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Supplement of

Climate elasticity of evapotranspiration shifts the water balance of Mediterranean climates during multi-year droughts

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Table S1. Overview of all measured or estimated data, their spatial-temporal resolution, whether they were measured/estimated in situ or remotely, and their use in the paper (see the Methods section in the main text for details). SWE is Snow Water Equivalent, ET is evapotranspiration, ΔS is annual change in subsurface storage.

Attribute	Spatial Resolution	Temporal Resolution	In situ vs. remotely sensed	Use
Air temperature (meas.)	Point	Daily	In situ	Force PRMS and drought climatology
Precipitation (meas.)	Point	Daily	In situ	Force PRMS (through DRAPER)
Precipitation (meas.)	Point	Monthly	In situ	Drought climatology
Precipitation (est.)	Contours (PRISM)	Monthly	Blended	Force PRMS (through DRAPER)
Precipitation (est.)	800 m (PRISM)	Annual	Blended	PRMS performance assessment
SWE (meas.)	Point (courses)	Monthly	In situ	Drought climatology
ET (est.)	30 m	Annual	Remotely sensed (derived)	PRMS performance assessment
ΔS (est.)	Basin-wide	Annual	Remotely sensed (derived)	PRMS performance assessment
Full-natural flow (est.)	Point	Daily	In situ	PRMS performance assessment
Full-natural flow (est.)	Point	Annual	In situ	PRMS performance assessment

Table S2. List of precipitation station used to compute annual statistics of precipitation across the Feather River in Figure 2 and Table 1 (main text). All data available at <https://cdec.water.ca.gov/> (visited July 19, 2019).

ID	Name	Elevation (m)	Operator
BCM	BRUSH CREEK (DWR-2)	1085	CA Dept of Water Resources
BCR	BRUSH CREEK RS	1072	US Forest Service
BUP	BUCKS CREEK POWERHOUSE	536	Pacific Gas & Electric
CNY	CANYON DAM	1390	Pacific Gas & Electric
CBO	CARIBOU PH	910	CA Dept Water Resources and Pacific Gas & Electric
CHS	CHESTER	1380	US Forest Service
PLE	PLUMAS EUREKA PARK	1574	Plumas County
PRT	PORTOLA	1478	National Weather Service
QRD	QUINCY RADIO STATION	1042	National Weather Service
QNC	QUINCY RS (USFS)	1042	US Forest Service
SRR	SIERRAVILLE RS (USFS)	1516	US Forest Service
STV	STRAWBERRY VALLEY	1160	National Weather Service
VNT	VINTON	1506	National Weather Service

Table S3. List of snow-course stations used to compute annual statistics of Snow Water Equivalent (SWE) across the Feather River in Figure 2 and Table 1 (main text). All data available at <https://cdec.water.ca.gov/> (visited July 19, 2019).

ID	Name	Elevation (m)
ABY	ABBEY	1722
ANR	ANTELOPE RIDGE	1722
BCP	BROWNS CAMP	1645
CHF	CHESTER FLAT	1402
CHU	CHURCH MEADOWS	2042
ERB	EUREKA BOWL	2072
EUR	EUREKA LAKE	1890
FEM	FEATHER RIVER MEADOW	1645
FP3	FREDONYER PASS 3	1783
FCV	FRENCHMAN COVE	1767
GRZ	GRIZZLY RIDGE	2103
HRF	HARKNESS FLAT	1889
HS2	HUMBUG SUMMIT 2	1478
KTL	KETTLE ROCK	2225
LTT	LETTERBOX	1706
LLP	LOWER LASSEN PEAK	2514
MLF	MILL CREEK FLAT	1798
MDY	MOUNT DYER 1	2164
MD2	MOUNT DYER 2	1844
MHG	MOUNT HOUGH	2042
MSV	MOUNT STOVER	1706
PLP	PILOT PEAK (DWR)	2072
RWL	ROWLAND CREEK	2042
3LK	THREE LAKES	1905
WRN	WARNER CREEK	1554

Table S4. Observed shift in precipitation-runoff relationship for the twelve main basins draining the western side of the California Sierra Nevada (in addition to the Feather River) and a representative value of annual precipitation during dry periods; see Section 2.3.1 and Equation 1 in the main text for a definition of all symbols. Contrary to Figure 4 in the main text, precipitation was estimated from PRISM maps with no daily tilting using in-situ data. The asterisk (*) denotes statistically significant values (that is, the sign of the confidence bounds agrees, 95% confidence level).

Basin	P (m)	Q_{dry,P_I} (m)	$Q_{\text{dry},P}$ (m)	M_Q (%)
Yuba	1.23	0.53	0.59	-10.05*
American	0.96	0.33	0.37	-12.48*
Cosumnes	0.78	0.12	0.15	-19.69*
Mokelumne	0.93	0.34	0.40	-14.44*
Stanislaus	0.87	0.29	0.33	-14.01*
Tuolumne	0.80	0.32	0.37	-14.41*
Merced	0.72	0.21	0.25	-15.10*
San Joaquin	0.68	0.25	0.31	-20.39*
Kings	0.68	0.27	0.32	-16.04*
Kaweah	0.62	0.17	0.20	-14.89
Tule	0.49	0.06	0.07	-21.74
Kern	0.40	0.07	0.08	-19.67

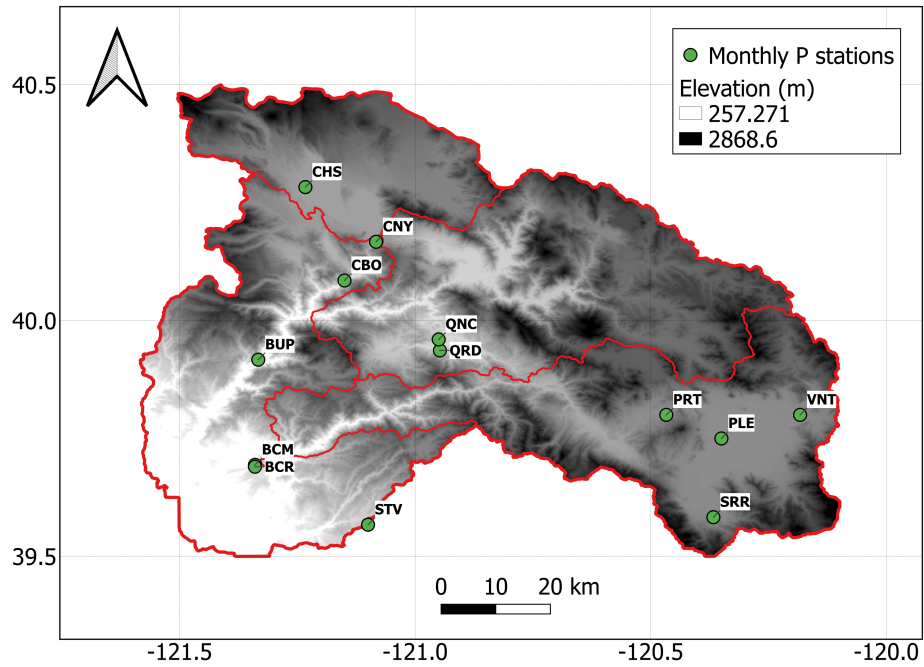


Figure S1. Precipitation station used to compute annual statistics of precipitation across the Feather River in Figure 2 and Table 1 (main text). All data available at <https://cdec.water.ca.gov/> (visited July 19, 2019).

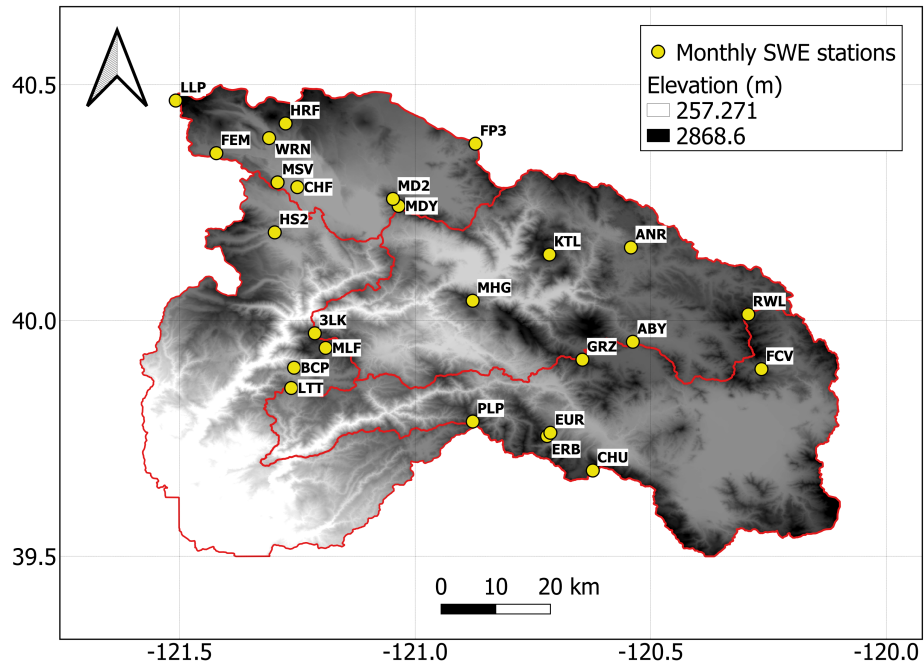


Figure S2. Snow-course stations used to compute annual statistics of Snow Water Equivalent (SWE) across the Feather River in Figure 2 and Table 1 (main text). All data available at <https://cdec.water.ca.gov/> (visited July 19, 2019).

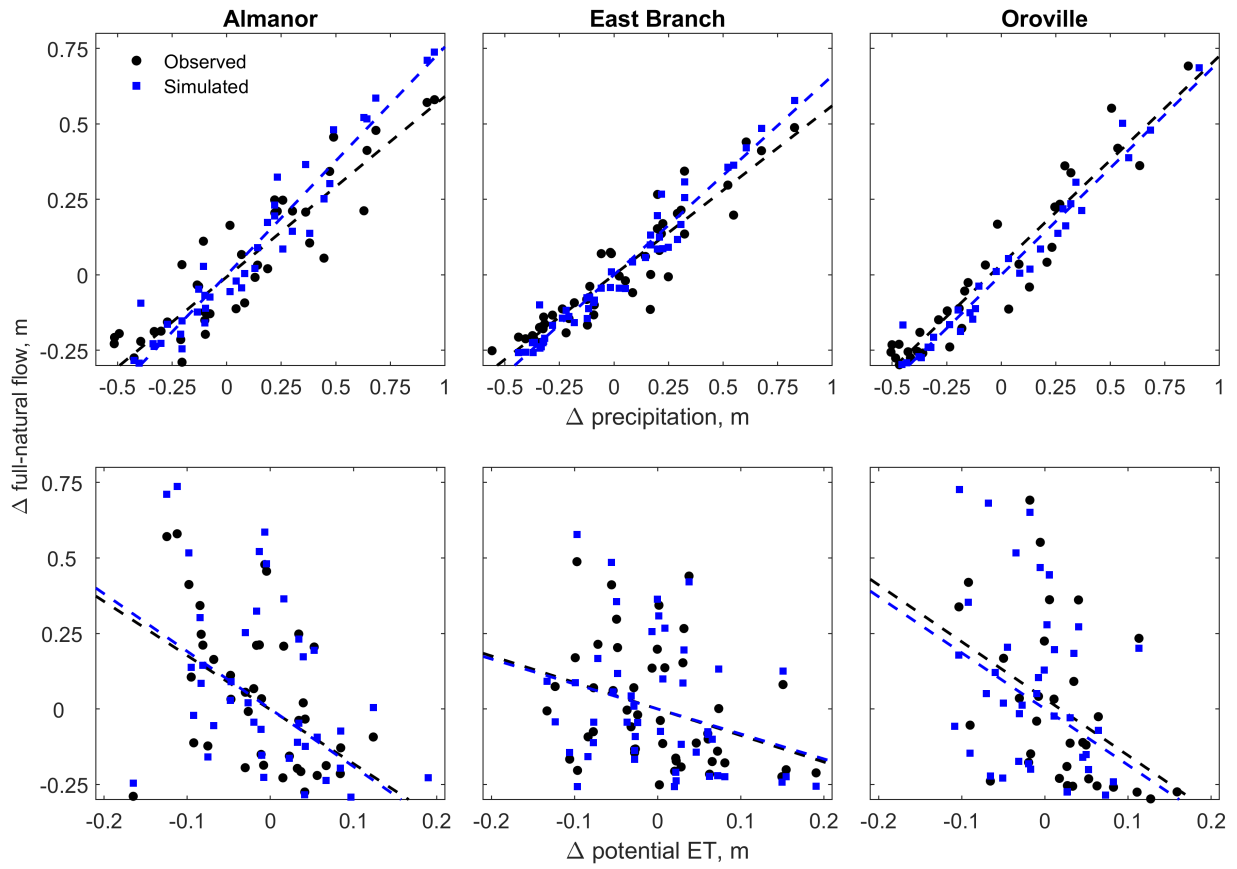


Figure S3. Modeled vs. observed univariate climate elasticity of full-natural flow to annual precipitation and potential evapotranspiration for the three basins under study with complete annual data. Precipitation, potential evapotranspiration, and full-natural flow were reported as differences (Δ) from a long-term mean across the available period of record.

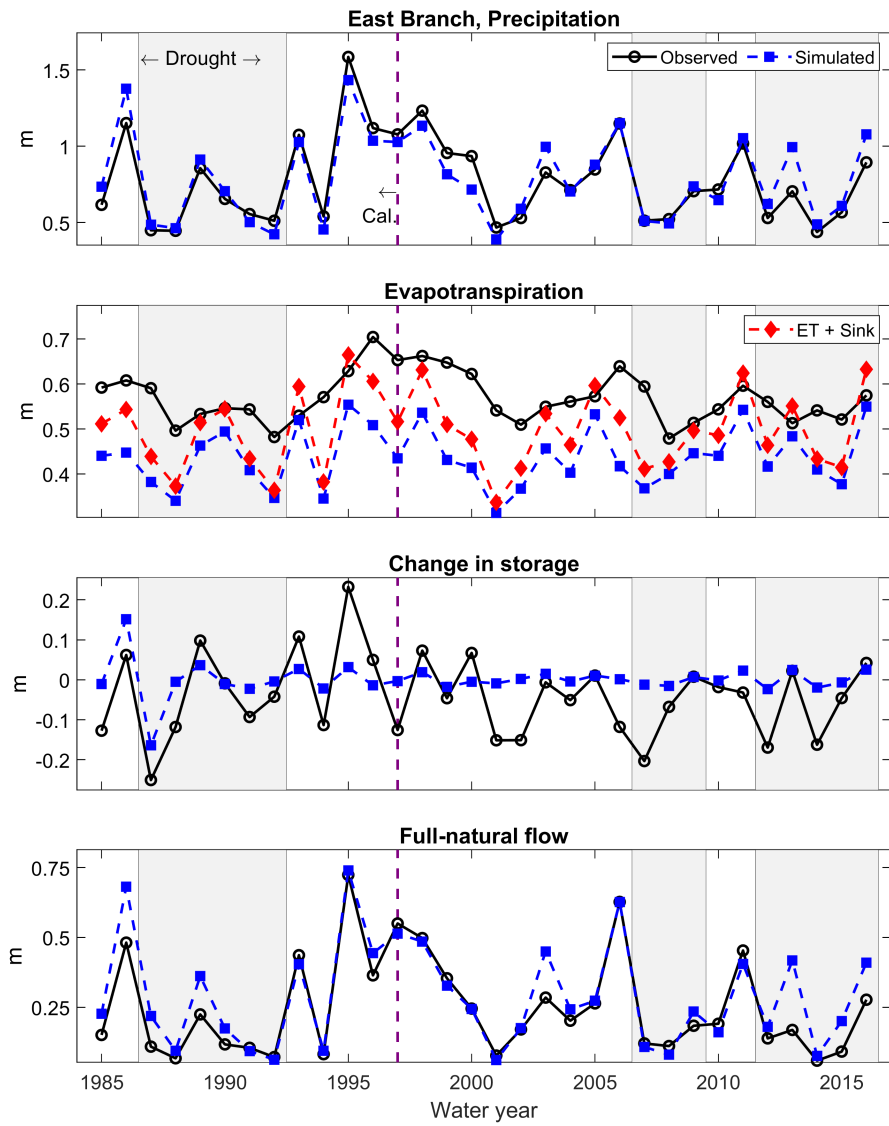


Figure S4. Simulated vs. observed (estimated) annual basin-wide water-balance components (P , ET , ΔS , and Q) for the East Branch sub-basin.

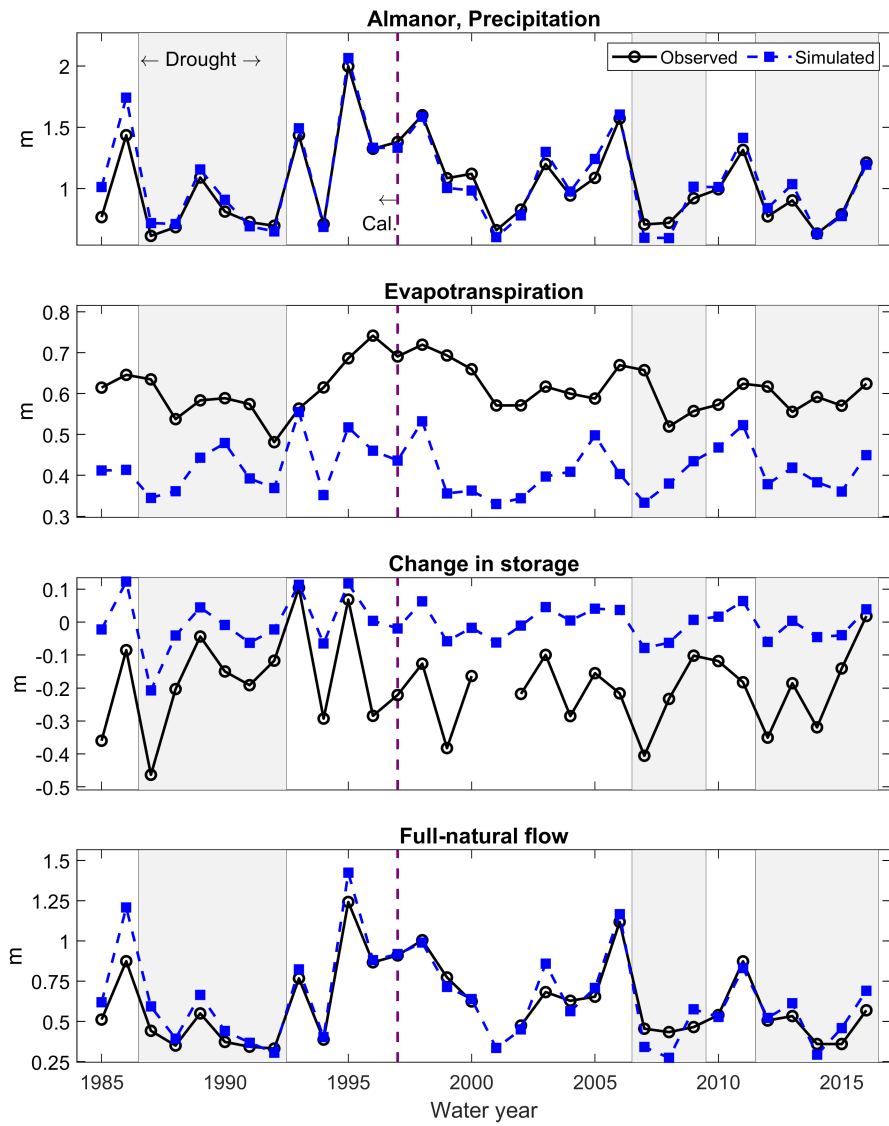


Figure S5. Simulated vs. observed (estimated) annual basin-wide water-balance components (P , ET , ΔS , and Q) for the Almanor sub-basin. The groundwater-sink term in this basin was set to zero during the original calibration.

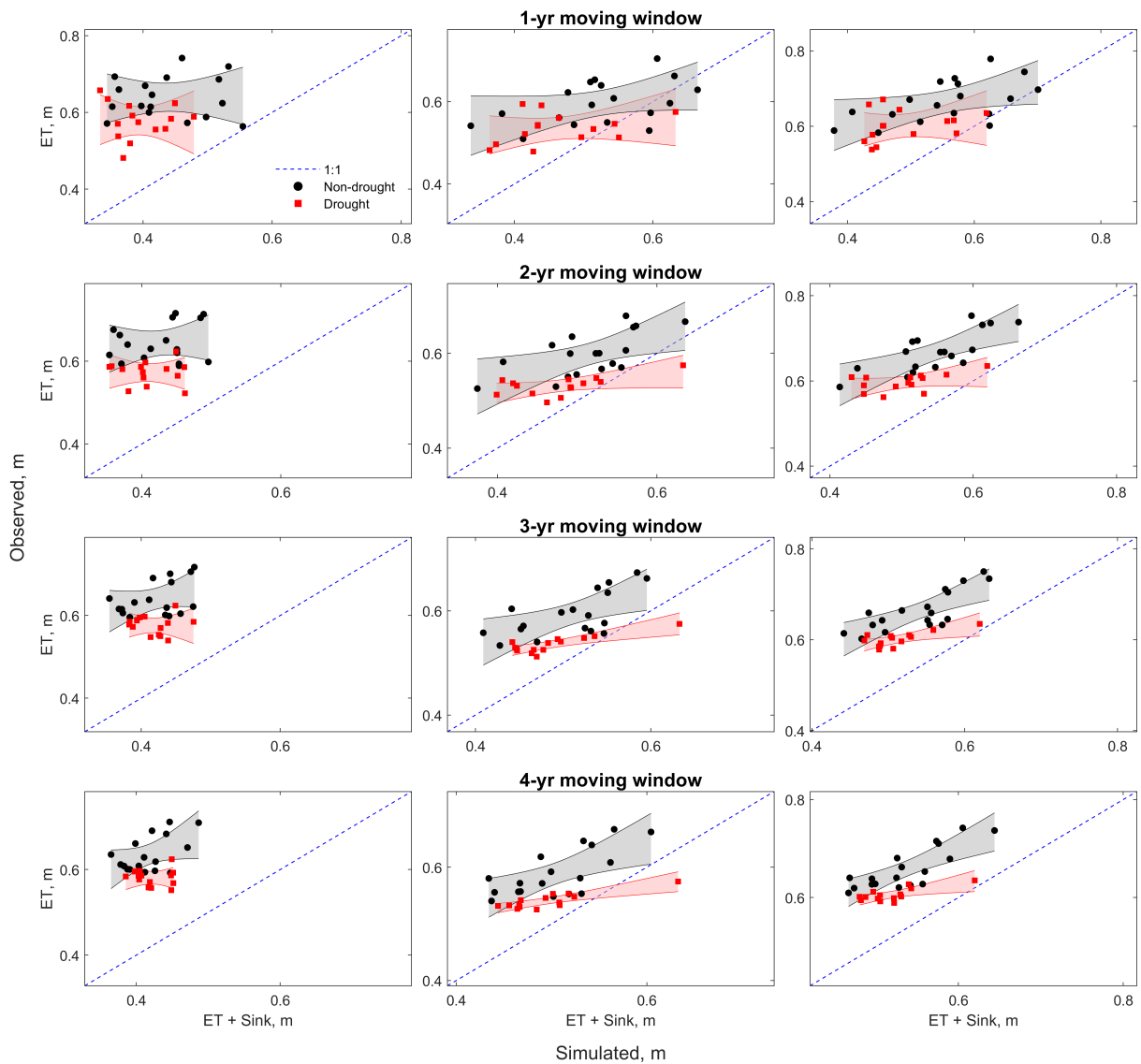


Figure S6. Simulated vs. observed average *ET* during drought (red) and non-drought (black) water years. Annual *ET* values were averaged using a moving window of 1 to 4 water years and included the groundwater-sink mass-flux component. The red and grey bands represent 95% confidence intervals for the regressions.

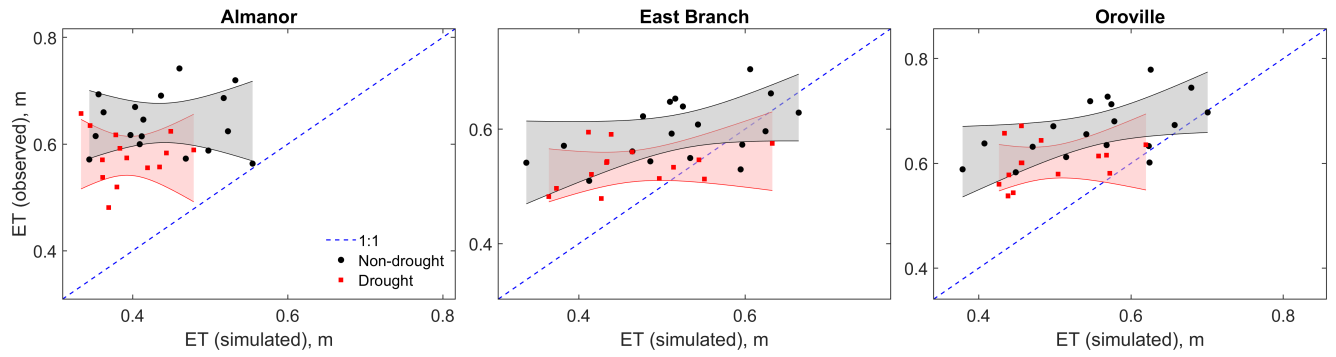


Figure S7. Simulated vs. observed annual basin-wide ET separated between drought (red) and non-drought (black) years. Contrary to Figure 8 in the main text, simulated annual ET here does not include the groundwater-sink mass-flux component. The red and grey bands represent 95% confidence intervals for the regressions.