

Niger-HYPE version: 2.0

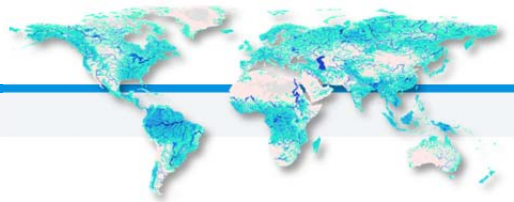
HYPE model version: HYPE version 4.6.0 was adapted to better represent the Inland Niger Delta in Mali by including a routine to simulate floodplain dynamics and river surface fluxes.

Geographical domain: The Niger River basin

Model purpose/User Community: The model is currently used to study the potential effects of climatic changes on floods, droughts and other water-related phenomena; and to connect this to adaptation strategies in West Africa. Together with key institutions in the region we also explore the possibility of using the tool for water resources management, education, and operational hydrological warning services. Table 1. Data sources and characteristics of the Niger-HYPE v.2.0 model setup.

Characteristic/Data type	Info/Name	Provider
Total area (km ²)	2.1 million	-
Number of sub-basins	803 (mean size 2665 km ²)	-
Topography	HydroSHEDS (15 arc-sec)	(Lehner et al., 2008)
Soil characteristics	Harmonised World Soil Database (HWSD) and WISE	(FAO et al., 2012), (Batjes, 2012)
Land use characteristics	GlobCOVER	(Arino et al., 2008)
Reservoir and dam	Global Reservoir and Dam database (GRanD)	(Lehner et al., 2011)
Lake and wetland	Global Lake and Wetland Database (GLWD)	(Lehner and Döll, 2004)
Discharge	Global Runoff Data Centre (GRDC), ABN and AGRHYMET	(GRDC, 2012), (ABN, 2008)
Precipitation	WATCH Forcing Data ERA-Interim (WFDEI)	(Weedon et al., 2014)
Temperature	WATCH Forcing Data ERA-Interim (WFDEI)	(Weedon et al., 2014)
Potential evapotranspiration	MOD16 (1 km ²)	(Mu et al., 2011)



**Calibration:**

Joint calibration against 56 daily discharge stations and monthly potential evapotranspiration at 1km² resolution for the period 1994-2009

Validation:

At the same 56 stations used for calibration for the independent period 1979-1993

At four independent stations for the independent period 1979-1993

Publications

Andersson, J.C.M.; Arheimer, B.; Traoré, F.; Gustafsson, D.; Ali, A. (2017). Process refinements improve a hydrological model concept applied to the Niger River basin. *Hydrological Processes*, <http://dx.doi.org/10.1002/hyp.11376>

Andersson, J.C.M., Ali A., Arheimer B., Gustafsson D., Minoungou B. (2017). Providing peak river flow statistics and forecasting in the Niger River basin. *Physics and Chemistry of the Earth*, <http://dx.doi.org/10.1016/j.pce.2017.02.010>

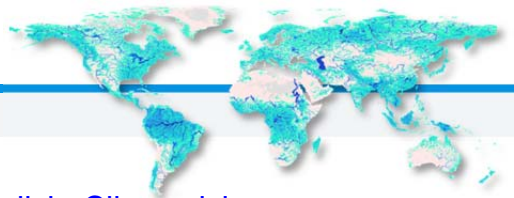
Andersson, J.C.M.; Ali, A.; Arheimer, B.; Gustafsson, D.; Minoungou, B. (2015) Providing infrastructure design variables and flood forecasting in the Niger River basin, in *Proceedings of the 16th WaterNet/WARFSA/GWP-SA Symposium "Infrastructural Planning for Water Security in Eastern and Southern Africa"*, 28–30 October 2015, Pointe Aux Piments, Mauritius. Available under <http://www.waternetonline.org/downloads/proceedings> -> 16th Symposium Full Papers -> Water Resources and Infrastructure Management for Oral Presentation.

Andersson, J.C.M.; Pechlivanidis, I.G.; Gustafsson, D.; Donnelly, C.; and B. Arheimer. (2015) Key Factors for Improving Large-scale Hydrological Model Performance. *European Water*, 49, 77-88, http://www.ewra.net/ew/pdf/EW_2015_49_06.pdf.

Andersson, J.C.M.; Ali, A.; Arheimer, B.; Traoré F. (2015) Strengthening resilience through collaborative research and open information. Poster presented at the World Water Week conference in Stockholm, Sweden, 23-28 August 2015. Available online at <http://poster.worldwaterweek.org/Default.aspx?s=E3-32-26-82-95-BA-7F-76-44-BC-FC-75-C9-20-85-59>.

Andersson, J.C.M.; Andersson, L.; Arheimer, B.; Bosshard, T.; Graham, L.P.; Nikulin, G.; Kjellström E. (2014) Experience from Assessments of Climate Change Effects on the Water Cycle in Africa, in *Proceedings of the 15th WaterNet/WARFSA/GWP-SA Symposium "IWRM for harnessing socio-economic development in Eastern and Southern Africa"*, 29–31 October 2014, Lilongwe, Malawi. Available under <http://www.waternetonline.org/downloads/proceedings> -> 15th symposium -> Hydrology for Oral Presentations.

Andersson, J.C.M.; Ali, A.; Arheimer, B.; Traoré F. (2014) Niger-HYPE: How may climate change affect floods and droughts in the Niger River basin? / Comment le changement climatique pourrait affecter les inondations et sécheresses dans le bassin du fleuve Niger?, Paper no. 2. in van Lanen H.A.J.; Demuth, S.; van der Heijden, A. (eds.) *Poster proceedings of the 7th Global FRIEND-Water conference "Hydrology in a Changing World: Environmental and Human Dimensions"*, held in Montpellier, France, 7-10 October 2014. Wageningen University, Wageningen and



UNESCO, Paris. [Click here to download the poster in English.](#) [Cliquez ici pour télécharger l'affiche en français.](#)

Contact person

For further information, please contact [Jafet Andersson](#). Funding: The model was developed in the context of collaborative research projects between Swedish and West African scientists funded by the SIDA project “Building resilience to floods and droughts in the Niger River basin - hydrological predictions for sustainable water user and climate change adaptation”, and the EU FP7 project “IMPACT2C”.

References for input data

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