2006-2099
SWAT	piControl	piControl	1861-2099	1861-2299	1861-2299	1861-2299
	Historical	Historical	1861-2005	1861-2005	1861-2005	1861-2005
		RCP2.6	2006-2099	2006-2299	2006-2299	2006-2299
		+Feature RCP4.5	2006-2099	2006-2099	2006-2299	2006-2099
		RCP6.0	2006-2099	2006-2099	2006-2099	2006-2099
		RCP8.5	2006-2099	2006-2099	2006-2299	2006-2099
SWIM	piControl	piControl	1861-2099	1861-2299	1861-2299	1861-2299
	Historical	Historical	1861-2005	1861-2005	1861-2005	1861-2005
		RCP2.6	2006-2099	2006-2299	2006-2299	2006-2299
		+Feature RCP4.5	2006-2099	2006-2099	2006-2299	2006-2099
		RCP6.0	2006-2099	2006-2099	2006-2099	2006-2099
		RCP8.5	2006-2099	2006-2099	2006-2299	2006-2099
VIC	piControl	piControl	1861-2099	1861-2299	1861-2299	1861-2299
	Historical	Historical	1861-2005	1861-2005	1861-2005	1861-2005
		RCP2.6	2006-2099	2006-2299	2006-2299	2006-2299
		+Feature RCP4.5	2006-2099	2006-2099	2006-2299	2006-2099
		RCP6.0	2006-2099	2006-2099	2006-2099	2006-2099
		RCP8.5	2006-2099	2006-2099	2006-2299	2006-2099