

Supplementary Material 2: Improving Future Estimation of Cheliff-Mactaa-Tafna Stream-flow via an Ensemble of Bias Correction Approaches.

Table S1 Evapotranspiration changes on future time horizons: 2050 and 2100.

Stations	RCP4.5 2050	RCP4.5 2100	RCP8.5 2050	RCP8.5 2100
Bir Ouled Tahar	36%	53%	31%	79%
Tikezal	33%	47%	29%	77%
Larabaa Ouled Fares	35%	49%	32%	79%
Ammi Moussa	41%	56%	38%	92%
Oued Lilli	41%	56%	38%	92%
Djediouia	39%	54%	36%	87%
Haciaba	41%	57%	36%	94%
Chouly	33%	47%	29%	77%

Projected season precipitation

Table S2 Change in mean seasonal (autumn) precipitation projection in CMT basins from the baseline period (1975–2012).

STATIONS	Autumn							
	Quantile Mapping (QM)				Scaled Distribution Mapping (SDM)			
	RCP4.5	RCP4.5	RCP8.5	RCP8.5	RCP4.5	RCP4.5	RCP8.5	RCP8.5
	2050	2100	2050	2100	2050	2100	2050	2100
Bir Ouled Tahar	-16%	-29%	-31%	-48%	-7%	-26%	-11%	-28%
Tikezal	-45%	-55%	-49%	-53%	-25%	-38%	-29%	-27%
Larabaa Ouled Fares	-25%	-28%	-23%	-46%	-25%	-16%	-20%	-23%
Ammi Moussa	-16%	-17%	-26%	-41%	13%	4%	-11%	-10%
Oued Lilli	8%	-17%	-26%	-41%	17%	18%	-11%	-10%
Djediouia	-31%	-29%	-37%	-47%	-18%	-21%	-5%	3%
Haciaba	-62%	-58%	-68%	-59%	-50%	-44%	-56%	-48%
Chouly	-15%	-26%	-31%	-43%	4%	1%	-11%	-12%
STATIONS	Quantile Delta Mapping (QDM)				Model (RAW)			
	RCP4.5	RCP4.5	RCP8.5	RCP8.5	RCP4.5	RCP4.5	RCP8.5	RCP8.5
	2050	2100	2050	2100	2050	2100	2050	2100
	2050	2100	2050	2100	2050	2100	2050	2100
Bir Ouled Tahar	6%	-10%	-14%	-32%	-12%	-25%	-22%	-41%
Tikezal	-26%	-38%	-31%	-37%	-35%	-47%	-39%	-43%
Larabaa Ouled Fares	-23%	-25%	-20%	-45%	-24%	-37%	-33%	-52%
Ammi Moussa	-4%	-5%	-14%	-29%	14%	-5%	-18%	-29%
Oued Lilli	21%	-5%	-14%	-29%	14%	-5%	-18%	-29%
Djediouia	-26%	-25%	-34%	-43%	-7%	-28%	-29%	-44%
Haciaba	75%	93%	77%	91%	-26%	-21%	-31%	-23%
Chouly	79%	65%	59%	43%	-4%	-3%	-6%	-17%

Table S3 Change in mean seasonal (Winter) precipitation projection in CMT basins from the baseline period (1975–2012).

Winter								
STATIONS	Quantile Mapping (QM)				Scaled Distribution Mapping (SDM)			
	RCP4.5	RCP4.5	RCP8.5	RCP8.5	RCP4.5	RCP4.5	RCP8.5	RCP8.5
	2050	2100	2050	2100	2050	2100	2050	2100
Bir Ouled Tahar	-22%	-22%	-35%	-36%	-15%	-25%	-27%	-41%
Tikezal	-52%	-56%	-49%	-45%	-35%	-43%	-34%	-47%
Larabaa Ouled Fares	-10%	-3%	-15%	-21%	-19%	-18%	-22%	-34%
Ammi Moussa	-23%	-32%	-34%	-36%	-10%	-27%	-23%	-24%
Oued Lilli	-16%	-21%	-34%	-36%	-10%	-18%	-21%	-24%
Djediouia	-15%	-30%	-26%	-17%	-29%	-43%	-17%	-27%
Haciaba	-28%	-45%	-54%	-70%	-5%	-30%	-39%	-45%
Chouly	-25%	-41%	-46%	-55%	-14%	-24%	-37%	-48%
STATIONS	Quantile Delta Mapping (QDM)				Model (RAW)			
	RCP4.5	RCP4.5	RCP8.5	RCP8.5	RCP4.5	RCP4.5	RCP8.5	RCP8.5
	2050	2100	2050	2100	2050	2100	2050	2100
Bir Ouled Tahar	-6%	-6%	-20%	-33%	-19%	-19%	-29%	-38%
Tikezal	-37%	-43%	-35%	-33%	-44%	-51%	-41%	-44%
Larabaa Ouled Fares	-5%	2%	-11%	-18%	-18%	-22%	-31%	-35%
Ammi Moussa	-19%	-27%	-26%	-27%	-12%	-18%	-28%	-30%
Oued Lilli	-7%	-13%	-26%	-27%	-12%	-18%	-28%	-30%
Djediouia	-10%	9%	-22%	-10%	-11%	-19%	-28%	-29%
Haciaba	-5%	15%	-5%	98%	-18%	-30%	-51%	-25%
Chouly	37%	17%	11%	0%	-20%	-24%	-31%	-42%

Table S4 Change in mean seasonal (Spring) precipitation projection in CMT basins from the baseline period (1975–2012).

Spring								
STATIONS	Quantile Mapping (QM)				Scaled Distribution Mapping (SDM)			
	RCP4.5	RCP4.5	RCP8.5	RCP8.5	RCP4.5	RCP4.5	RCP8.5	RCP8.5
	2050	2100	2050	2100	2050	2100	2050	2100
Bir Ouled Tahar	-27%	-34%	-13%	-62%	-27%	-19%	0%	-41%
Tikezal	-82%	-58%	-38%	-68%	-75%	-37%	-17%	-42%
Larabaa Ouled Fares	-20%	-25%	-9%	-54%	-16%	-19%	2%	-37%
Ammi Moussa	-41%	-41%	-19%	-71%	-16%	-23%	-12%	-49%
Oued Lilli	-33%	-41%	-19%	-71%	-13%	-14%	-8%	-49%
Djediouia	-34%	-31%	-19%	-59%	-32%	-32%	-14%	-40%
Haciaba	-65%	-74%	-65%	-94%	-50%	-58%	-50%	-80%
Chouly	-47%	-54%	-43%	-79%	-34%	-40%	-29%	-66%

STATIONS	Quantile Delta Mapping (QDM)				Model (RAW)			
	RCP4.5	RCP4.5	RCP8.5	RCP8.5	RCP4.5	RCP4.5	RCP8.5	RCP8.5
	2050	2100	2050	2100	2050	2100	2050	2100
Bir Ouled Tahar	-8%	-15%	-5%	-47%	-22%	-25%	-9%	-55%
Tikezal	-76%	-41%	-20%	-54%	-78%	-48%	-28%	-59%
Larabaa Ouled Fares	-17%	-22%	-5%	-53%	-31%	-34%	-21%	-57%
Ammi Moussa	-25%	-31%	-9%	-61%	-25%	-31%	-13%	-62%
Oued Lilli	-23%	-31%	-9%	-61%	-25%	-31%	-13%	-62%
Djediouia	-27%	-27%	-15%	-55%	-29%	-33%	-19%	-58%
Haciaba	69%	75%	100%	17%	-31%	-35%	-22%	-64%
Chouly	18%	8%	23%	-23%	-35%	-38%	-25%	-63%

Table S5 Change in mean seasonal (Summer) precipitation projection in CMT basins from the baseline period (1975–2012).

STATIONS	Summer Quantile Mapping (QM)				Summer Scaled Distribution Mapping (SDM)			
	RCP4.5	RCP4.5	RCP8.5	RCP8.5	RCP4.5	RCP4.5	RCP8.5	RCP8.5
	2050	2100	2050	2100	2050	2100	2050	2100
Bir Ouled Tahar	-21%	-29%	-11%	-24%	38%	21%	42%	35%
Tikezal	-3%	-16%	2%	-9%	43%	37%	58%	44%
Larabaa Ouled Fares	-24%	8%	17%	7%	14%	60%	36%	28%
Ammi Moussa	85%	-17%	17%	-32%	10%	-2%	-9%	3%
Oued Lilli	-34%	-37%	-31%	-47%	14%	9%	-25%	-3%
Djediouia	91%	52%	-24%	-6%	93%	98%	12%	88%
Haciaba	46%	99%	84%	85%	88%	78%	83%	85%
Chouly	-29%	-28%	5%	-2%	-12%	-5%	14%	20%

STATIONS	Quantile Delta Mapping (QDM)				Model (RAW)			
	RCP4.5	RCP4.5	RCP8.5	RCP8.5	RCP4.5	RCP4.5	RCP8.5	RCP8.5
	2050	2100	2050	2100	2050	2100	2050	2100
Bir Ouled Tahar	36%	25%	43%	28%	-5%	-15%	7%	-6%
Tikezal	49%	47%	56%	44%	11%	0%	19%	0%
Larabaa Ouled Fares	50%	3%	12%	1%	22%	30%	26%	13%
Ammi Moussa	98%	21%	5%	-4%	3%	-15%	-17%	-22%
Oued Lilli	21%	-4%	8%	-4%	3%	-15%	-17%	-22%
Djediouia	92%	65%	-4%	7%	88%	72%	2%	37%
Haciaba	73%	90%	73%	53%	59%	78%	77%	53%
Chouly	24%	32%	26%	35%	-18%	-10%	3%	-4%

Streamflow projected season

Table S6 Change in mean seasonal (Autumn) projected streamflow in CMT basins from the baseline period (1975–2012).

Autumn								
STATIONS	Quantile Mapping (QM)				Scaled Distribution Mapping (SDM)			
	RCP4.5	RCP4.5	RCP8.5	RCP8.5	RCP4.5	RCP4.5	RCP8.5	RCP8.5
	2050	2100	2050	2100	2050	2100	2050	2100
Bir Ouled Tahar	20%	-94%	-93%	-84%	12%	-91%	-41%	-85%
Tikezal	-91%	-92%	-91%	-92%	-89%	-91%	-68%	-89%
Larabaa Ouled Fares	-8%	-13%	-9%	-35%	-10%	-10%	-5%	-3%
Ammi Moussa	-59%	-60%	-45%	-64%	-52%	-53%	-39%	-45%
Oued Lilli	-17%	-18%	-25%	-42%	10%	4%	-12%	-13%
Djediouia	-75%	-71%	-66%	-87%	-87%	-78%	-57%	-30%
Haciaba	-84%	-80%	-83%	-82%	-81%	-78%	-82%	-81%
Chouly	-68%	-85%	-85%	-92%	-73%	-77%	-81%	-87%

STATIONS	Quantile Delta Mapping (QDM)				Model (RAW)			
	RCP4.5	RCP4.5	RCP8.5	RCP8.5	RCP4.5	RCP4.5	RCP8.5	RCP8.5
	2050	2100	2050	2100	2050	2100	2050	2100
Bir Ouled Tahar	70%	18%	-1%	-78%	33%	-97%	-96%	-97%
Tikezal	-90%	-91%	-89%	-91%	-91%	-97%	-95%	-97%
Larabaa Ouled Fares	-4%	-9%	-6%	-32%	-6%	-23%	-41%	-41%
Ammi Moussa	-53%	-53%	-36%	-56%	-46%	-54%	-45%	-56%
Oued Lilli	-5%	-6%	-12%	-30%	16%	4%	-19%	-30%
Djediouia	-71%	-90%	-72%	-84%	-45%	-89%	-78%	-95%
Haciaba	-64%	-56%	-58%	-56%	-78%	-77%	-79%	-77%
Chouly	52%	-20%	-87%	-75%	-80%	-77%	-81%	-89%

Table S7 Change in mean seasonal (Winter) projected streamflow in CMT basins from the baseline period (1975–2012).

Winter								
STATIONS	Quantile Mapping (QM)				Scaled Distribution Mapping (SDM)			
	RCP4.5	RCP4.5	RCP8.5	RCP8.5	RCP4.5	RCP4.5	RCP8.5	RCP8.5
	2050	2100	2050	2100	2050	2100	2050	2100
Bir Ouled Tahar	-26%	-14%	-72%	-18%	-21%	-53%	-10%	-44%
Tikezal	-89%	-90%	4%	67%	-31%	-63%	105%	38%
Larabaa Ouled Fares	-20%	-10%	-26%	-28%	-47%	-28%	-31%	-43%
Ammi Moussa	-29%	-29%	-7%	-28%	-32%	-33%	3%	-14%
Oued Lilli	-23%	-11%	-28%	-29%	-17%	-28%	-14%	-28%
Djediouia	60%	29%	71%	83%	-21%	30%	66%	48%
Haciaba	21%	-4%	-46%	-46%	46%	29%	-13%	-4%
Chouly	-22%	-33%	-39%	-84%	-13%	13%	-42%	-88%

STATIONS	Quantile Delta Mapping (QDM)				Model (RAW)			
	RCP4.5	RCP4.5	RCP8.5	RCP8.5	RCP4.5	RCP4.5	RCP8.5	RCP8.5
	2050	2100	2050	2100	2050	2100	2050	2100
Bir Ouled Tahar	70%	18%	-1%	-78%	33%	-97%	-96%	-97%
Tikezal	-90%	-91%	-89%	-91%	-91%	-97%	-95%	-97%
Larabaa Ouled Fares	-4%	-9%	-6%	-32%	-6%	-23%	-41%	-41%
Ammi Moussa	-53%	-53%	-36%	-56%	-46%	-54%	-45%	-56%
Oued Lilli	-5%	-6%	-12%	-30%	16%	4%	-19%	-30%
Djediouia	-71%	-90%	-72%	-84%	-45%	-89%	-78%	-95%
Haciaba	-64%	-56%	-58%	-56%	-78%	-77%	-79%	-77%
Chouly	52%	-20%	-87%	-75%	-80%	-77%	-81%	-89%

	2050	2100	2050	2100	2050	2100	2050	2100
Bir Ouled Tahar	-3%	46%	8%	4%	58%	-13%	-38%	-84%
Tikezal	-29%	-80%	105%	158%	-86%	-90%	53%	-36%
Larabaa Ouled Fares	-16%	-6%	-22%	-25%	-28%	-28%	-74%	-40%
Ammi Moussa	-22%	-22%	8%	-14%	-11%	-8%	-2%	-31%
Oued Lilli	-20%	-22%	-20%	-20%	-15%	1%	-26%	-35%
Djediouia	84%	-48%	52%	113%	55%	63%	21%	-8%
Haciaba	96%	96%	96%	96%	54%	29%	-15%	37%
Chouly	275%	177%	-51%	-7%	-38%	-9%	-33%	-85%

Table S8 Change in mean seasonal (Spring) projected streamflow in CMT basins from the baseline period (1975–2012).

Spring								
STATIONS	Quantile Mapping (QM)				Scaled Distribution Mapping (SDM)			
	RCP4.5	RCP4.5	RCP8.5	RCP8.5	RCP4.5	RCP4.5	RCP8.5	RCP8.5
	2050	2100	2050	2100	2050	2100	2050	2100
Bir Ouled Tahar	-2%	30%	37%	-62%	-7%	50%	10%	-40%
Tikezal	-94%	-93%	-48%	-94%	-92%	-1%	39%	-28%
Larabaa Ouled Fares	48%	41%	65%	-13%	54%	48%	91%	18%
Ammi Moussa	8%	10%	13%	-75%	26%	36%	6%	-51%
Oued Lilli	-50%	-49%	-32%	-77%	-37%	-40%	-29%	-61%
Djediouia	-62%	-23%	58%	-54%	-83%	-35%	-32%	-59%
Haciaba	-79%	-86%	-79%	-92%	-72%	-81%	-75%	-85%
Chouly	-87%	-73%	-67%	-97%	-79%	-63%	-60%	-98%

STATIONS	Quantile Delta Mapping (QDM)				Model (RAW)			
	RCP4.5	RCP4.5	RCP8.5	RCP8.5	RCP4.5	RCP4.5	RCP8.5	RCP8.5
	2050	2100	2050	2100	2050	2100	2050	2100
Bir Ouled Tahar	35%	1%	45%	-48%	-67%	31%	47%	-11%
Tikezal	-91%	-58%	-4%	-92%	-94%	-86%	-9%	-78%
Larabaa Ouled Fares	54%	46%	72%	-11%	28%	22%	-10%	-19%
Ammi Moussa	16%	-66%	31%	-66%	31%	36%	20%	-66%
Oued Lilli	-42%	-37%	-16%	-69%	-43%	-36%	-28%	-70%
Djediouia	-52%	-87%	37%	-41%	-61%	-64%	-32%	-86%
Haciaba	-42%	-47%	-35%	-45%	-69%	-71%	-66%	-95%
Chouly	35%	1%	-77%	-83%	-90%	-67%	-55%	-97%

Table S9 Change in mean seasonal (Summer) projected streamflow in CMT basins from the baseline period (1975–2012).

Summer								
STATIONS	Quantile Mapping (QM)				Scaled Distribution Mapping (SDM)			
	RCP4.5	RCP4.5	RCP8.5	RCP8.5	RCP4.5	RCP4.5	RCP8.5	RCP8.5

	2050	2100	2050	2100	2050	2100	2050	2100
Bir Ouled Tahar	-72%	109%	-71%	-77%	-55%	-49%	-46%	-57%
Tikezal	-78%	-87%	-78%	-87%	-70%	-78%	-70%	-78%
Larabaa Ouled Fares	-56%	-39%	-39%	-35%	-34%	-6%	-21%	-24%
Ammi Moussa	168%	79%	43%	-15%	181%	134%	12%	25%
Oued Lilli	14%	12%	25%	-26%	93%	58%	75%	29%
Djediouia	-90%	-90%	-95%	-95%	-90%	-90%	-94%	-90%
Haciaba	-72%	-63%	-63%	-69%	-61%	-65%	-59%	-65%
Chouly	-99%	-57%	-99%	-99%	-99%	-59%	-99%	-99%

STATIONS	Quantile Delta Mapping (QDM)				Model (RAW)			
	RCP4.5	RCP4.5	RCP8.5	RCP8.5	RCP4.5	RCP4.5	RCP8.5	RCP8.5
	2050	2100	2050	2100	2050	2100	2050	2100
Bir Ouled Tahar	-58%	98%	60%	-63%	-93%	117%	120%	29%
Tikezal	-70%	-78%	-70%	-78%	-90%	-90%	-90%	-90%
Larabaa Ouled Fares	-12%	-42%	-32%	-38%	-29%	-26%	143%	-33%
Ammi Moussa	214%	137%	28%	17%	154%	110%	3%	-3%
Oued Lilli	37%	36%	48%	-1%	-62%	-68%	-69%	-71%
Djediouia	-90%	-90%	-95%	-94%	-91%	-92%	-95%	-94%
Haciaba	-49%	-37%	-35%	-55%	-61%	-57%	-57%	-61%
Chouly	-99%	-35%	-99%	-99%	-99%	-59%	-99%	-99%