Preliminary results – subject to change

EGU 2024
ADDITIONAL POSTER INFORMATION

Gabrielle Burns – PhD student at The University of Melbourne

gabrielle.burns@unimelb.edu.au

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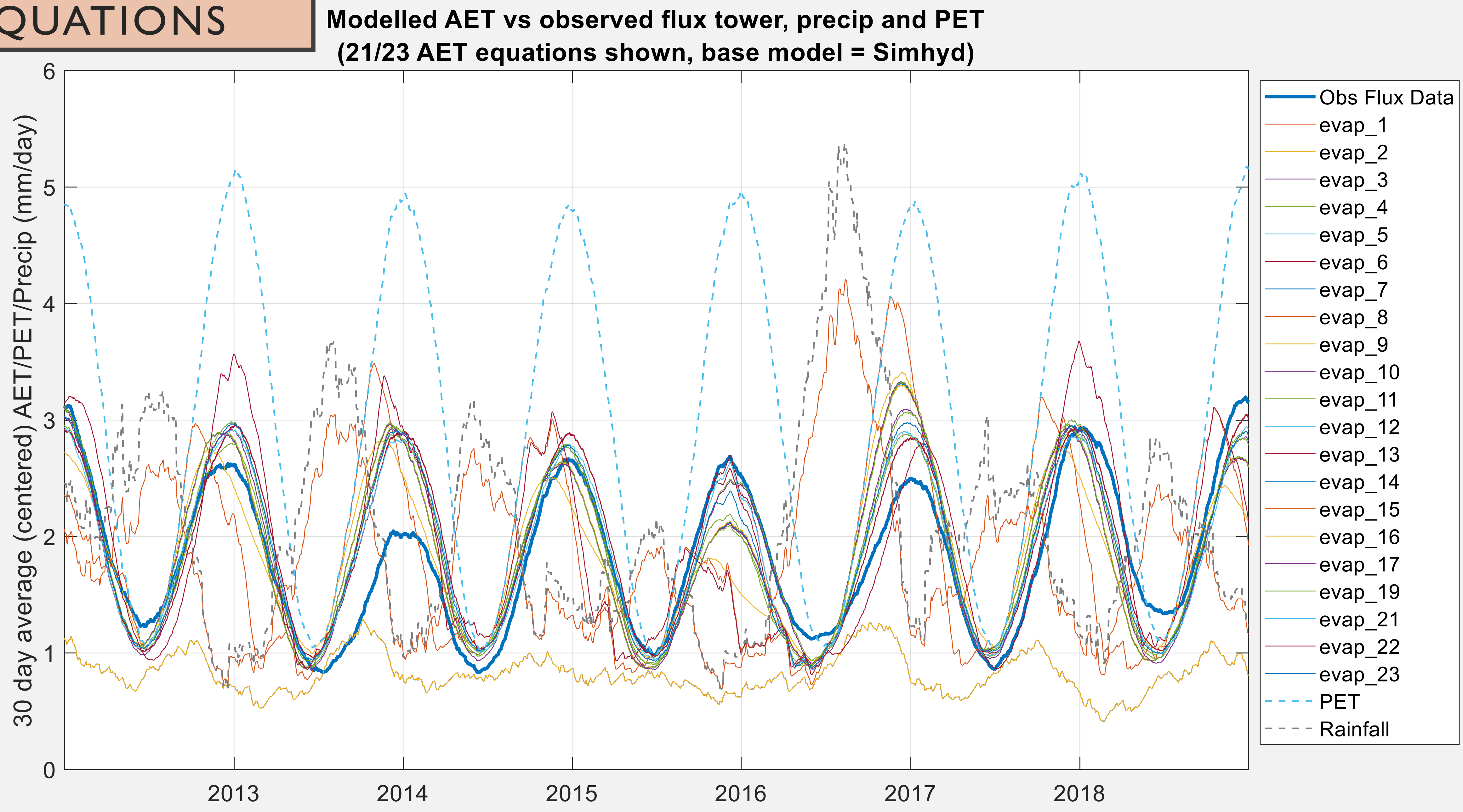
Co-Authors: Keirnan Fowler, Clare Stephens, Murray Peel

SIMHYD ALL EQUATIONS



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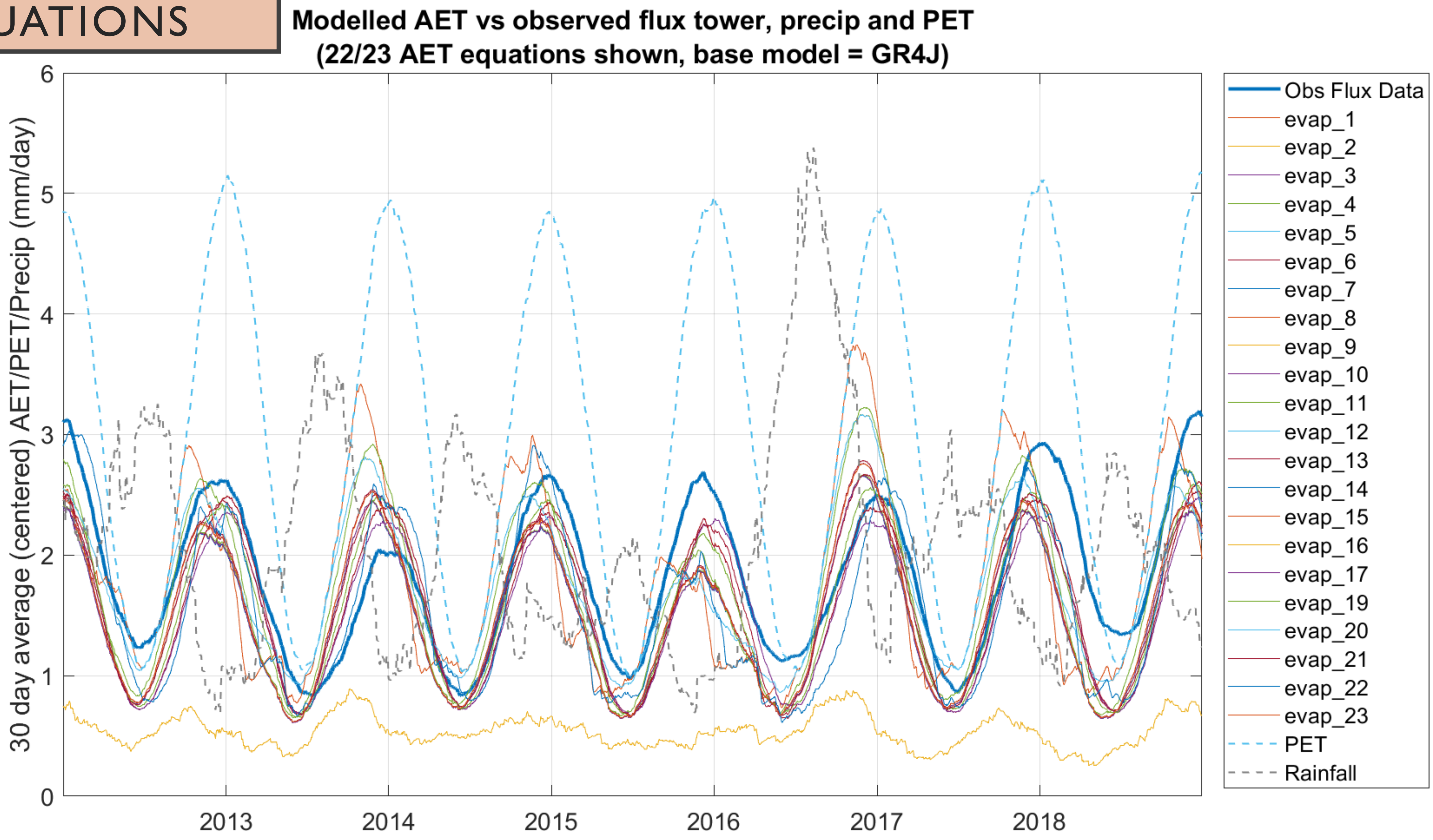
GR4J ALL EQUATIONS



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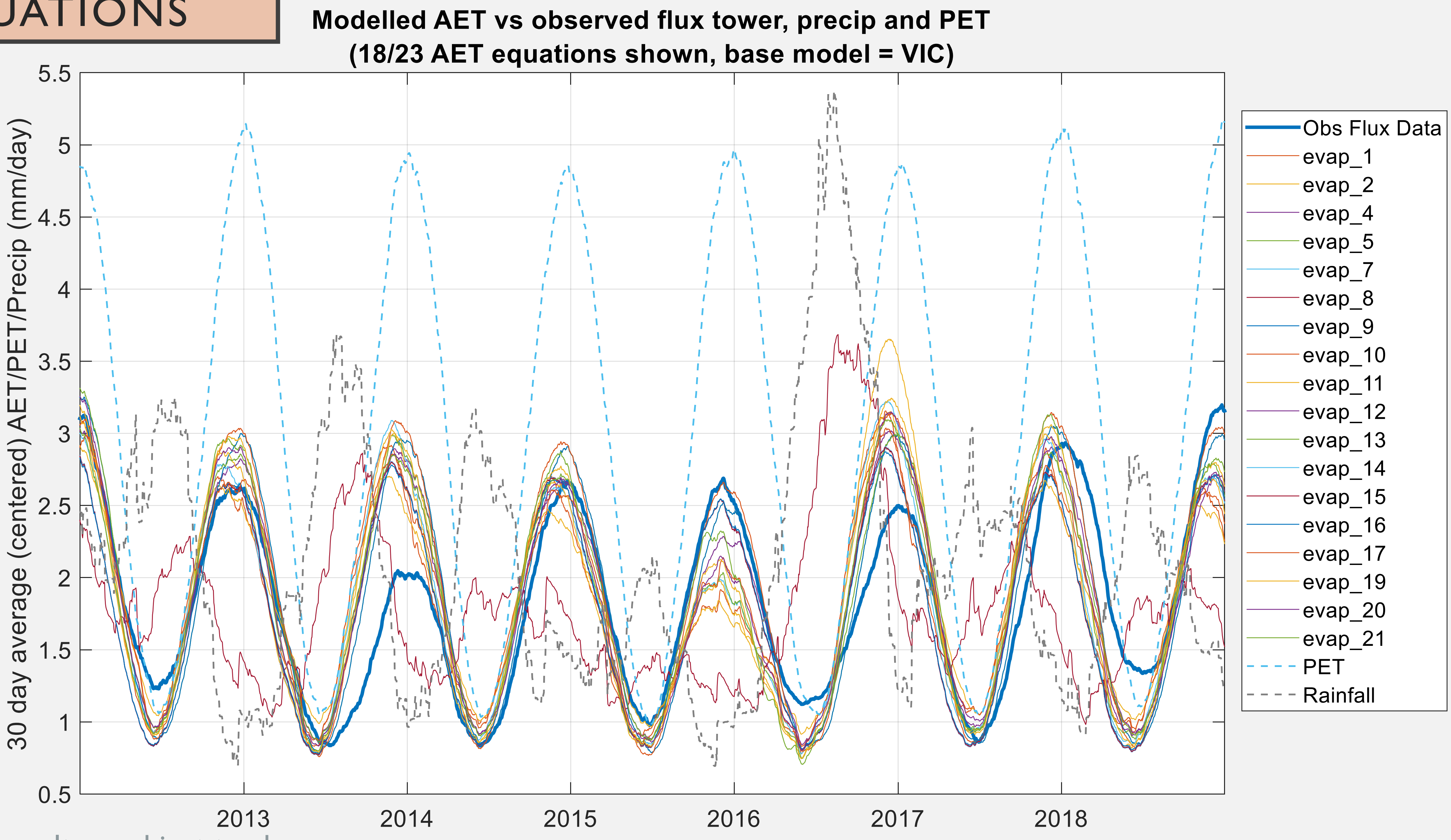
VIC ALL EQUATIONS



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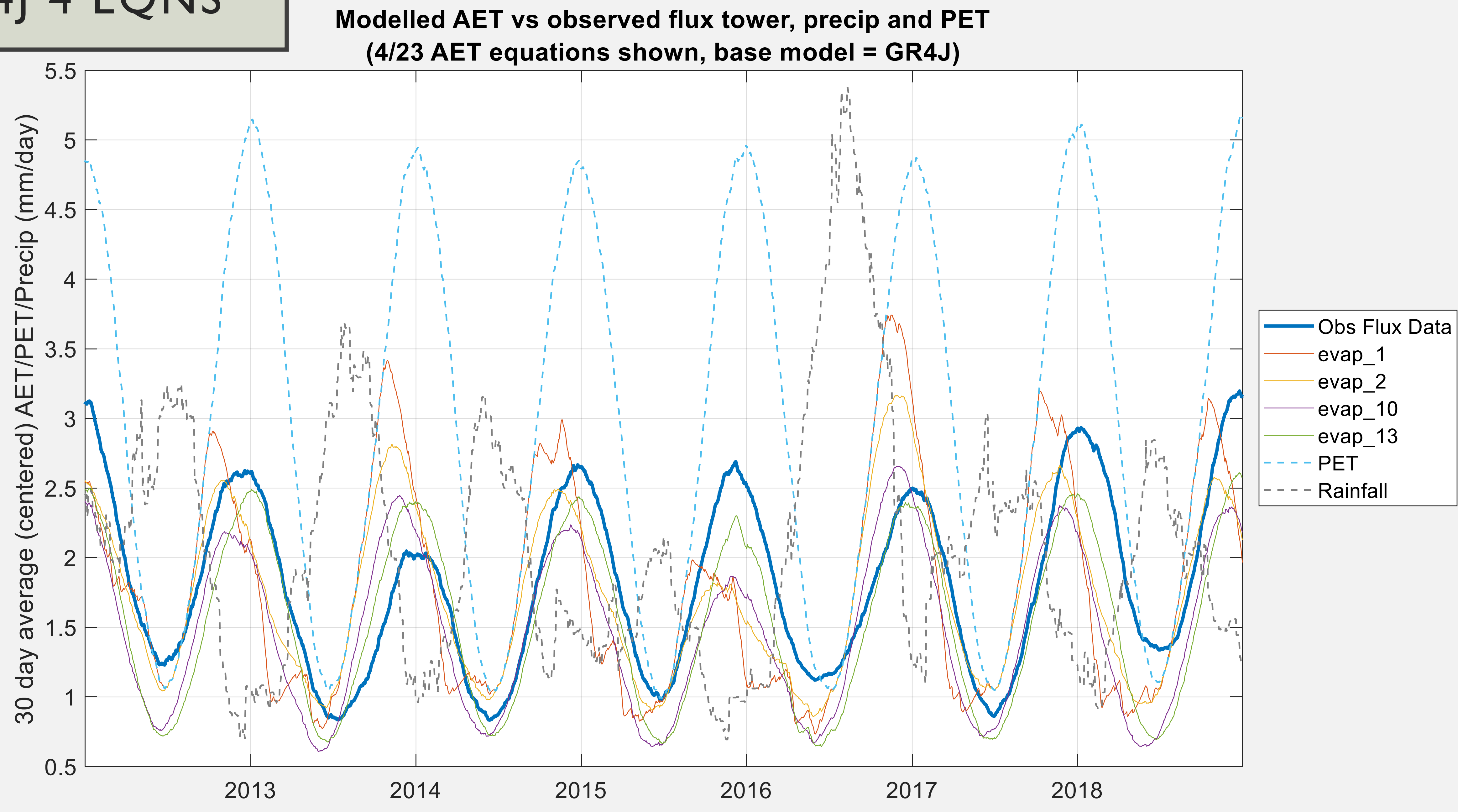
GR4J 4 EQNS



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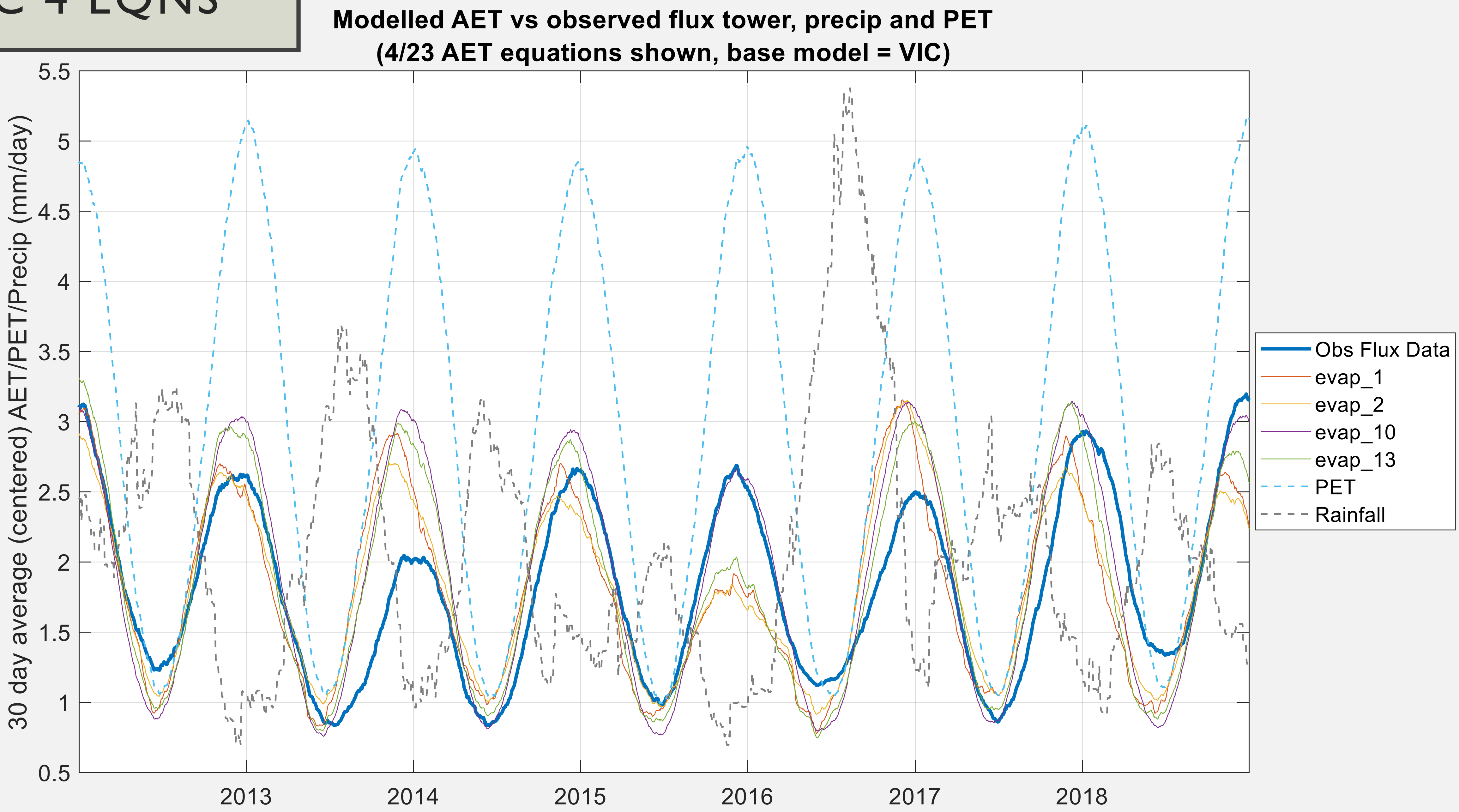
VIC 4 EQNS



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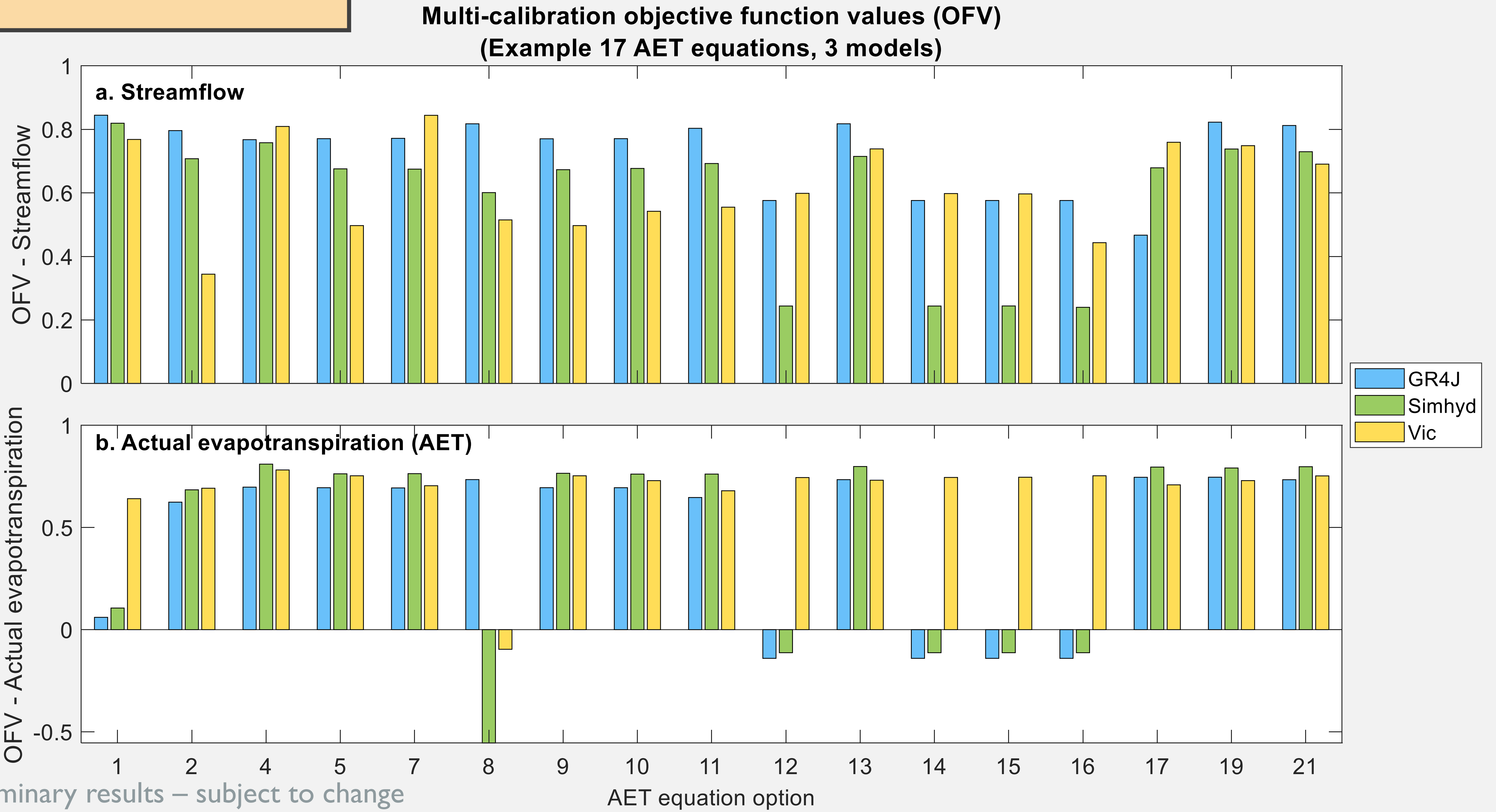
ALL CALIBRATIONS BAR CHART



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Ranked results (OFV)

aet eqn		GR4J	Simhyd	VIC
1	Evaporation at the potential rate	18	16	8
2	Evaporation at a scaled, plant-controlled rate — equation used for base model = **	14	**14****	17
3	Evaporation based on scaled current water storage and wilting point	6	12	#N/A
4	Constrained, scaled evaporation if storage is above a wilting point	12	1	1
5	Evaporation from bare soil scaled by relative storage	10	9	14
6	Transpiration from vegetation at the potential rate if storage is above a wilting point and scaled by relative storage if not	7	5	#N/A
7	Evaporation scaled by relative storage	9	11	**2****
8	Transpiration from vegetation, at potential rate if soil moisture is above the wilting point, and linearly decreasing if not. Also scaled by relative storage across all stores	2	21	18
9	Evaporation from bare soil scaled by relative storage and by relative water availability across all stores all stores	11	13	14
10	Evaporation from bare soil scaled by relative storage	8	10	12
11	Evaporation quadratically related to current soil moisture	**13****	8	15
12	Evaporation from deficit store, with exponential decline as deficit goes below a threshold	19	18	9
13	Exponentially scaled evaporation	3	6	4
14	Exponentially scaled evaporation that only activates if another store goes below a certain threshold	22	19	10
15	Scaled evaporation if another store is below a threshold	20	17	11
16	Scaled evaporation if another store is below a threshold	21	20	16
17	Scaled evaporation from a store that allows negative values	17	7	5
18	Exponentially declining evaporation from deficit store	#N/A	#N/A	#N/A
19	Non-linear scaled evaporation	1	2	3
20	Evaporation limited by a maximum evaporation rate and scaled below a wilting point	15	#N/A	6
21	Threshold-based evaporation with constant minimum rate	4	3	7
22	Threshold-based evaporation rate	16	15	#N/A
23	Transpiration from vegetation at the potential rate if storage is above field capacity and scaled by relative storage if not (similar to evap_6), addition of evaporation from bare soil scaled by relative storage (similar to evap_5)	5	4	#N/A

MARRMOT

Modular Assessment of Rainfall-Runoff Models Toolbox

Matlab code for 47 conceptual hydrologic models

V2 paper: Trotter et al., 2022

Trotter, L., Knoben, W. J., Fowler, K. J., Saft, M., & Peel, M. C. (2022). Modular Assessment of Rainfall–Runoff Models Toolbox (MARRMoT) v2. 1: an object-oriented implementation of 47 established hydrological models for improved speed and readability. *Geoscientific Model Development*, *15*(16), 6359-6369. https://doi.org/10.5194/gmd-15-6359-2022

V1 paper: Knoben et al., 2019

Knoben, W. J., Freer, J. E., Fowler, K. J., Peel, M. C., & Woods, R. A. (2019). Modular Assessment of Rainfall–Runoff Models Toolbox (MARRMoT) v1. 2: an open-source, extendable framework providing implementations of 46 conceptual hydrologic models as continuous state-space formulations. *Geoscientific Model Development*, *12*(6), 2463-2480. https://doi.org/10.5194/gmd-12-2463-2019

CONTACT

- Gabrielle Burns – PhD Student
  - gabrielle.burns@unimelb.edu.au

- Supervisors:
  - Dr Keirnan Fowler
  - Dr Murray Peel
  - Dr Clare Stephens