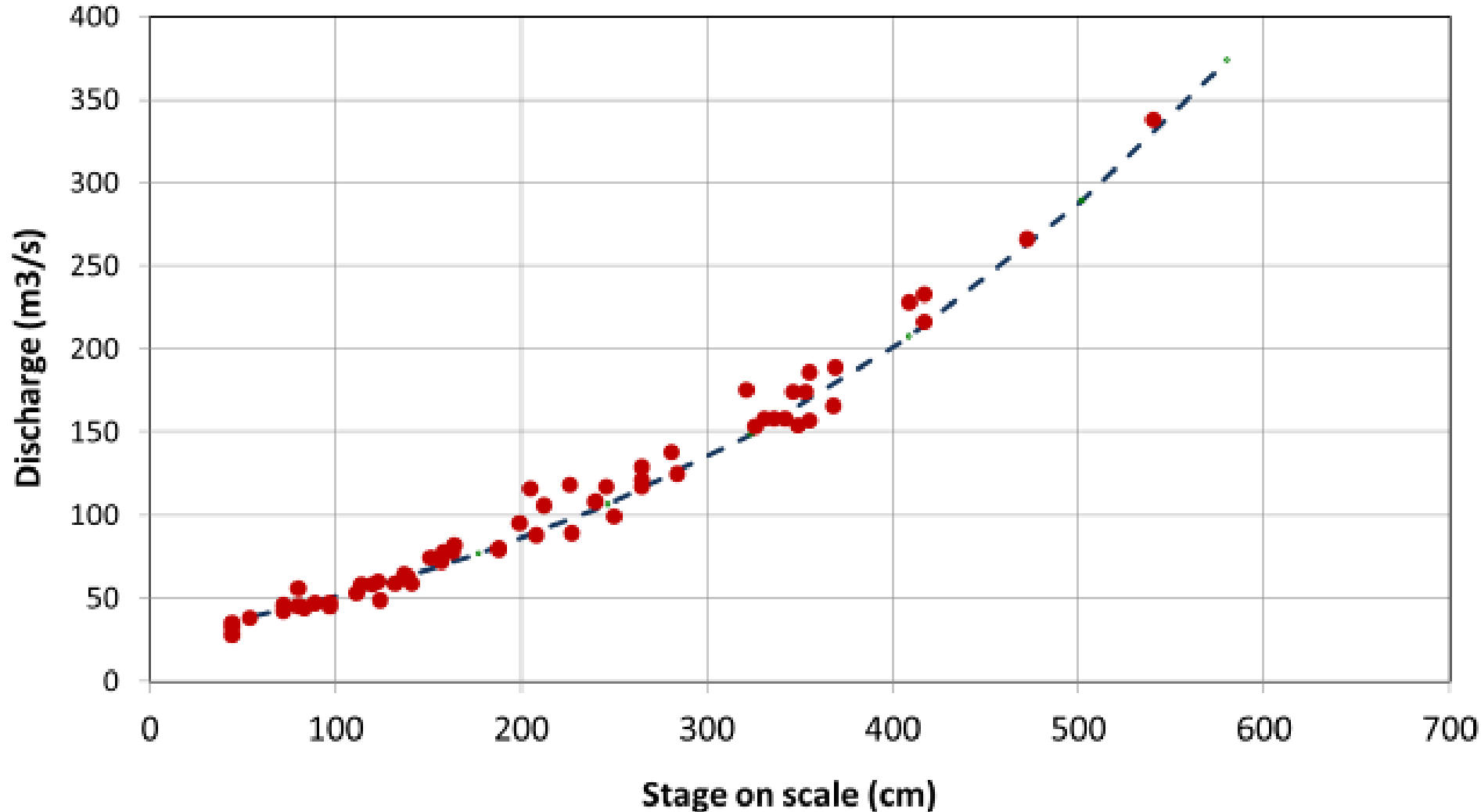


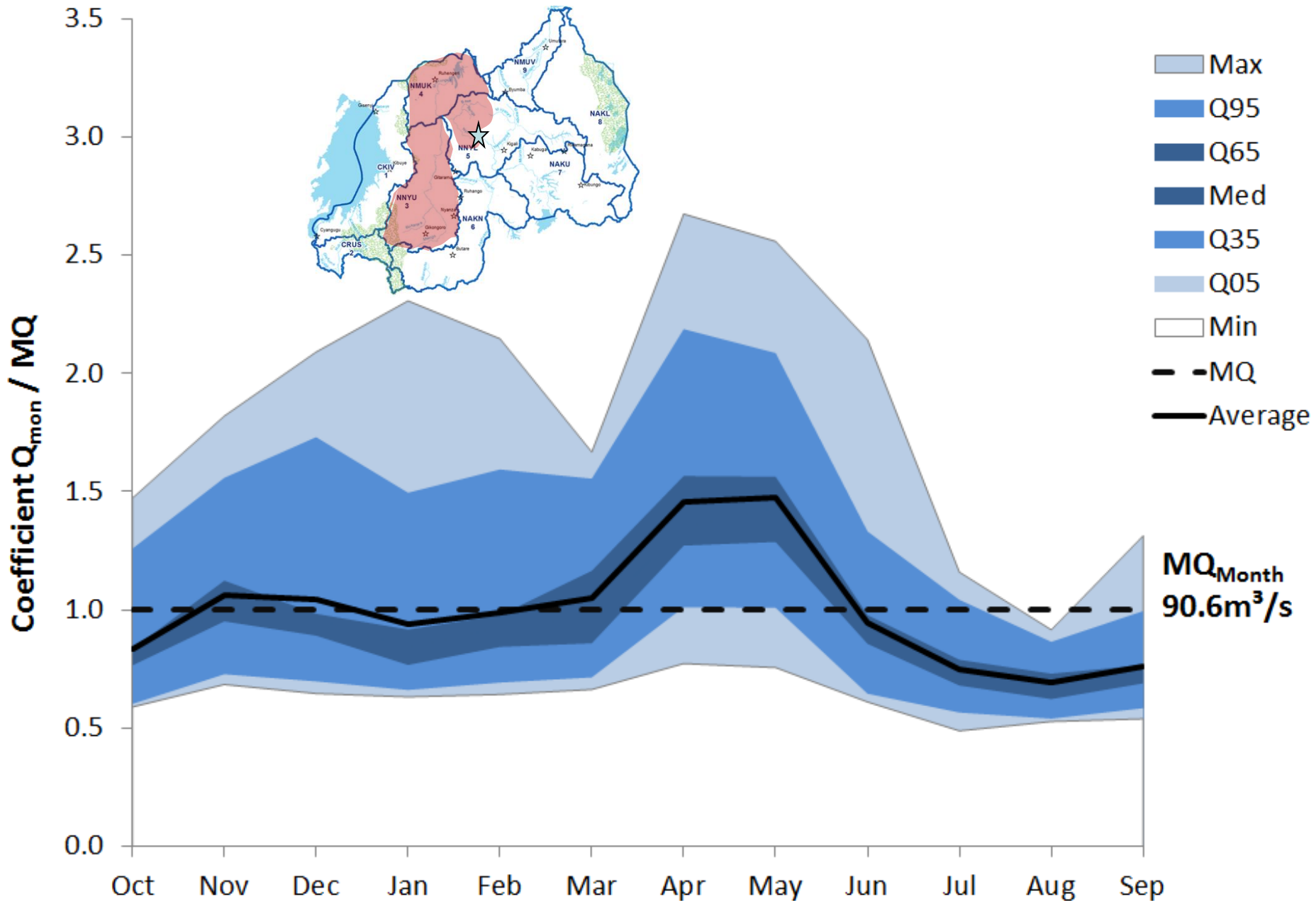
National Inventory of Water Resources (1): *Data*



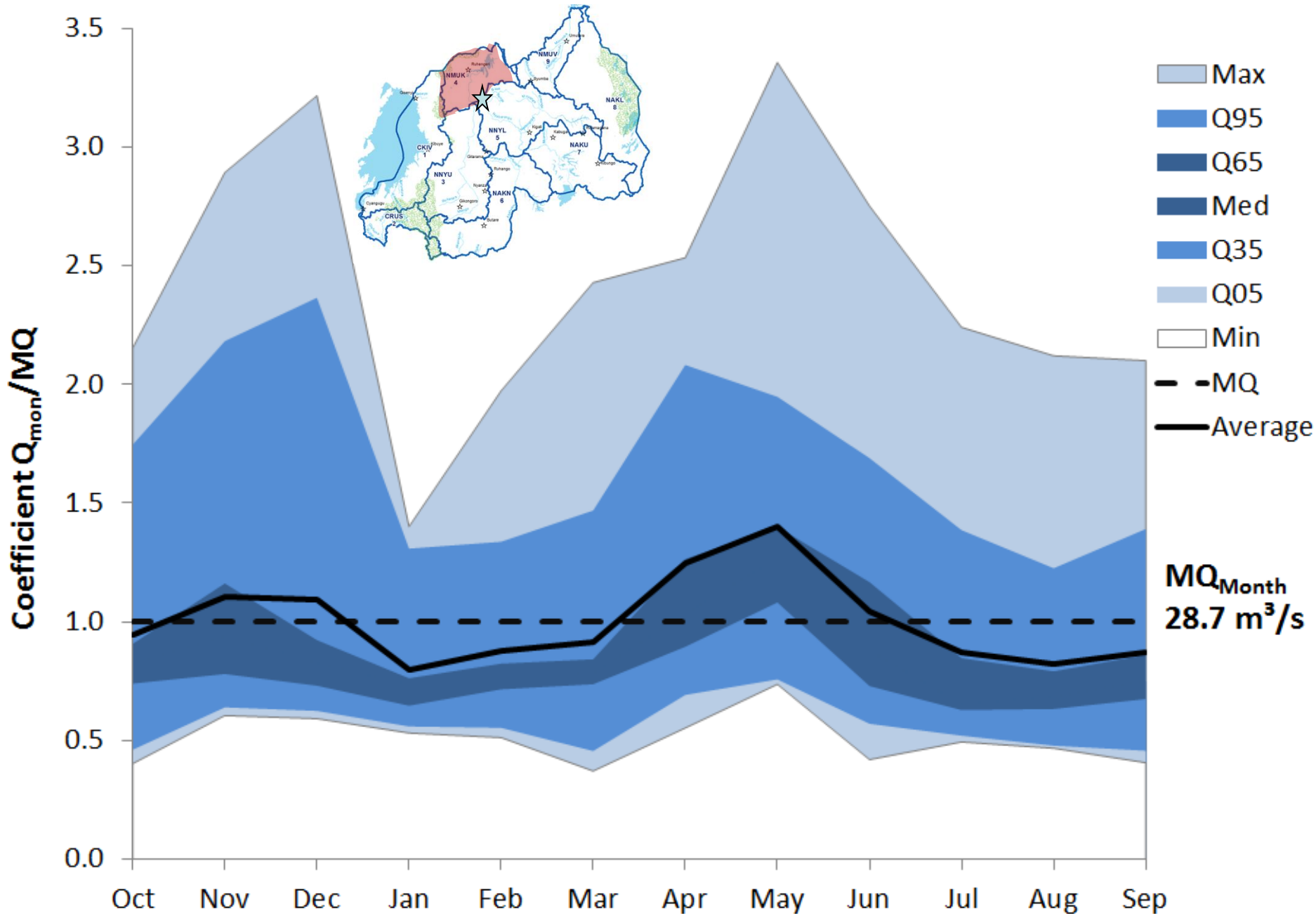
Station: 70005 = Ruliba (NNYL)
Sensor: I-H = Stages Output Sensor: I-H
Rating Table from 1/1/1955 1:00:00 AM to 1/1/2001



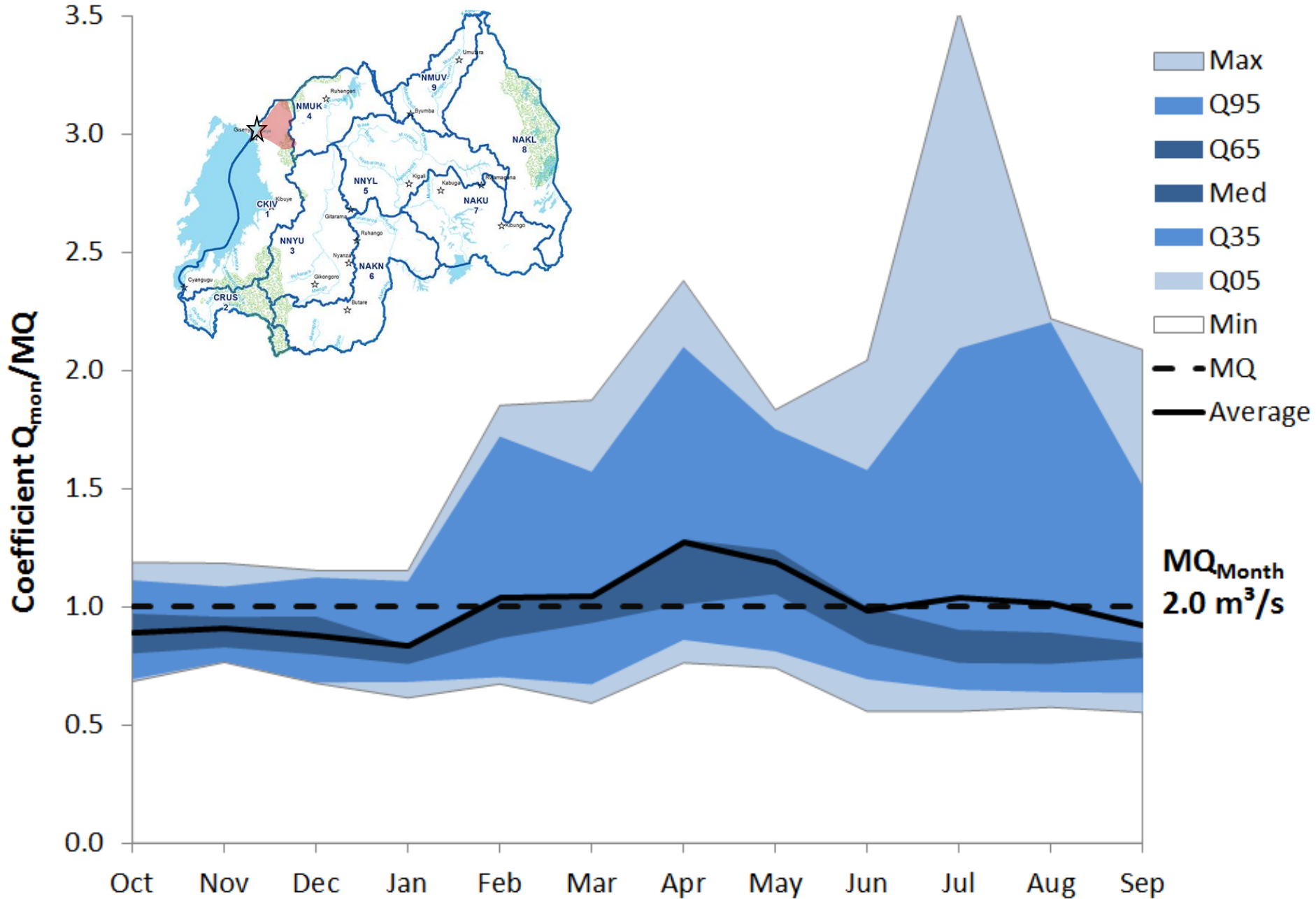
Seasonal Regime for NNYL (Station 70005)



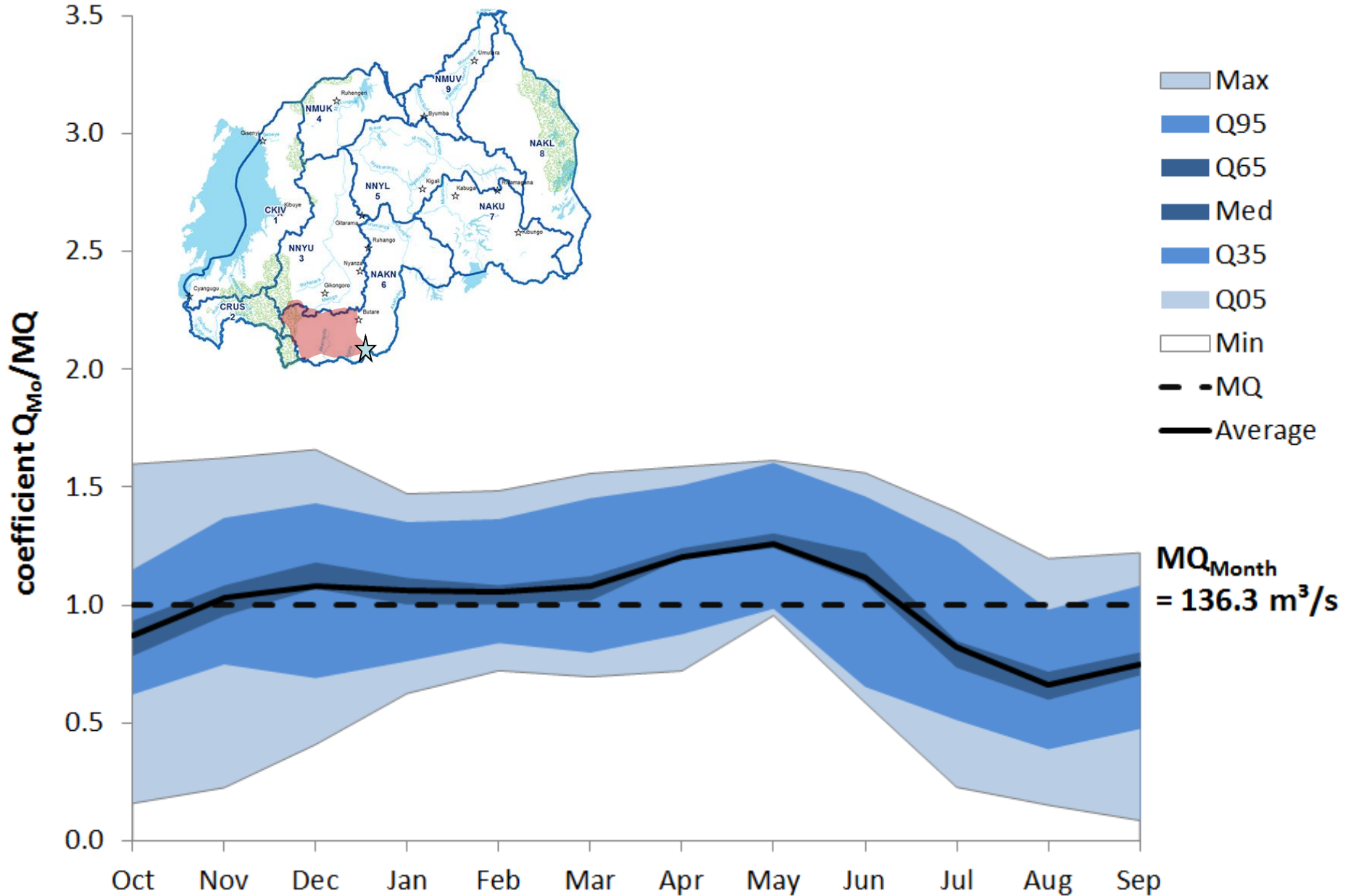
Seasonal Regime for NMUK (Ngaru 70012)



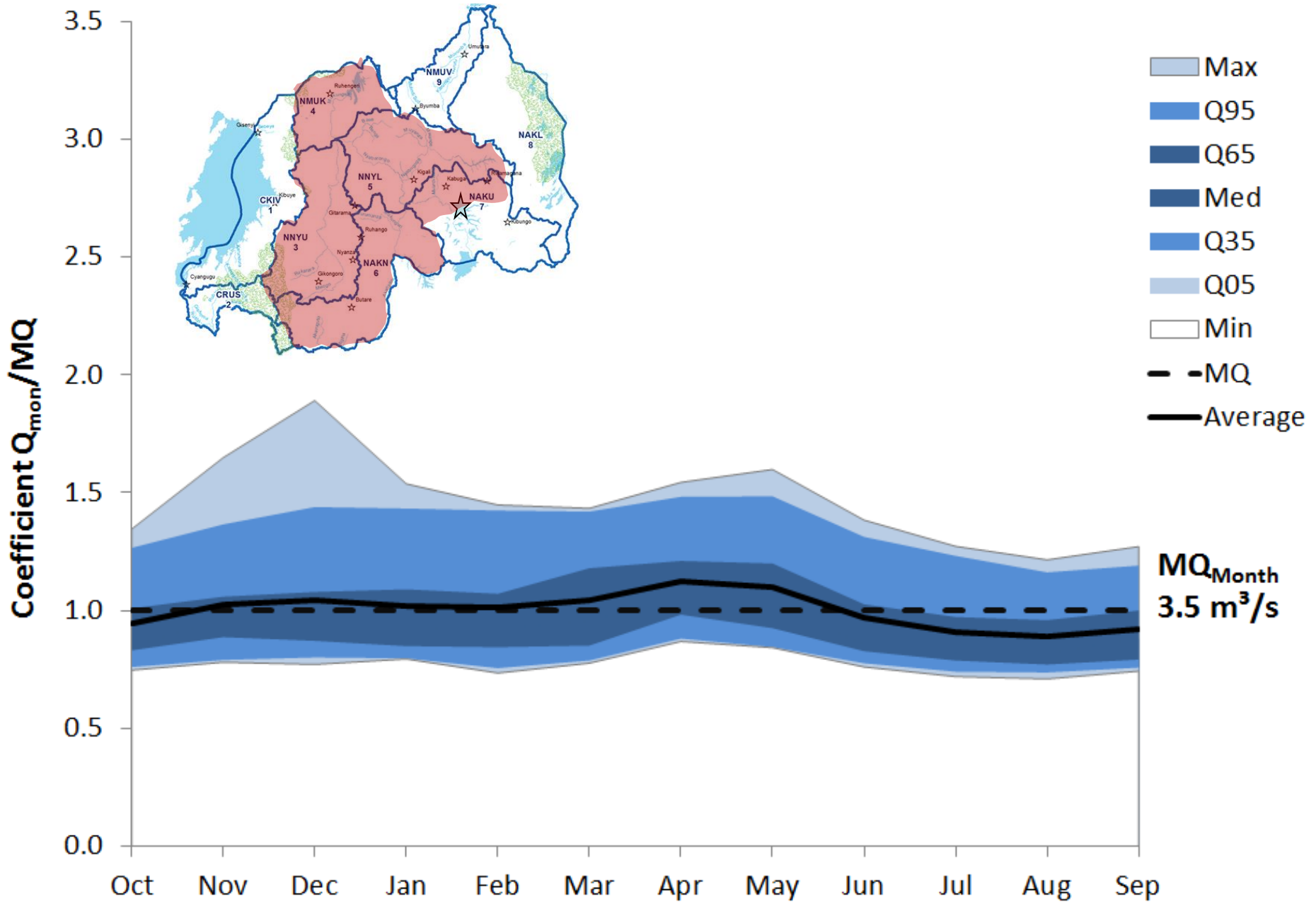
Seasonal Regime for NAKN (Kibeho 70009)



Seasonal Regime for NAKN (Kibeho 70009)

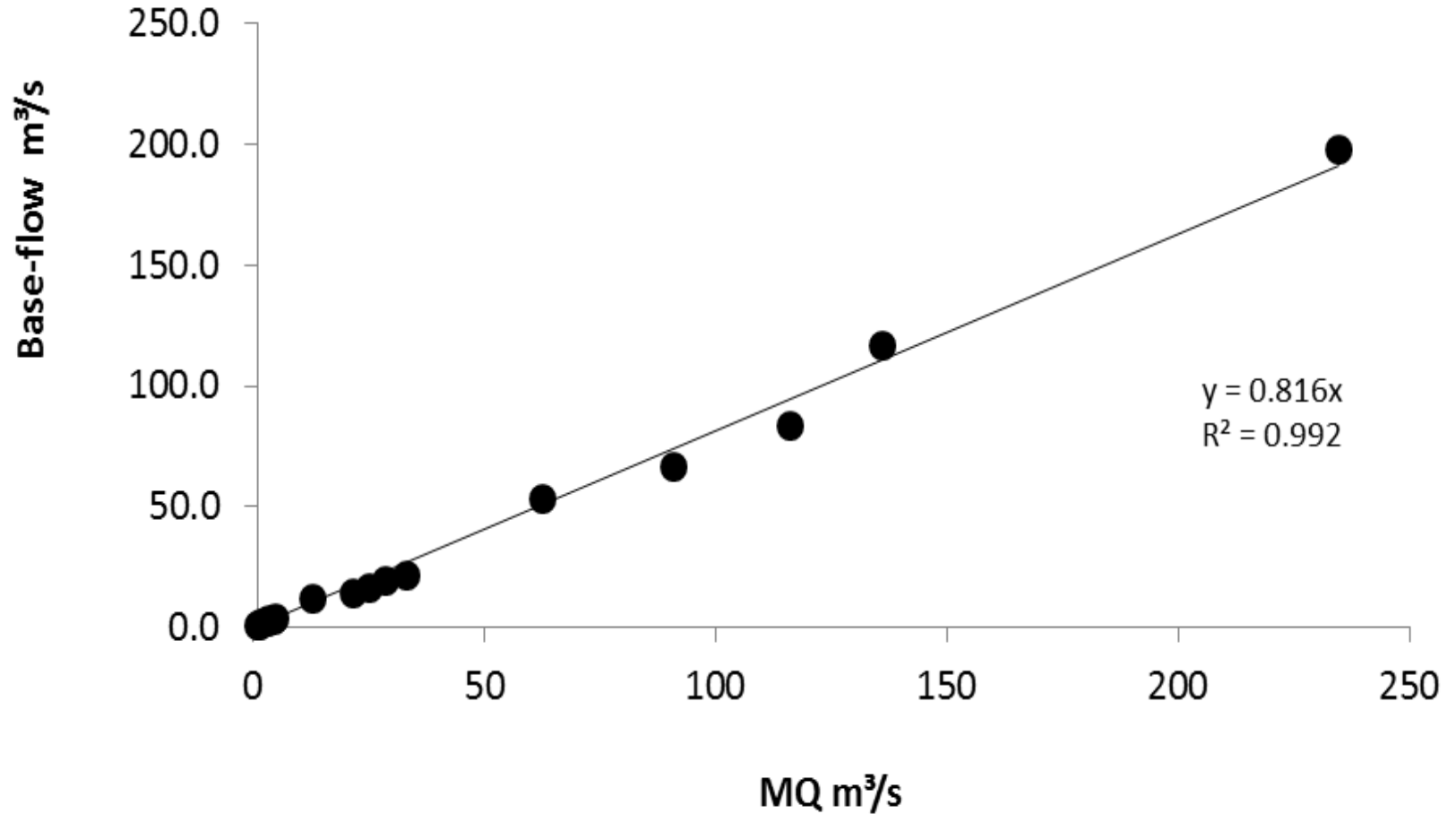


Seasonal Regime for NAKU (Kanzene 70004)



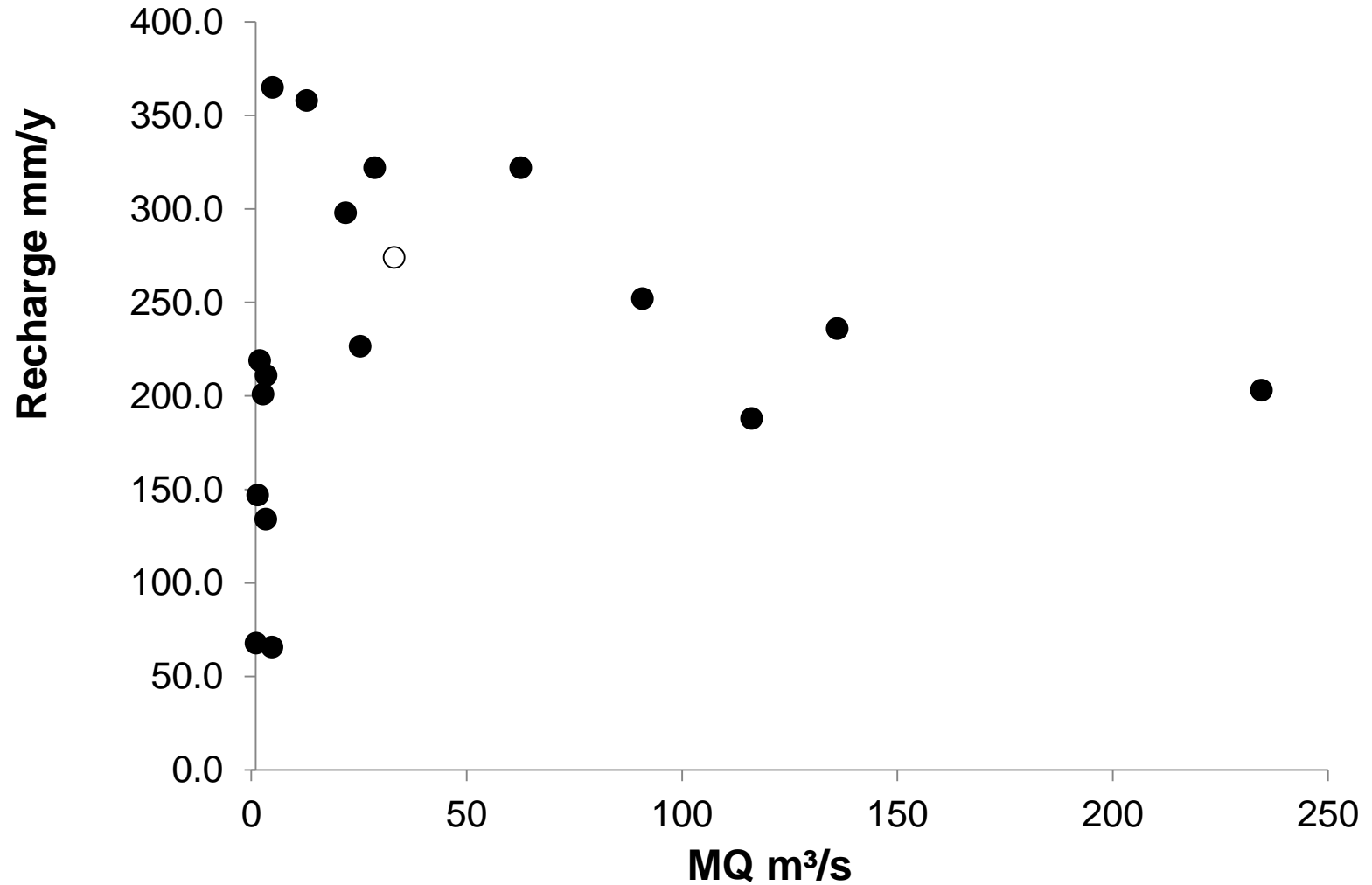
Results of Data Analysis of Streamflow Records

Prediction of Base Flow for Basins $> 100 \text{ km}^2$ from MQ



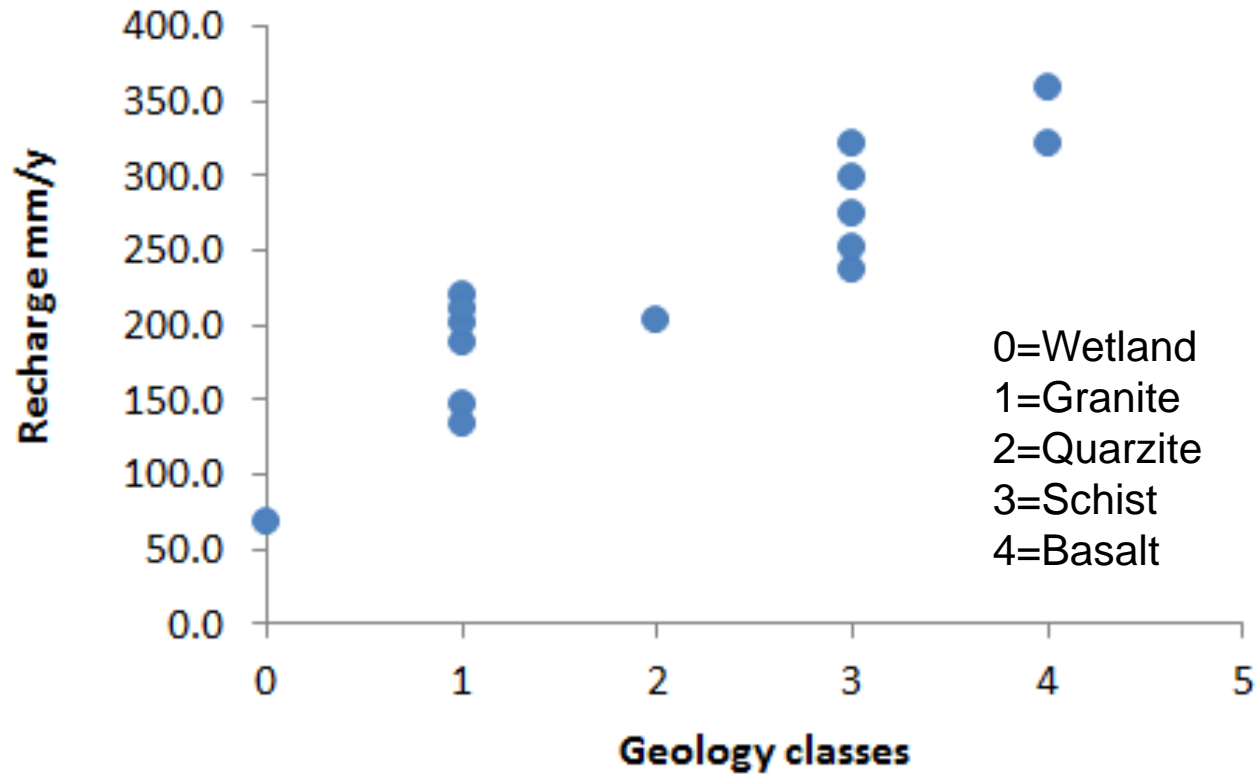
Results of Data Analysis of Streamflow Records

Prediction of Recharge for Basins $> 100 \text{ km}^2$ from MQ



Results of Data Analysis of Streamflow Records

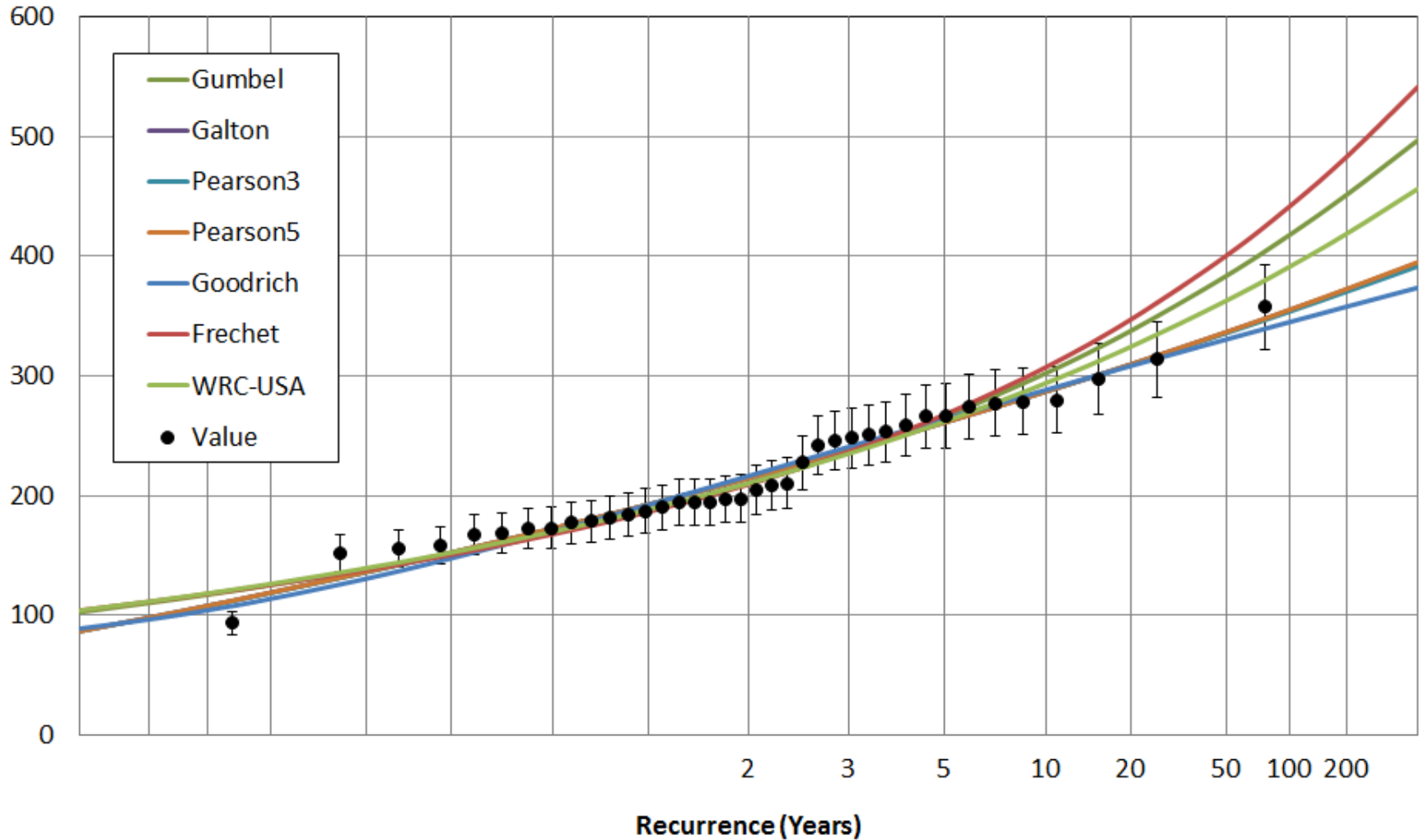
Prediction of Base Flow for Basins $> 100 \text{ km}^2$ from MQ



Results of Data Analysis of Streamflow Records

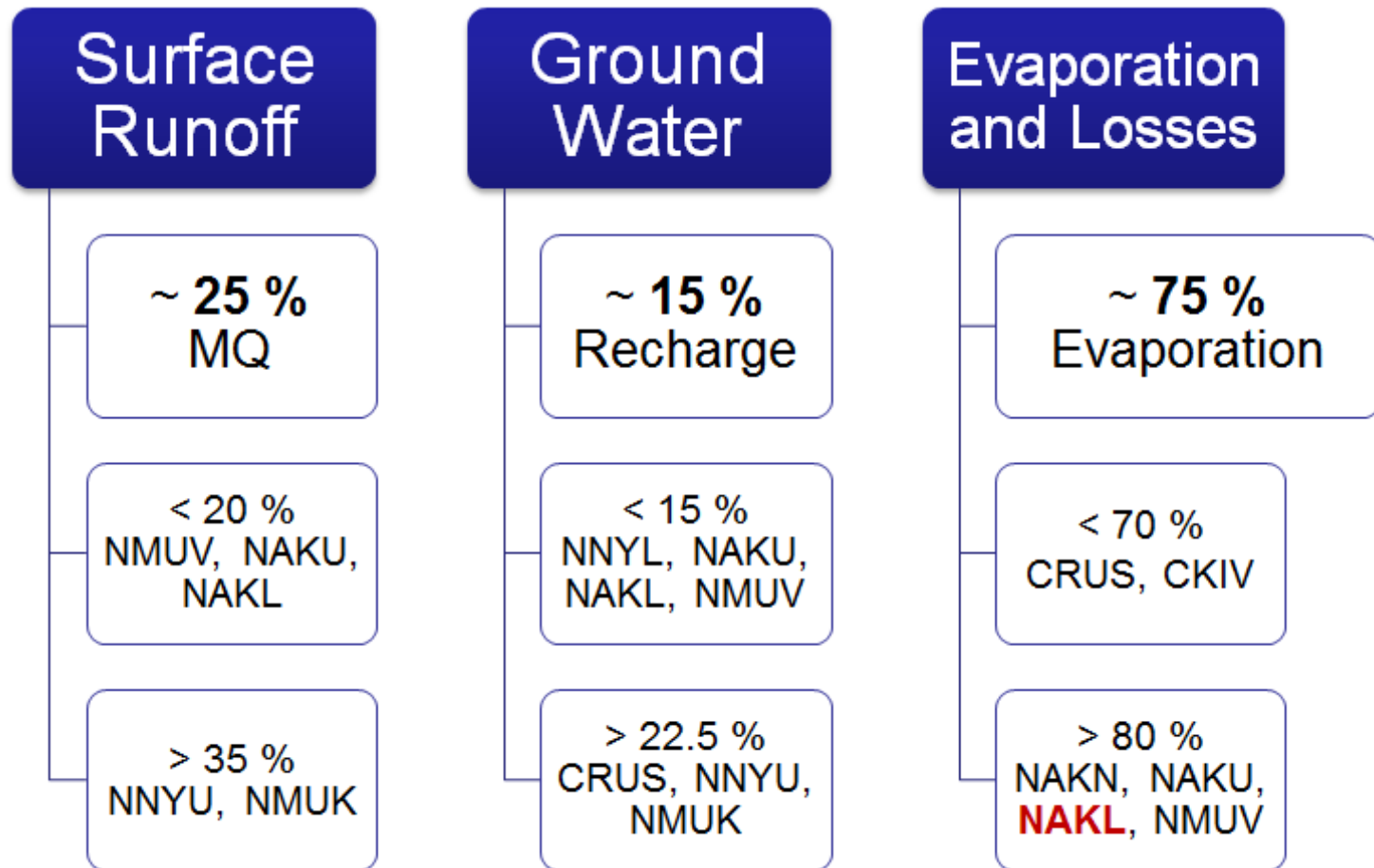
Analysis of Peak Flow and of Flood Probability

Maximum (m^3/s)
Fitting to a sample of annual values



Results of Data Analysis of Streamflow Records

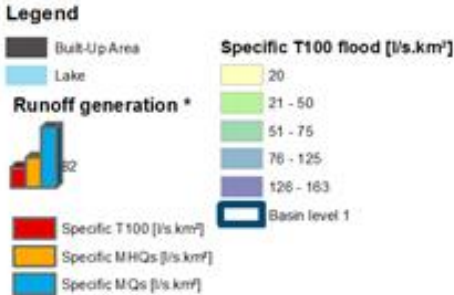
Prediction of Base Flow for Basins > 100 km² from MQ



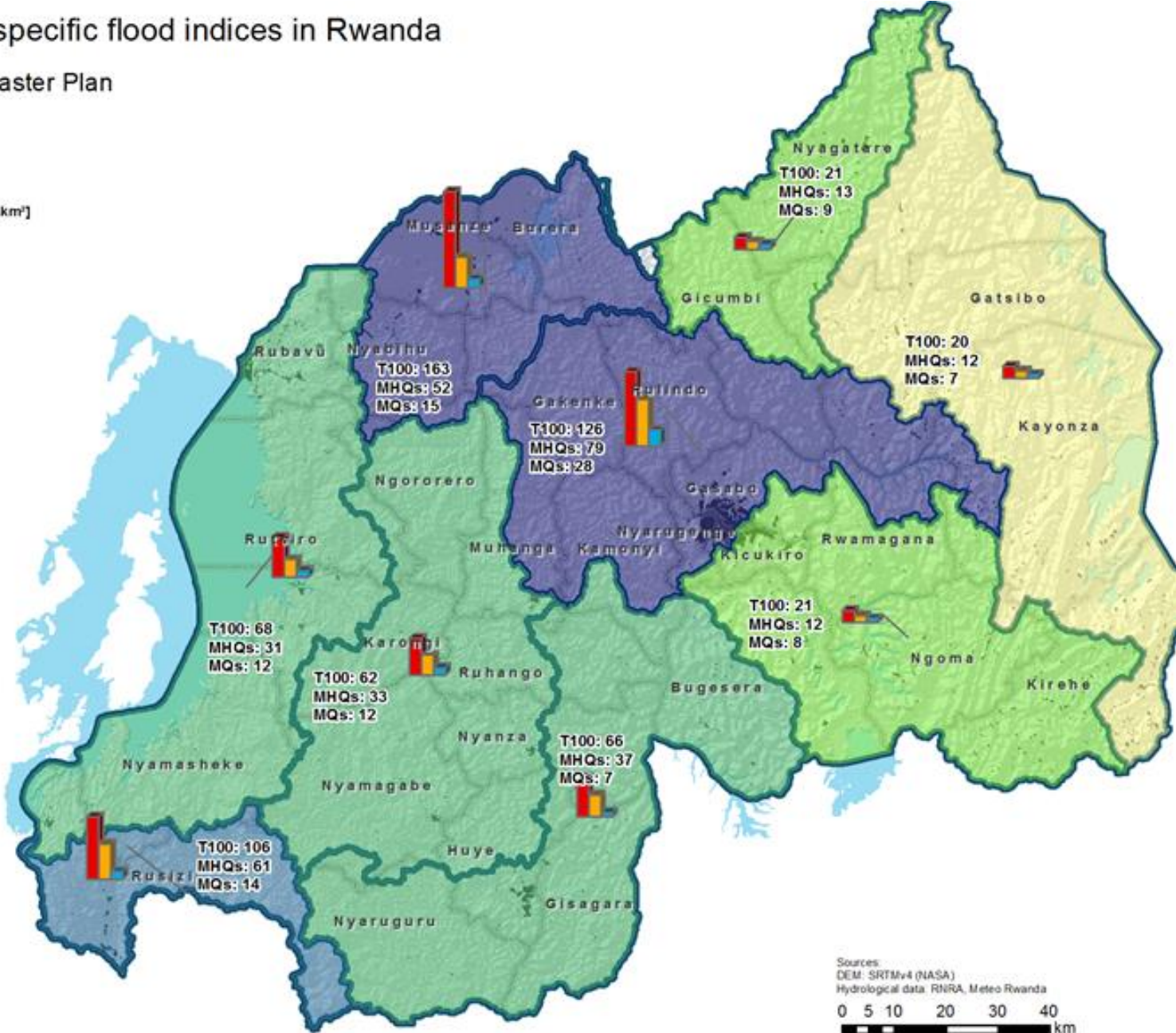
Generation of specific MQ, MHQ, T₁₀₀: Map

Runoff generation and specific flood indices in Rwanda

National Water Resources Master Plan
February 2013

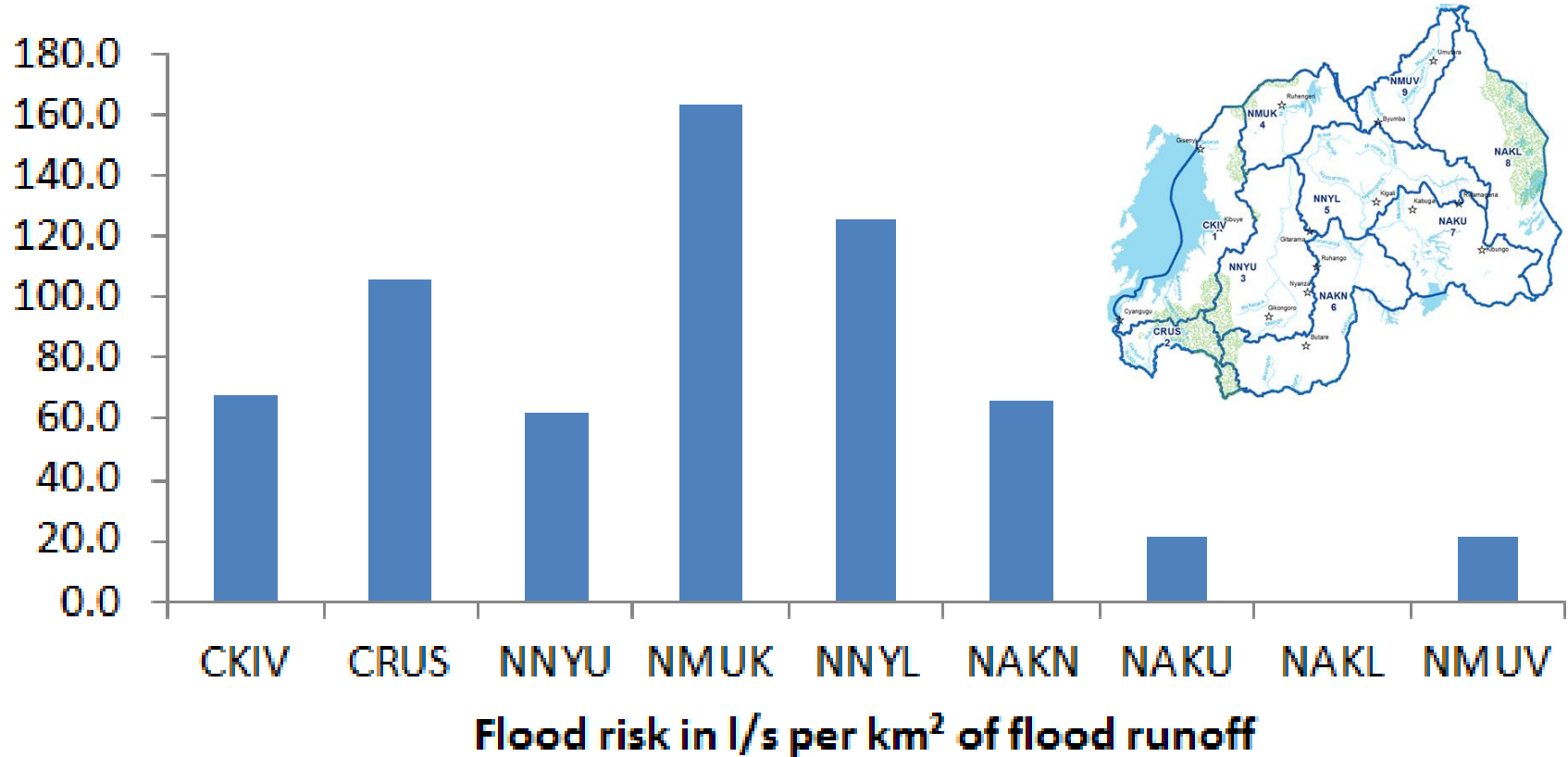


* Runoff generation in l/s per km²
T100: 100 year flood
MHQs: Average of annual max. flood
MQs: Mean flow



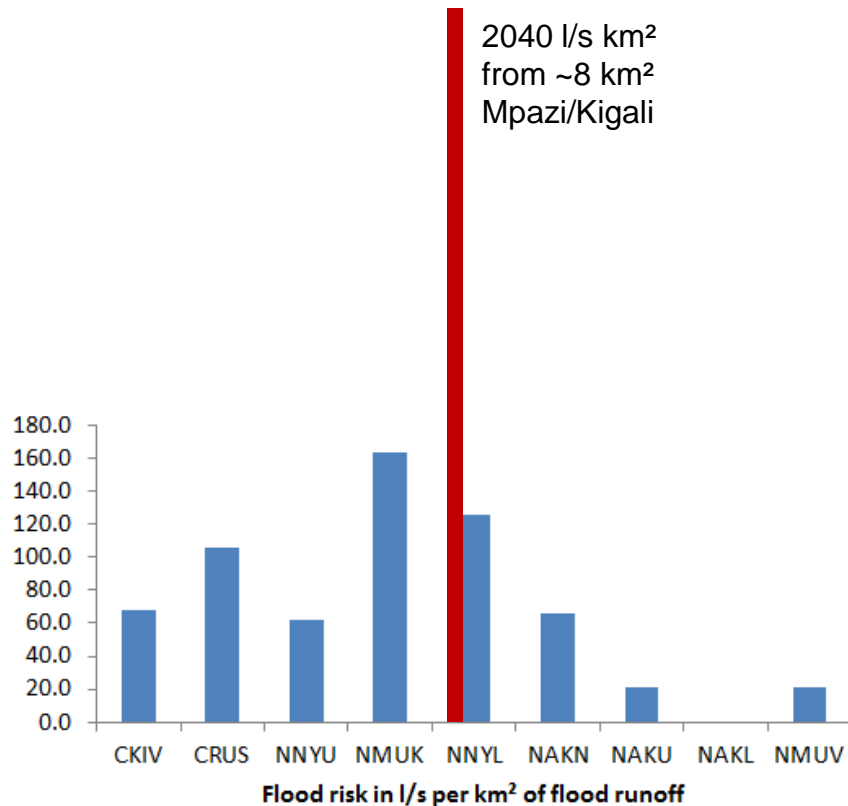
Results of Data Analysis of Streamflow Records

Analysis of Peak Flow and of Flood Probability



Results of Data Analysis of Streamflow Records

Analysis of Peak Flow and of Flood Probability



Results

- *Runoff production is scale dependent*
- *Small catchments (urban) extreme floods, extra effects*

Water Resources per Person in m³ per year

Water Yield per Person in Rwanda

National Water Resources Master Plan
2013

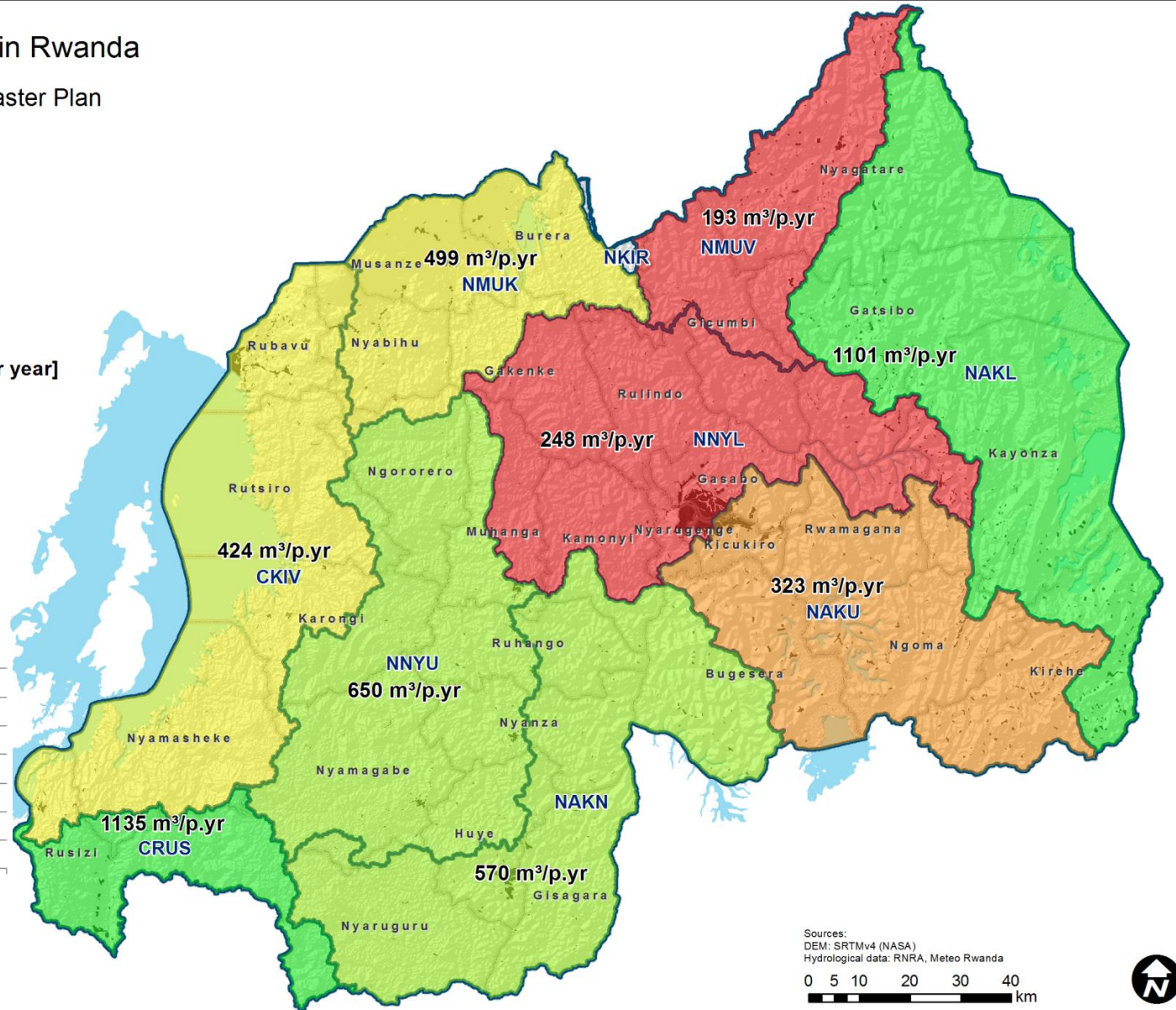
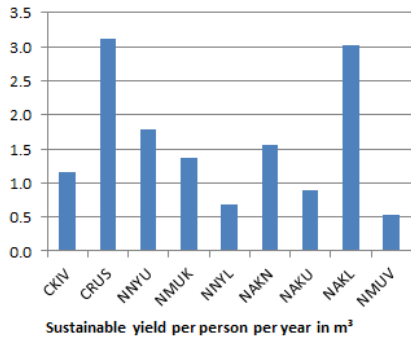
Legend

- Built-Up Area
- Lake
- District
- Basin level 1

Yield per person [m³ / person per year]

- 193 - 250
- 251 - 350
- 351 - 500
- 501 - 750
- 751 - 1135

* Population data: census 2002, projections, NISR
NWRMP projections and regionalisations



Sources:
DEM: SRTMv4 (NASA)
Hydrological data: RNRA, Meteo Rwanda

0 5 10 20 30 40
km



SHER Ingénieurs-Conseils s.a.
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Seasonal (monthly) Availability

Surface and Groundwater at Different Probability

NMUV	unit	annual	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep
1565	km ²													
1565	km ²													
Rainfall	TCM	1557175												
Evaporation	TCM	1364335												
Mean Runoff	TCM	192840												
Regime Rs														
5%	(-)	1.50	1.43	2.13	1.63	1.16	1.25	1.28	2.26	2.25	1.29	1.12	1.11	1.15
Regime Rs														
35%	(-)	1.03	1.02	1.06	1.05	0.99	0.98	1.02	1.13	1.12	1.02	0.99	0.98	0.99
Regime Rs														
50%	(-)	0.96	0.95	1.00	0.99	0.92	0.93	0.95	1.07	1.06	0.94	0.91	0.91	0.91
Regime Rs 65														
%	(-)	0.90	0.89	0.94	0.93	0.87	0.85	0.88	1.00	0.99	0.88	0.83	0.83	0.84
Regime Rs														
95%	(-)	0.56	0.54	0.69	0.67	0.52	0.40	0.47	0.85	0.85	0.52	0.35	0.39	0.52
Runoff (Q5)	TCM	290071	22974	34164	26179	18623	20148	20605	36243	36165	20772	18006	17761	18433
Runoff (Q35)	TCM	198480	16342	17065	16883	15839	15739	16398	18235	18018	16420	15951	15683	15907
Runoff (Q50)	TCM	185593	15314	16080	15957	14706	14901	15337	17124	16990	15169	14694	14666	14655
Runoff (Q65)	TCM	172744	14287	15169	14923	14007	13656	14169	16063	15962	14141	13403	13400	13564
Runoff (Q95)	TCM	108685	8662	11025	10689	8358	6390	7572	13716	13684	8423	5602	6246	8320

Results

- *Example of Muvumba, total and percent*
- *Note low relative values in July and August for 95 %*