

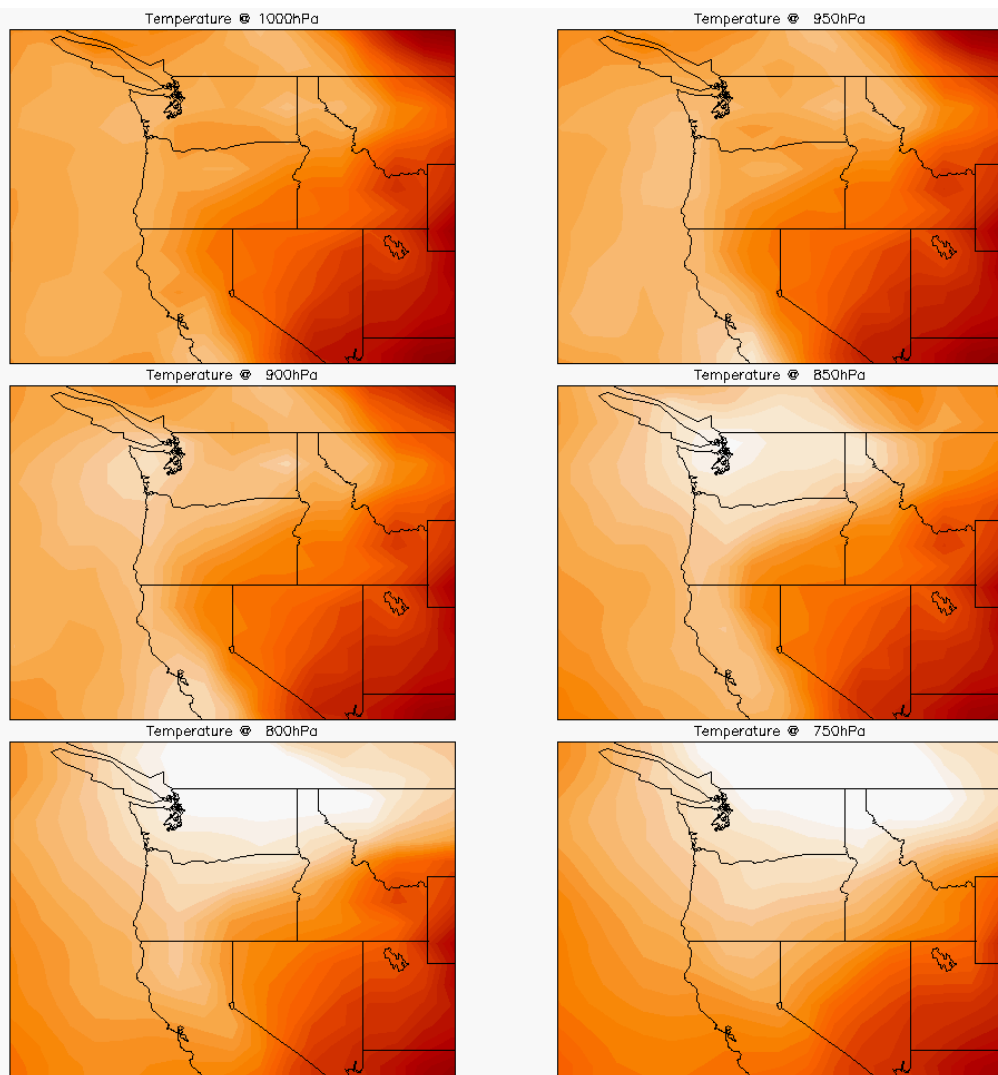


## Supplemental Material

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### CESM LENS M24 (Min T)



### CESM LENS M15 (Min Q)

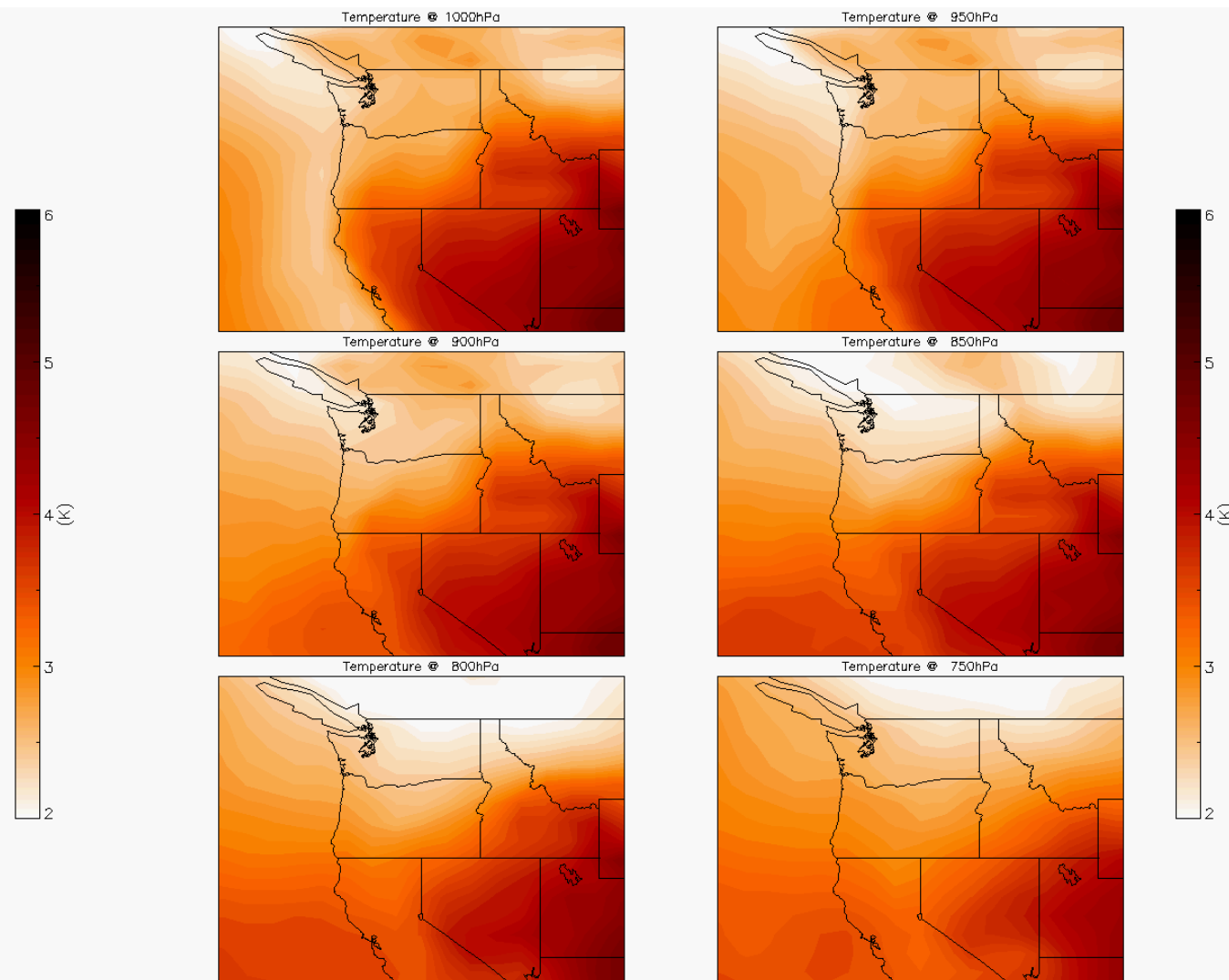
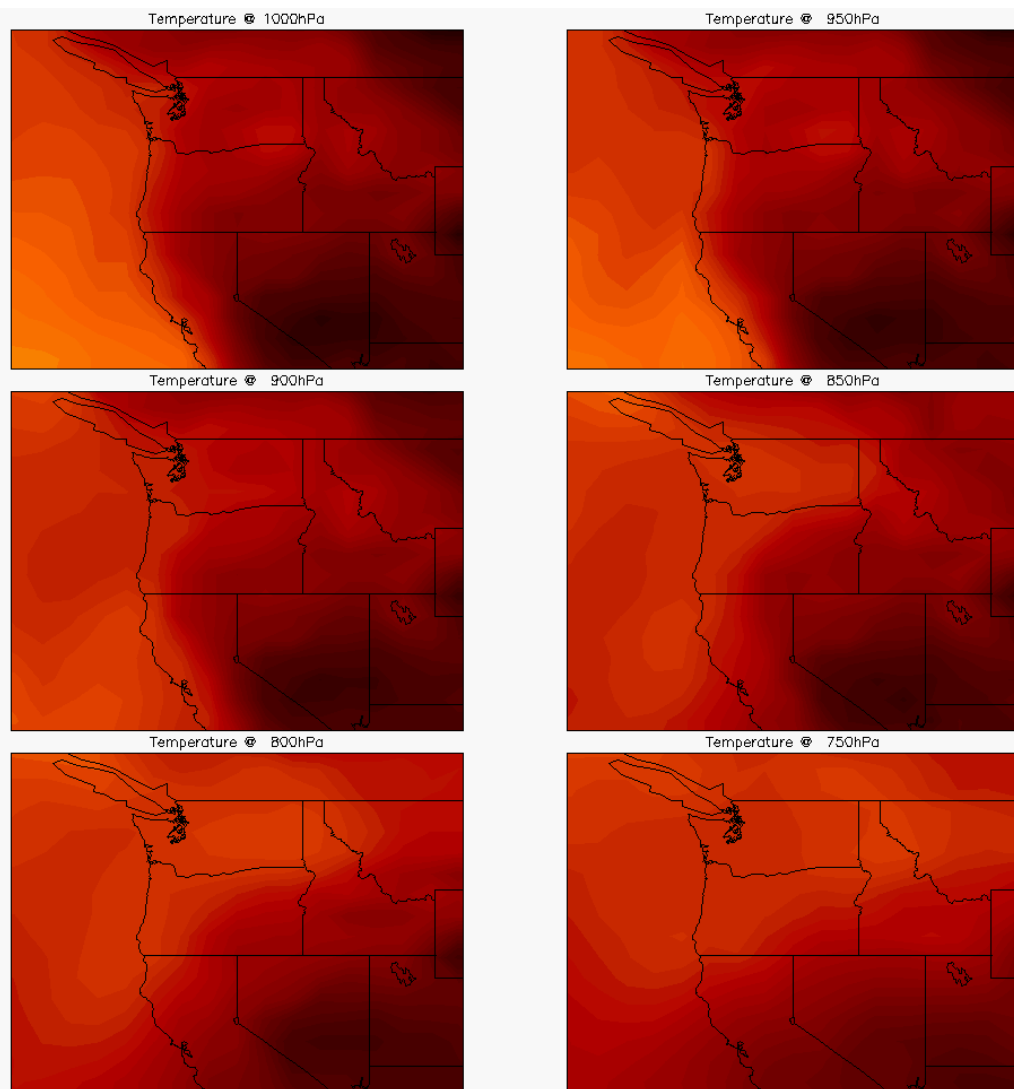


Figure S1: CESM LENS temperature difference between future (2070 – 2079) and past (1990 – 1999) periods at 1000, 950, 900, 850, 800, 750 hPa as labeled for M24 (left) and M15 (right)

### CESM LENS M20 (Med T)



### CESM LENS M16 (Med Q)

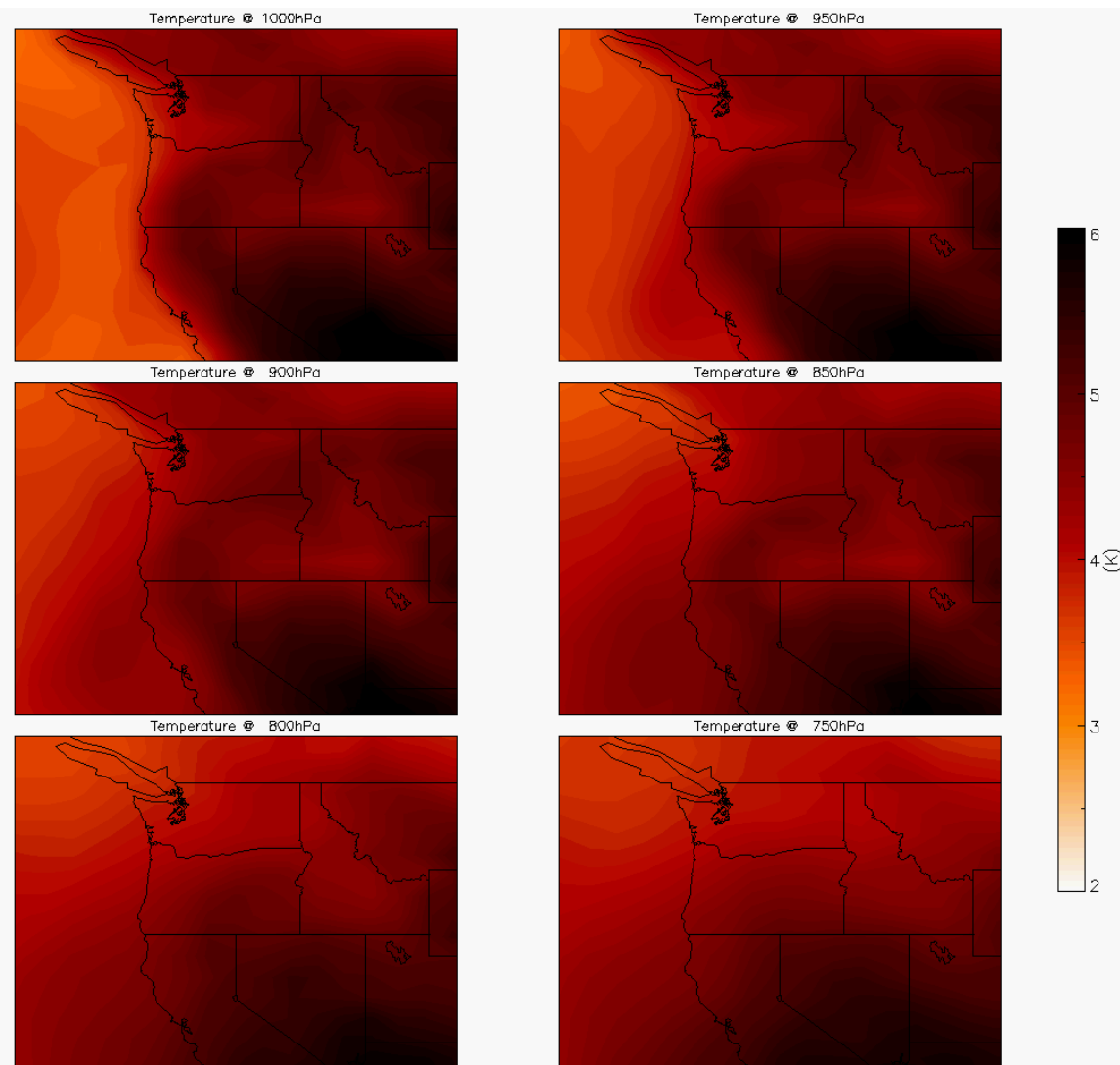
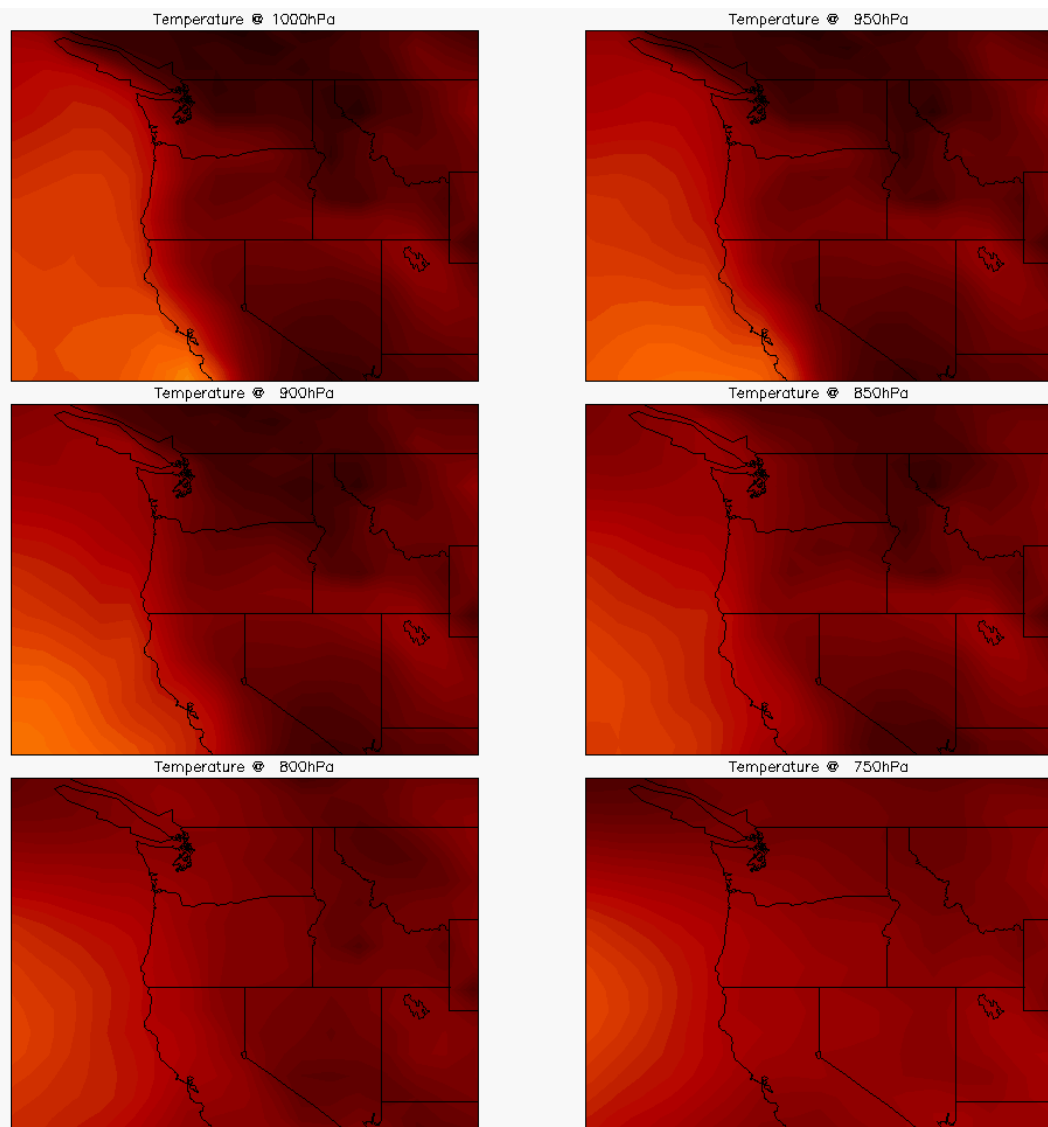


Figure S2: As in Fig. S1 except for M20 (left) and M16 (right)

### CESM LENS M7 (Max T)



### CESM LENS M2 (Max Q)

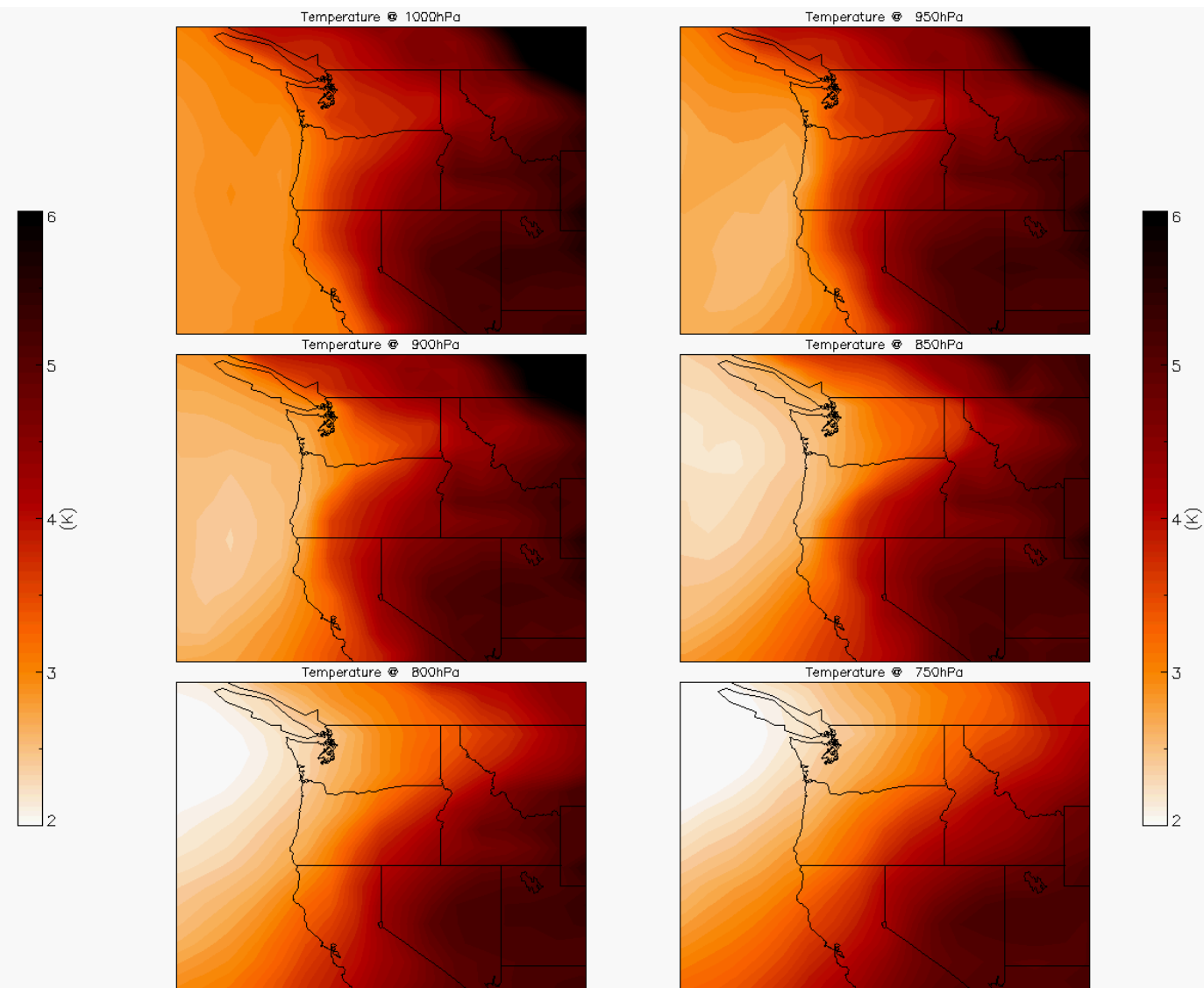
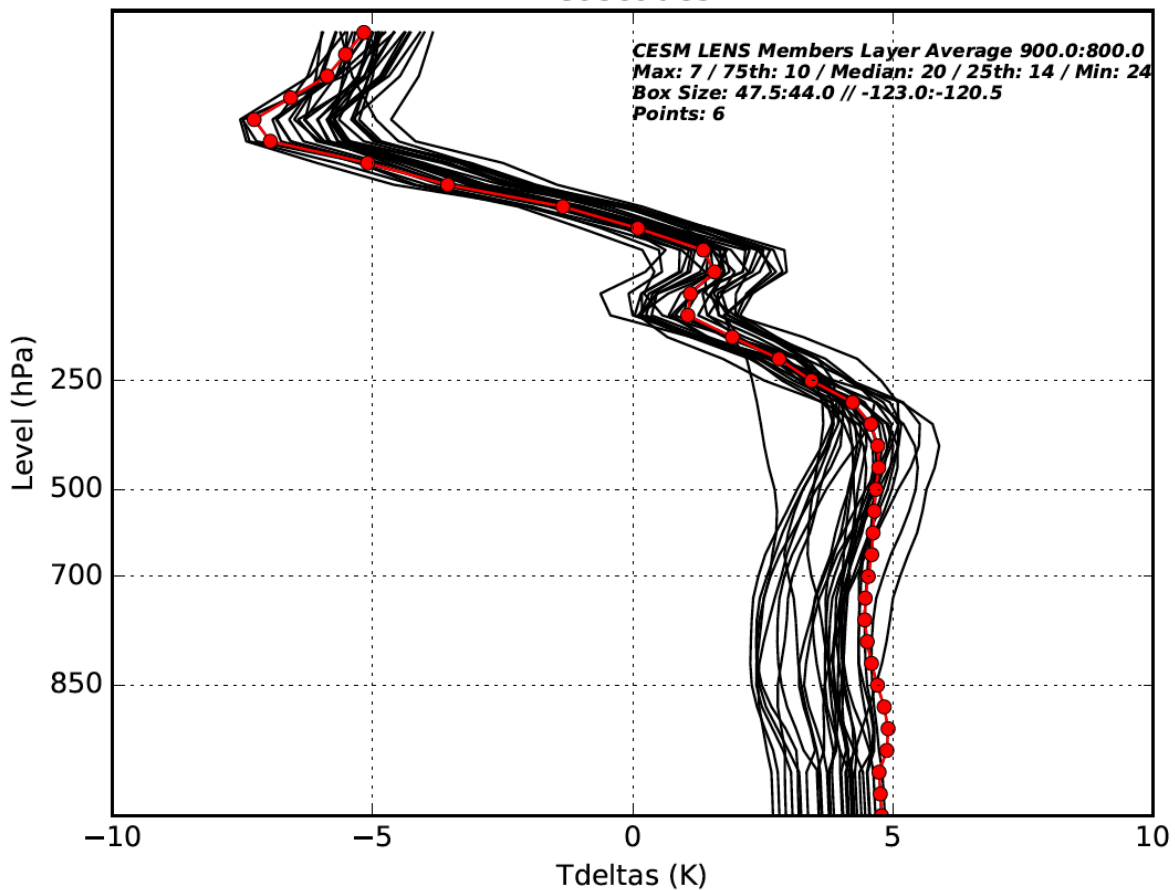


Figure S3: As in Fig. S1 except for M07 (left) and M02 (right)

### CESM LENS All Members: T deltas

November Tdeltas for 30 members - Red Member: 7  
Cascades



### CESM LENS All Members: Q deltas

November Qdeltas for 30 members - Red Member: 7  
Cascades

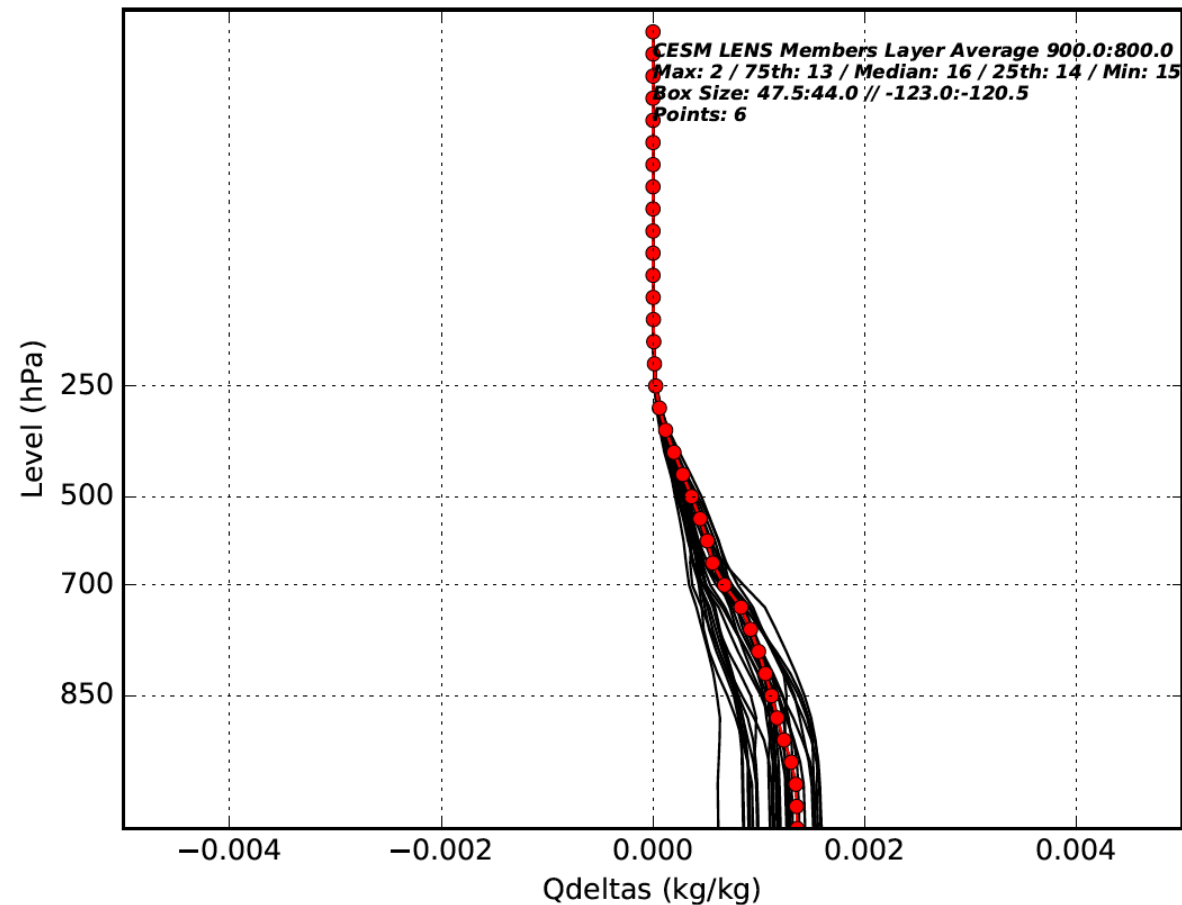


Figure S4: 900hPa – 800hPa layer average November T, q deltas averaged over Cascade-region selection box. M07 (MaxT) member highlighted in red.

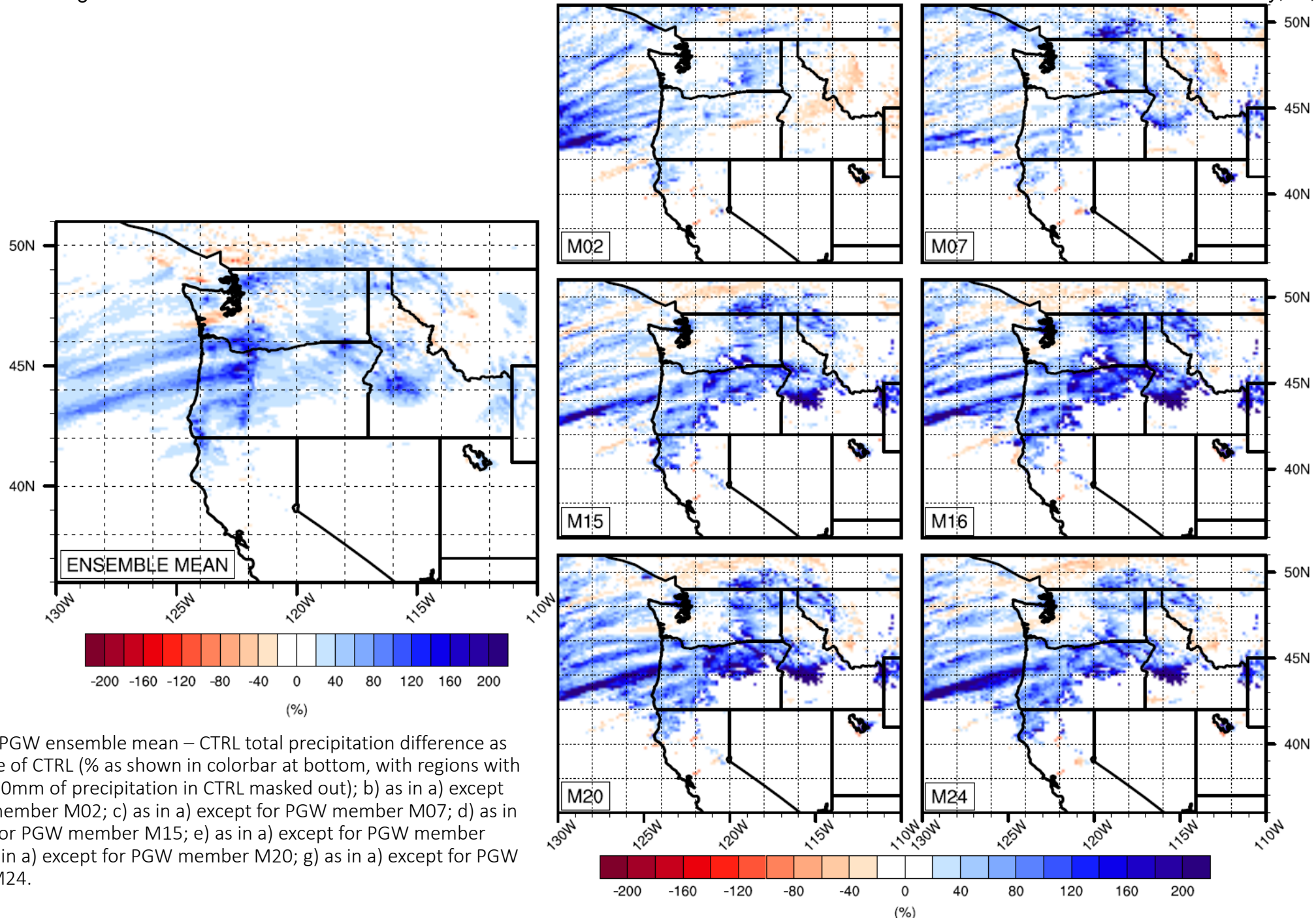


Figure S5: PGW ensemble mean – CTRL total precipitation difference as percentage of CTRL (% as shown in colorbar at bottom, with regions with less than 10mm of precipitation in CTRL masked out); b) as in a) except for PGW member M02; c) as in a) except for PGW member M07; d) as in a) except for PGW member M15; e) as in a) except for PGW member M16; f) as in a) except for PGW member M20; g) as in a) except for PGW member M24.

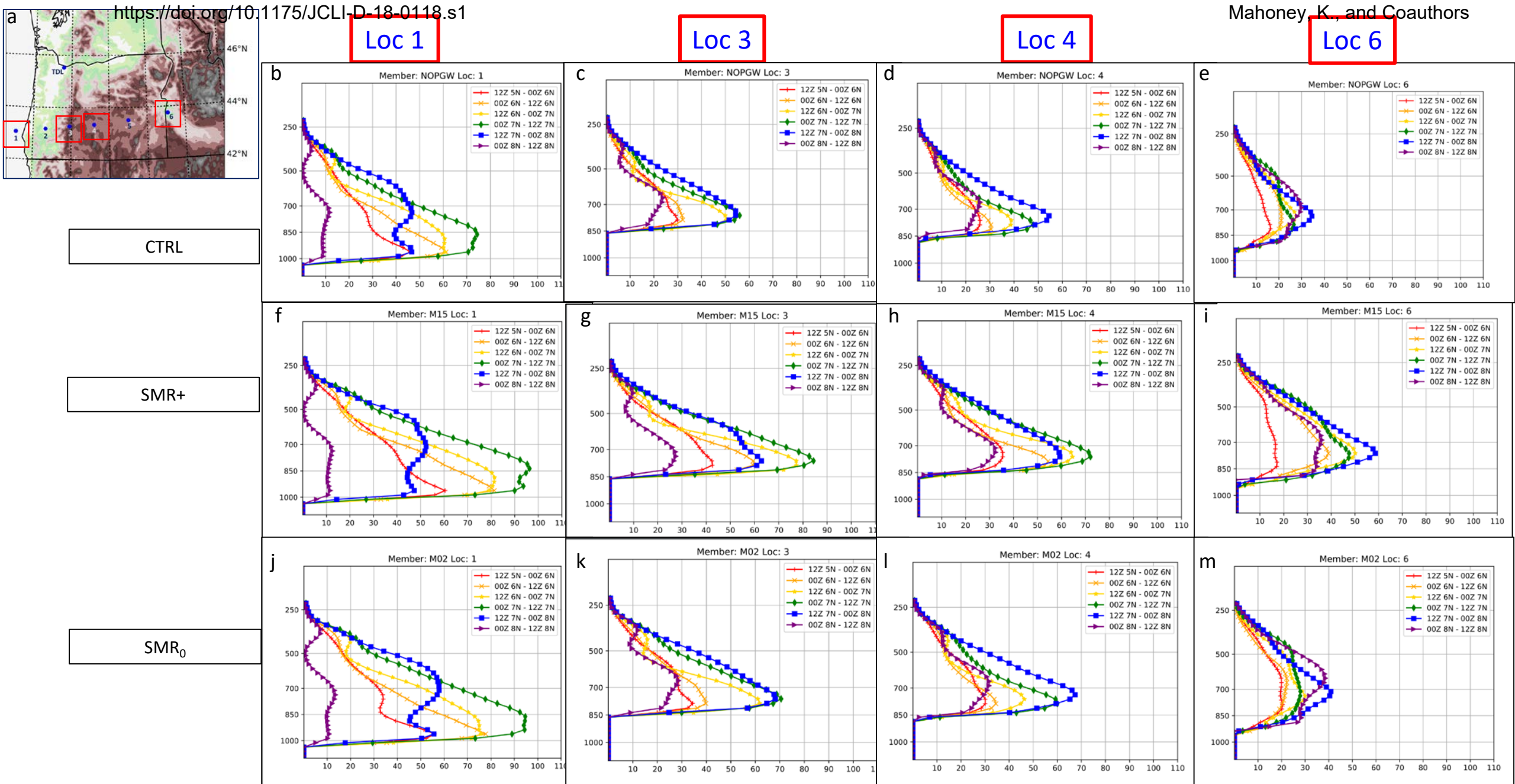


Figure S6: Vertical profiles of water vapor transport above points shown in upper left. Traces are colored according to 12-h periods as shown in legend.

Loc 1

Loc 3

Loc 4

Loc 6

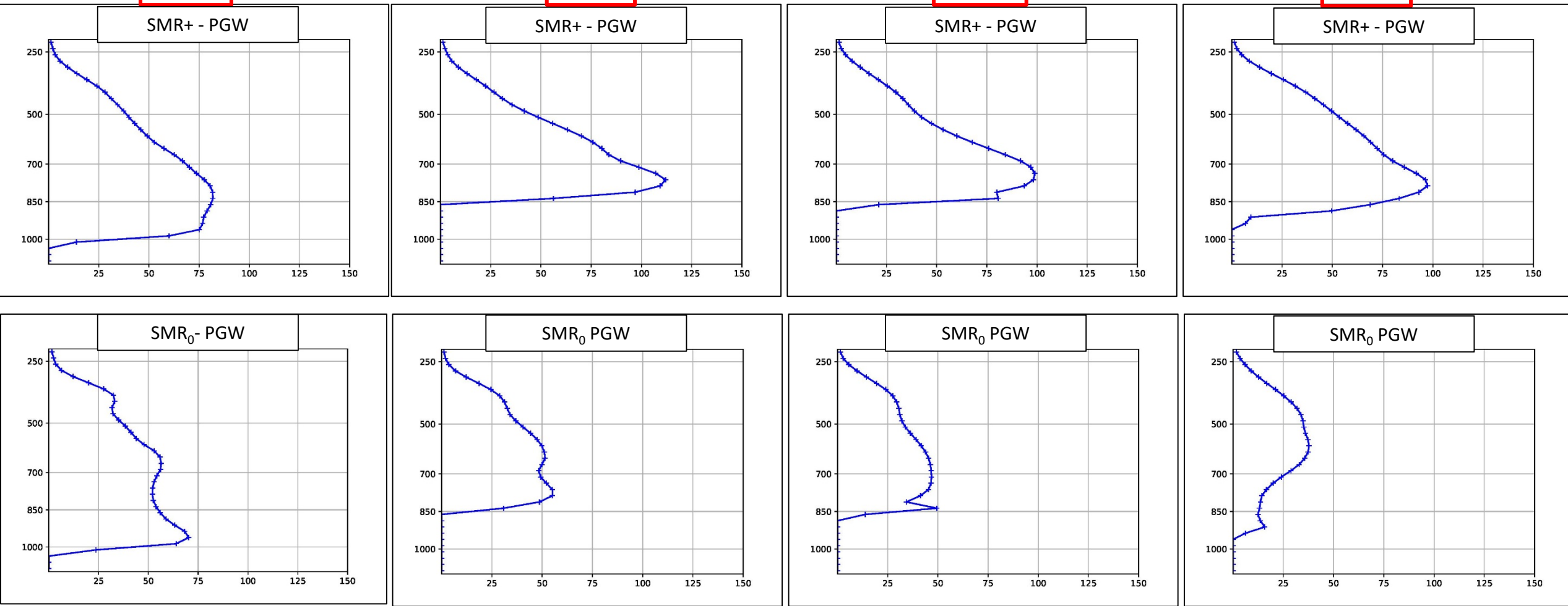
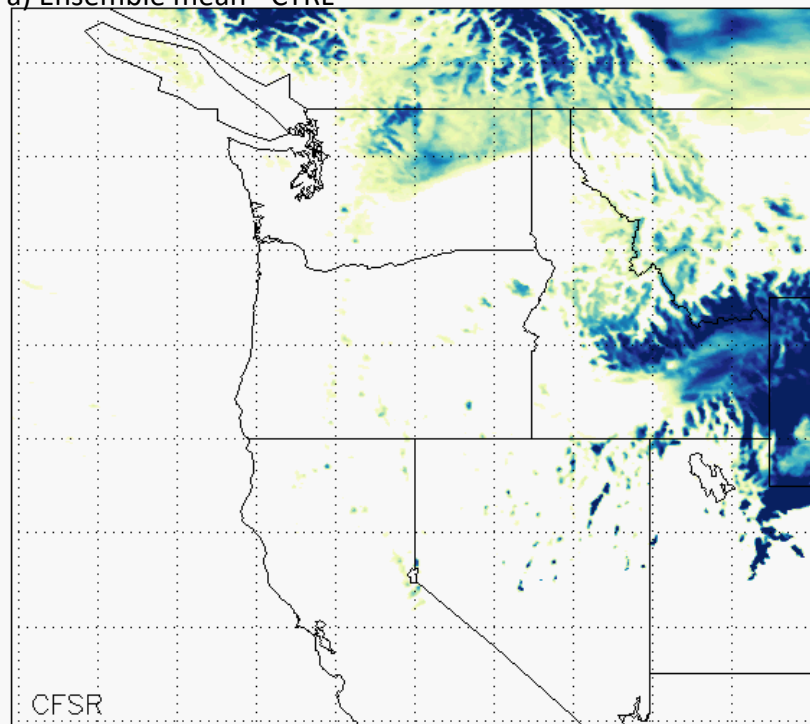


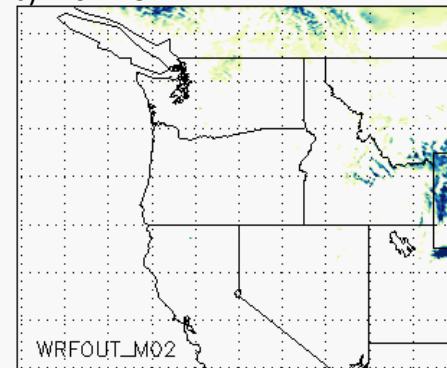
Figure S7: Vertical profiles of time-integrated water vapor transport differences from CTRL above points shown in Figs. 1a, 4a, S6.



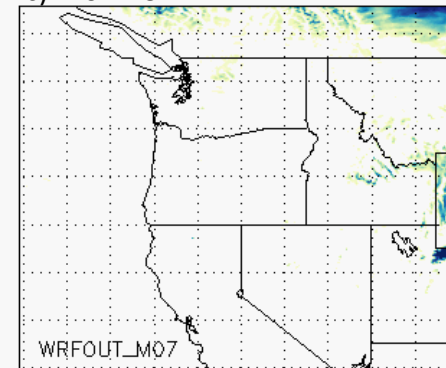
a) Ensemble mean - CTRL



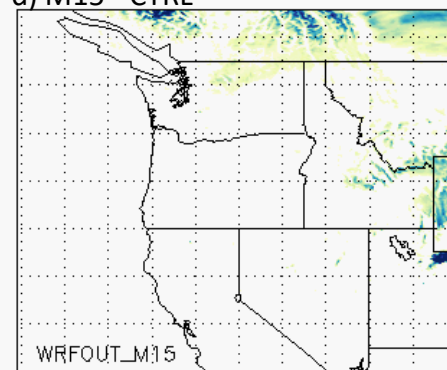
b) M02 - CTRL



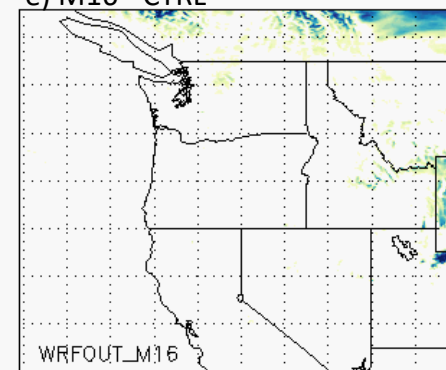
c) M07 - CTRL



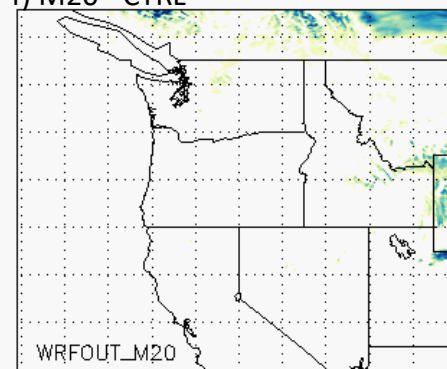
d) M15 - CTRL



e) M16 - CTRL



f) M20 - CTRL



g) M24 - CTRL

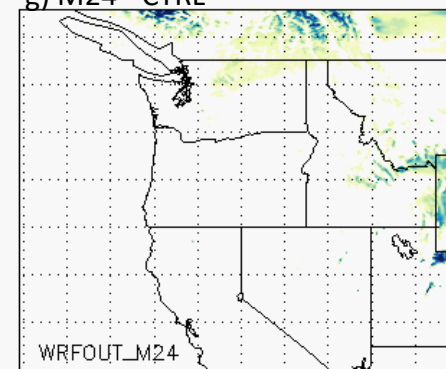
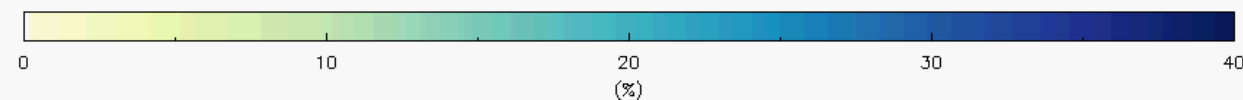


Figure S8: a) CTRL % of total precipitation that is frozen precipitation, b) – g) % of frozen precipitation for PGW members



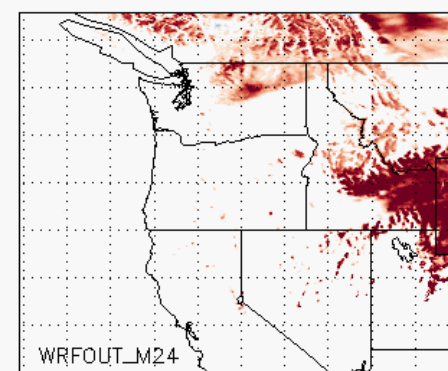
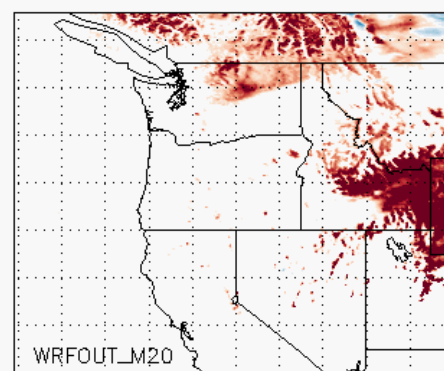
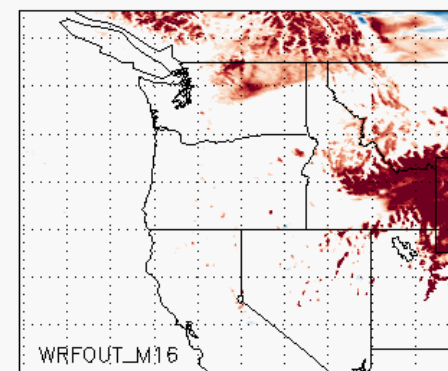
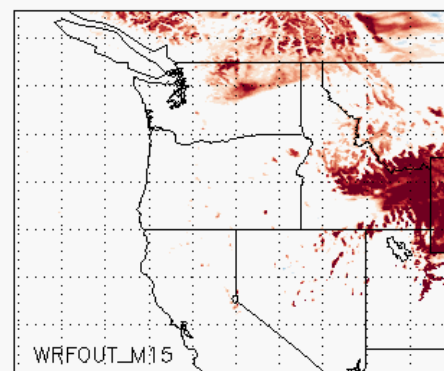
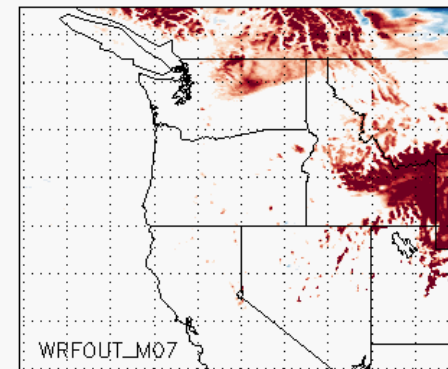
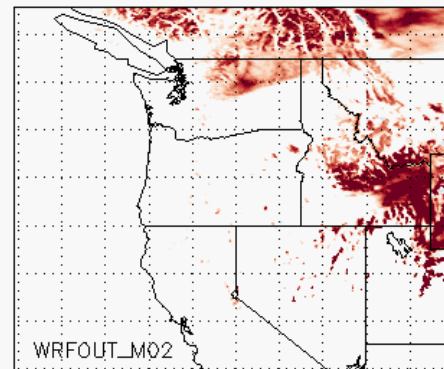
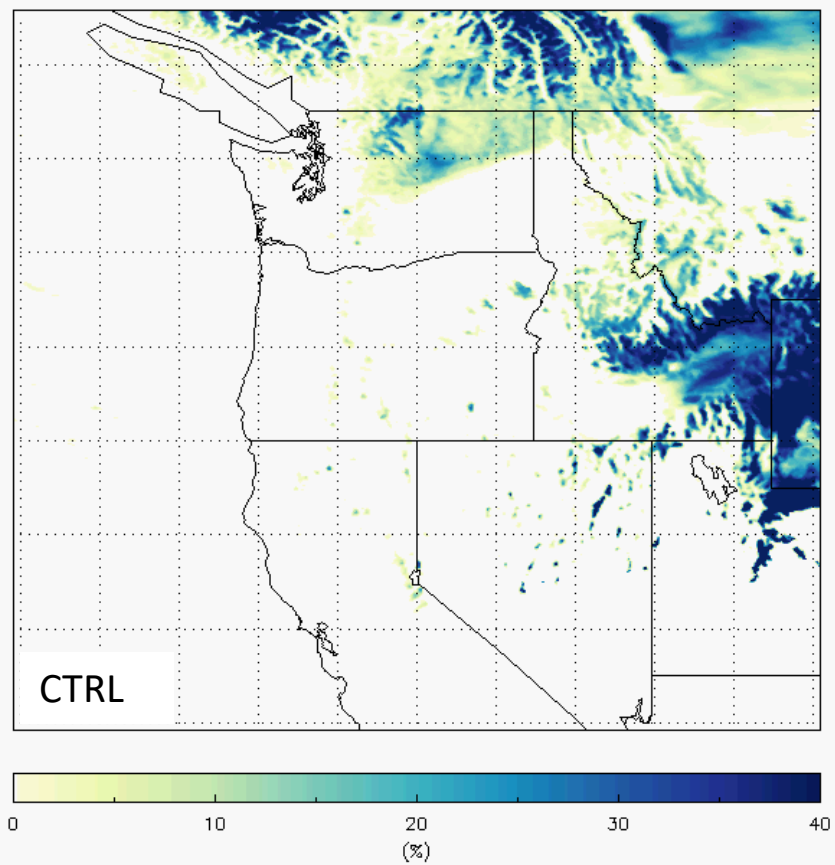
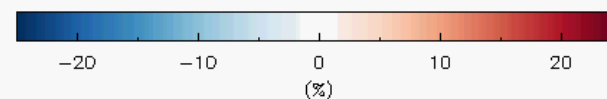


Figure S9: a) CTRL % of total precipitation that is frozen precipitation, b) – g)  $\Delta\%$  of frozen precipitation for PGW members - CTRL



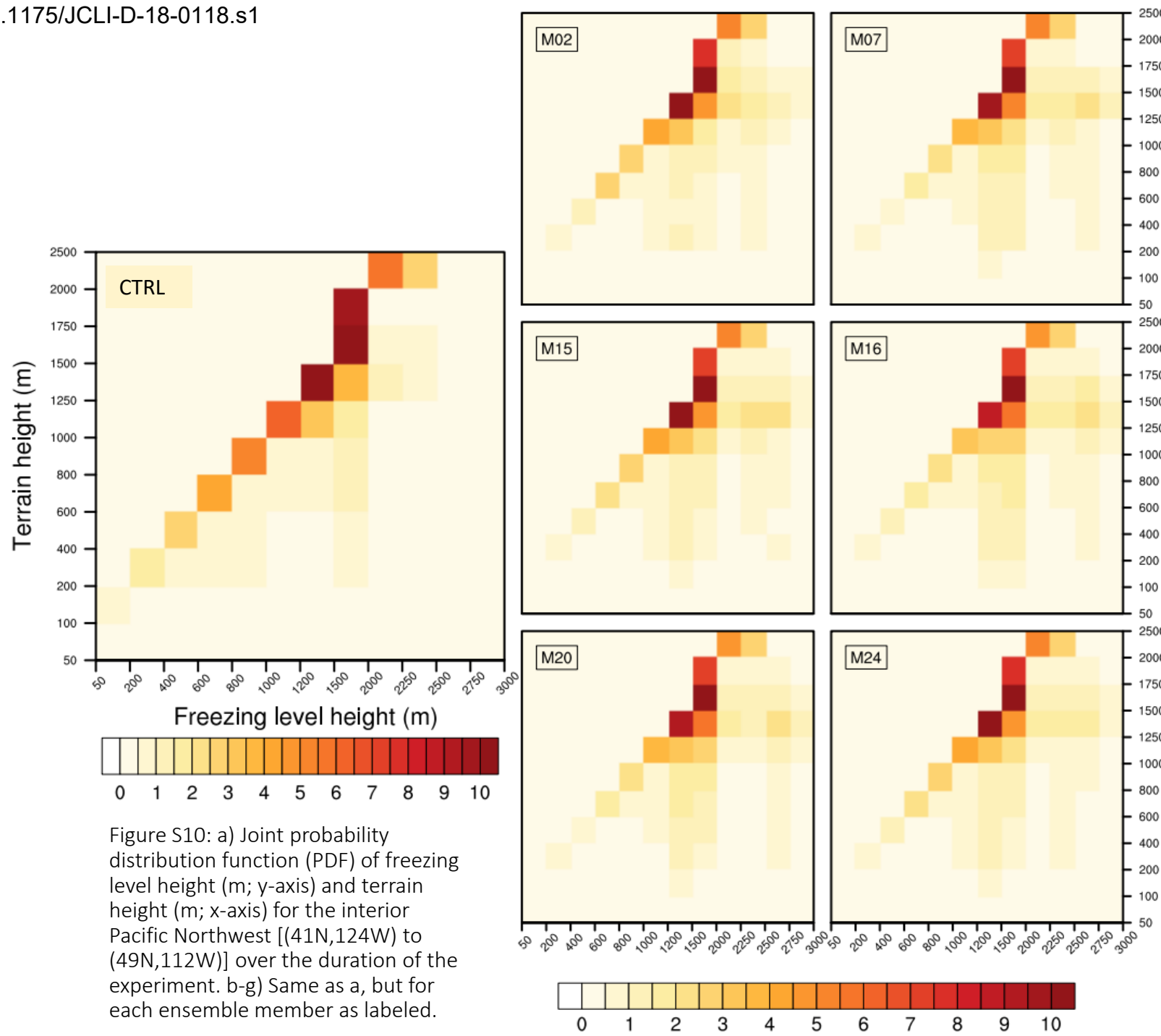


Figure S10: a) Joint probability distribution function (PDF) of freezing level height (m; y-axis) and terrain height (m; x-axis) for the interior Pacific Northwest [(41N,124W) to (49N,112W)] over the duration of the experiment. b-g) Same as a, but for each ensemble member as labeled.

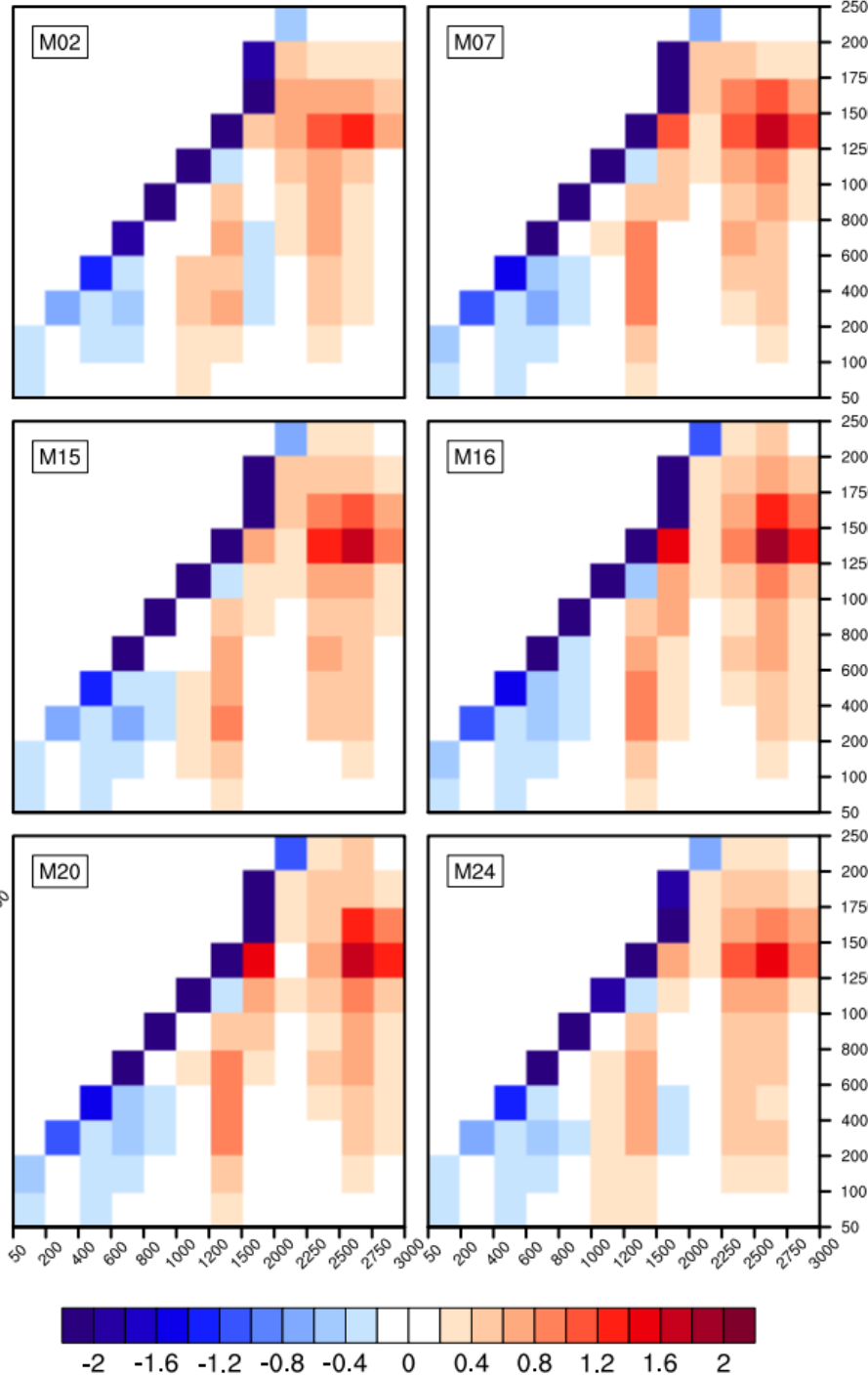
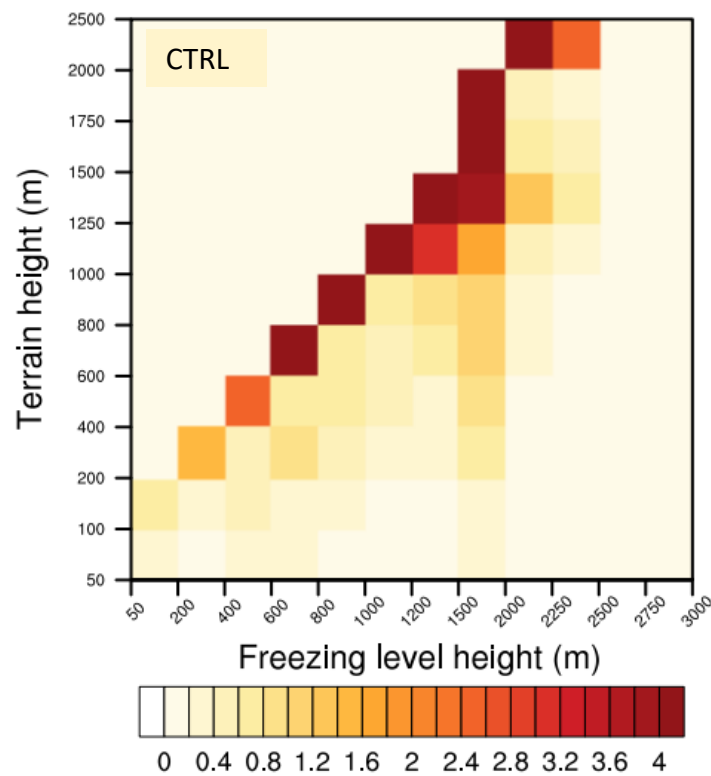


Figure S11: a) Joint probability distribution function (PDF) of freezing level (y-axis) and terrain height (x-axis) for the interior Pacific Northwest [(41N,124W) to (49N,112W)] over the duration of the experiment. b-g) Change in joint-PDF for each ensemble member as labeled.