

NOAA14 EVALUATION Application to Lake Tahoe Basin

Prepared by Sacramento District
Corps of Engineers in
Cooperation with Lake Tahoe
SWQIC

Purpose

- Evaluate NOAA14 DDF relationships
 - Compare with data obtained from NRCS SNOTEL gages (not used in NOAA14 study)
- Investigate relationship between precipitation and rainfall frequency
 - NOAA14 present precipitation DDF relationships
- Impacts of gage measurement error

SUMMARY

- Gage Data Base for Comparison
 - NOAA14 used only two gages in basin
 - An additional eight NRCS SNOTEL gages available
- DDF curve Comparisons
 - 24hour and 60 minute comparisons possible
 - Comparison of durations < 60 minutes not possible

SUMMARY (continued)

➤ Gage Comparison

- Significant effort to filter NRCS SNOTEL data (oscillations due to temperature effect)
- NOAA14 gages elevations < 7000ft
- NRCS gage elevations < 9000 ft
 - Coverage near 9000 ft limited
- NRCS gage record lengths shorter but significant

Summary (continued)

➤ Comparison results

- Ratio 60min/24hr agreed well for range of return intervals
- 24hr frequency curves agreed extremely well
 - Agreement demonstrated NOAA14 value for elevations outside of study range (7500ft or possibly higher)
 - Impressive result

Summary (continued)

➤ Short duration comparisons

- None
- NOAA14 gages used – low elevation – not necessarily relevant to Lake Tahoe
- n-minute/60 minute ratios accepted on “faith”

SUMMARY (CONTINUED)

➤ Precipitation versus Rainfall

- SWE and temperature measurements used to identify phase of precipitation (snow versus rain)
- Annual 24hr maximum events show a significant fraction of rain for events < 10yr (0.80)
- 1997 event mostly rain – driving conclusion 100yr
- Conclusions regarding shorter durations not possible

Summary (continued)

➤ Measurement Error

- Wind affect snow more than rain
- Snow drift blow in to gage
- Crusting on top of gage

➤ Importance

- Higher proportion of snow in more frequent events
- Effect on mean statistics more likely
- Impact on PRISM mapping
- Mean statistics affect application of L-moment dimensionless curves

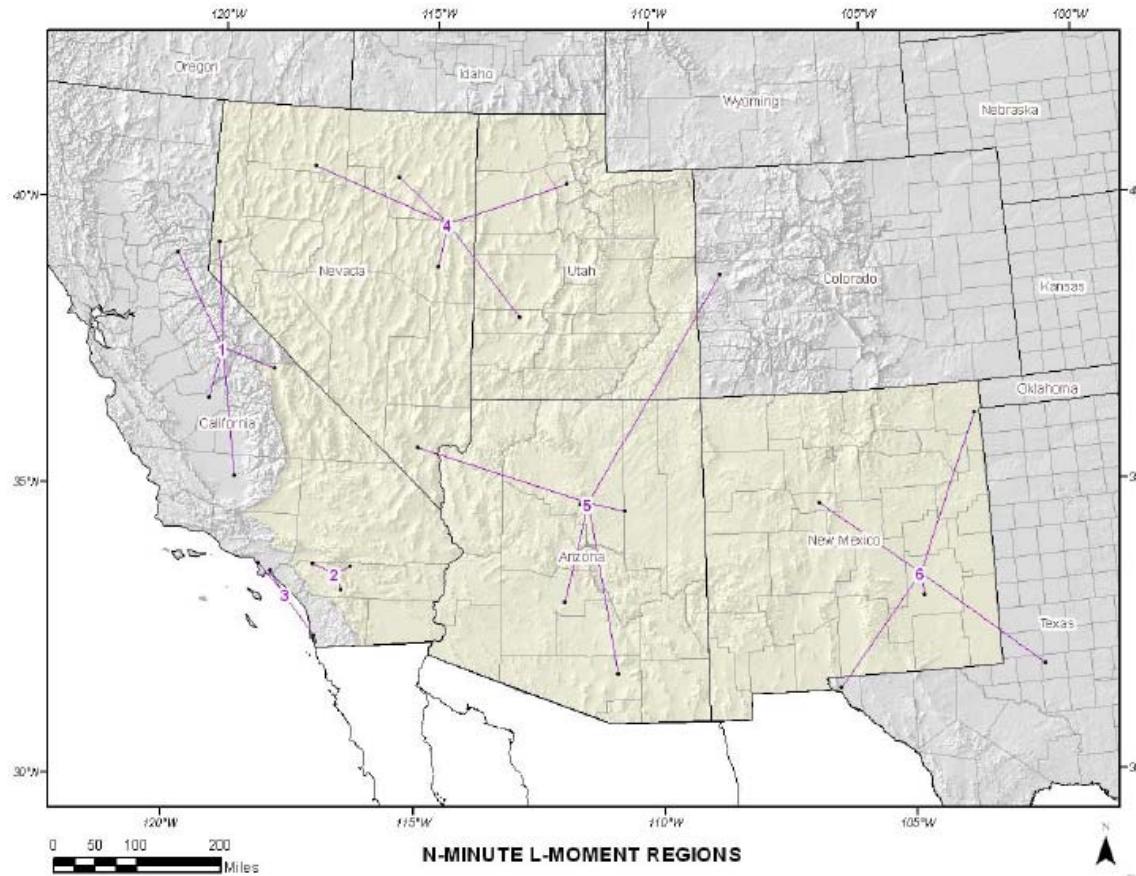
Gage	ID	Elev	Latitude	Longitude	Period of Record
NOAA Cooperative					
³ Mt. Rose Christmas Tree (H/D) ⁵	265441	7235	39.34222	119.8636	01OCT1971-01OCT2000
³ Truckee RS (H/D)	049043	6020	39.3311	120.8192	01JAN1948 - 01JAN2001
Daggett Pass	262119	7334	¹ 38 59	119 53	01JAN1988 - 01JAN2001
³ Glenbrook Creek	263205	6350	¹ 39 05	119 56	01JAN1948 - 01JAN2001
⁴ Tahoe City	048758	6240	39.167	120.1330	01JAN1931 - 01JAN1999
Meyers Inspection	045572	6345	¹ 38 51	120 01	01JAN1955 - 01JAN1969
NRCS SNOTEL					
Big Meadow	19K08S	8249	39.45503	119.942217	01JAN1983 - 01JAN2005
CSSLAB	20K31S	6855	39.3256	120.368067	01JAN1983 - 01JAN2005
Independence Camp	20k03S	6456	39.40167	120.21823	01JAN1980 - 01JAN2005
Independence Ck.	20K04S	7003	39.4528	120.292683	01JAN1978 - 01JAN2005
Mt. Rose Ski	19K07S	8801	39.31573	119.894733	01JAN1980 - 01JAN2005
⁴ Echo Peak (H/D)	20L06	7670	38.84903	120.0785	01JAN1980 - 01JAN2005
⁴ Fallen Leaf (H/D)	20L10	6236	38.93405	120.0545667	01JAN1979 - 01JAN2005
⁴ Hagan's Meadow(H/D)	19L03	7776	38.85185	119.9374167	01JAN1978 - 01JAN2005
⁴ Heavenly Valley (H/D)	19L24	8582	38.92433	119.9164667	01JAN1978 - 01JAN2005
⁴ Marlette Lake (H/D)	19K04S	7880	39.16395	119.8967167	01JAN1978 - 01JAN2005
⁴ Rubicon #2 (H/D)	20L02	7689	38.9992	120.1303167	01JAN1980 - 01JAN2005
⁴ Squaw Valley G.C. (H/D)	20K30	8029	39.18998	120.26475	01JAN1980 - 01JAN2005
⁴ Tahoe City Cross (H/D)	20K27S	6797	39.17162	120.1536167	01JAN1980 - 01JAN2005
⁴ Ward Creek #3 (H/D)	20K25S	6655	39.13562	120.2176333	01JAN1978 - 01JAN2005

¹Degrees and minutes, ² NOAA14 gages, ³Hourly and Daily data available for gage ⁵(H/D)

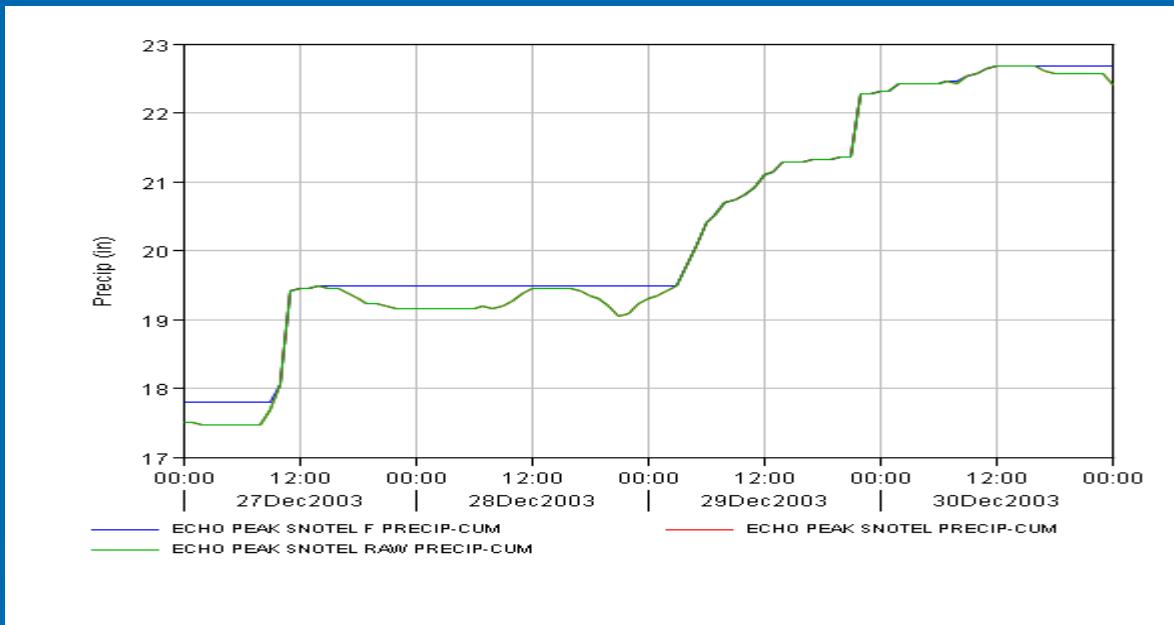
⁴Gages within the Lake Tahoe Basin

N-minute/60 minute ratios

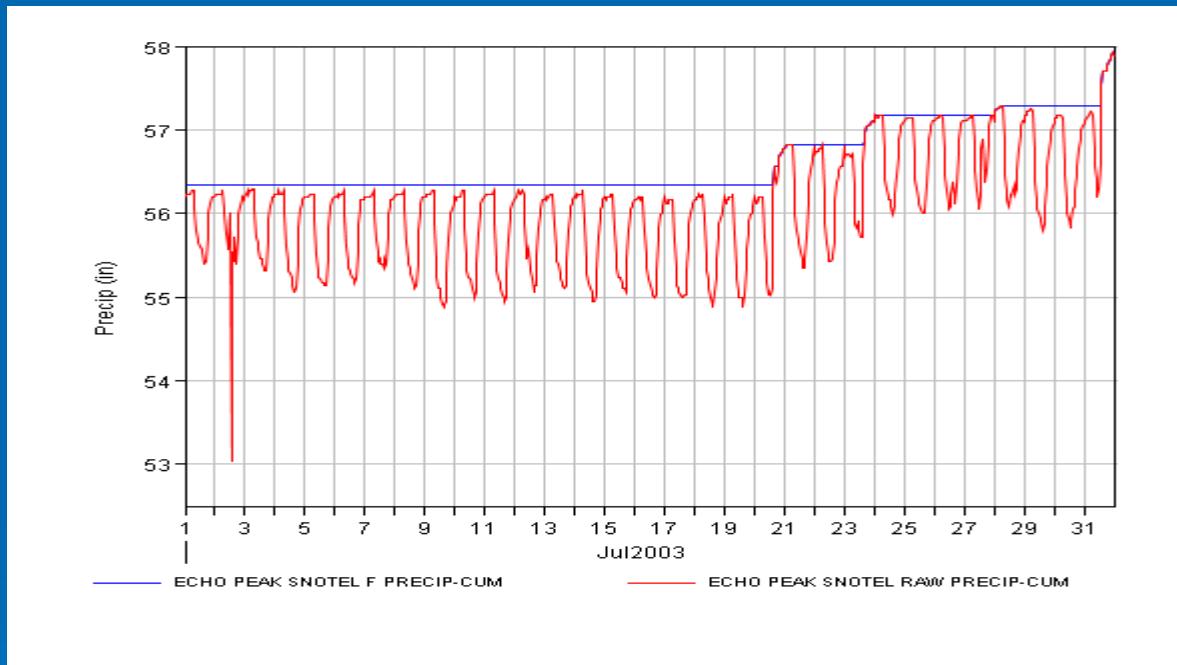
Figure 4.1.5. Regional groupings for n-minute data for NOAA Atlas 14 Volume 1.



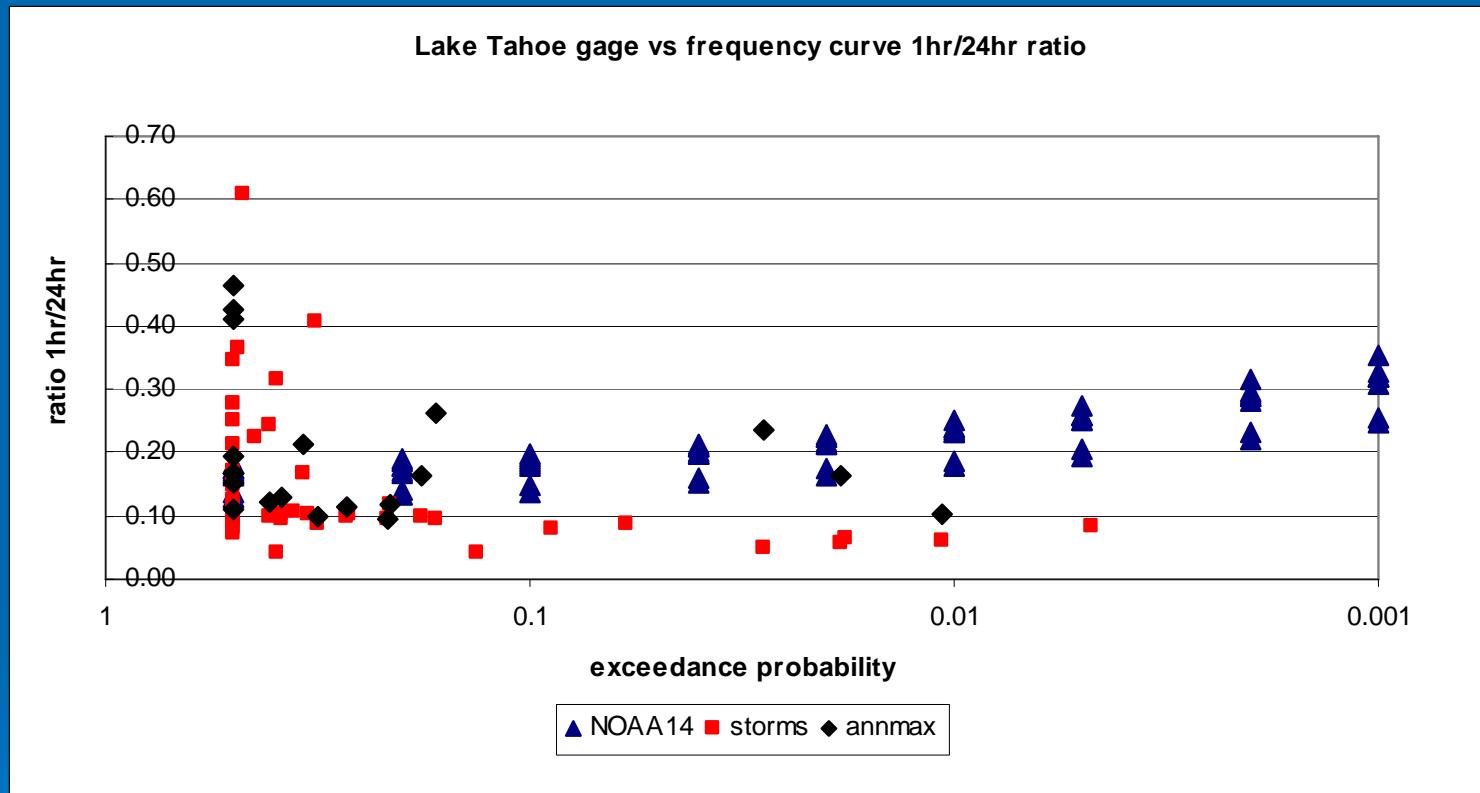
SNOTEL Data Filtering Winter



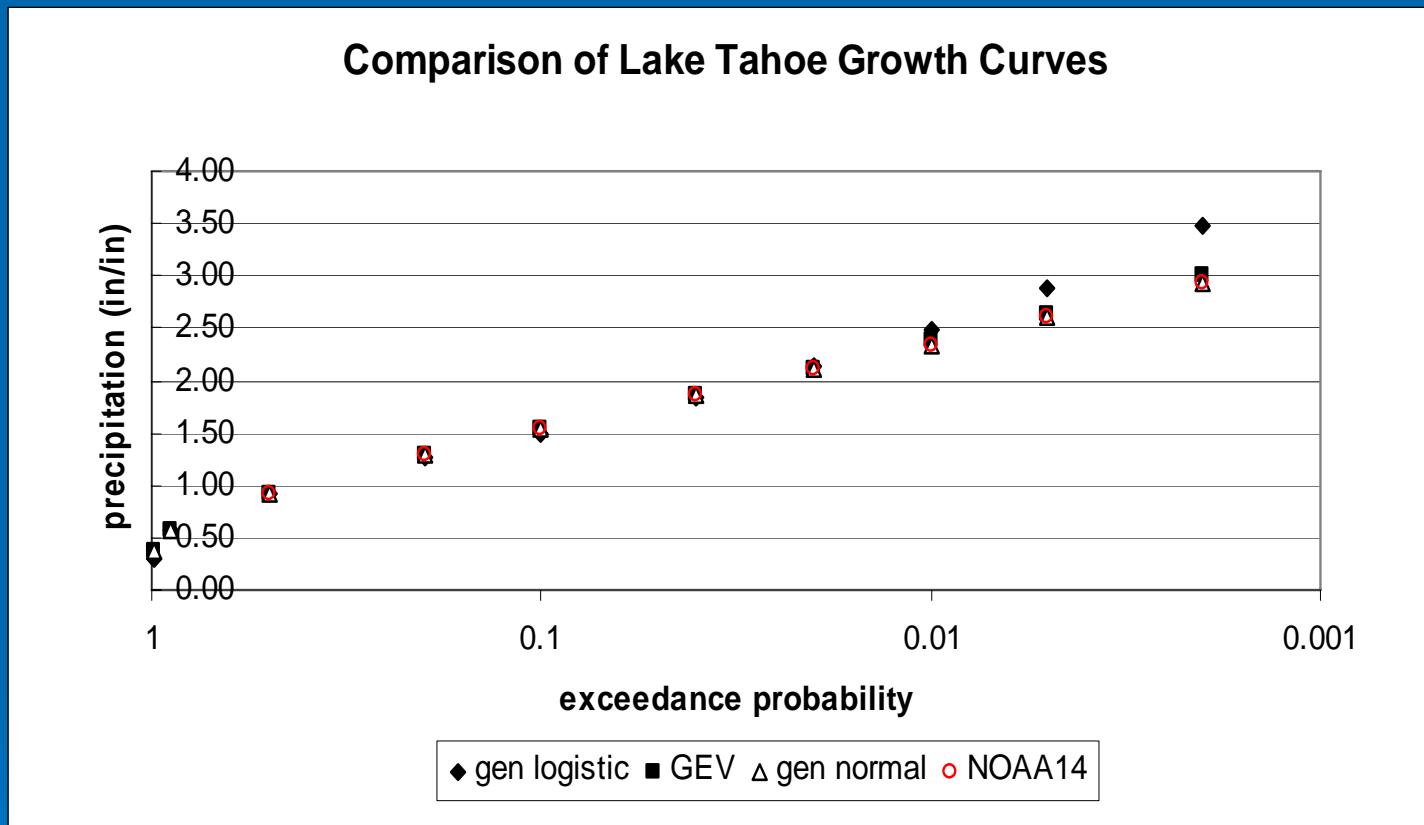
SNOTEL Data Filtering (summer)



60min/24hr ratios



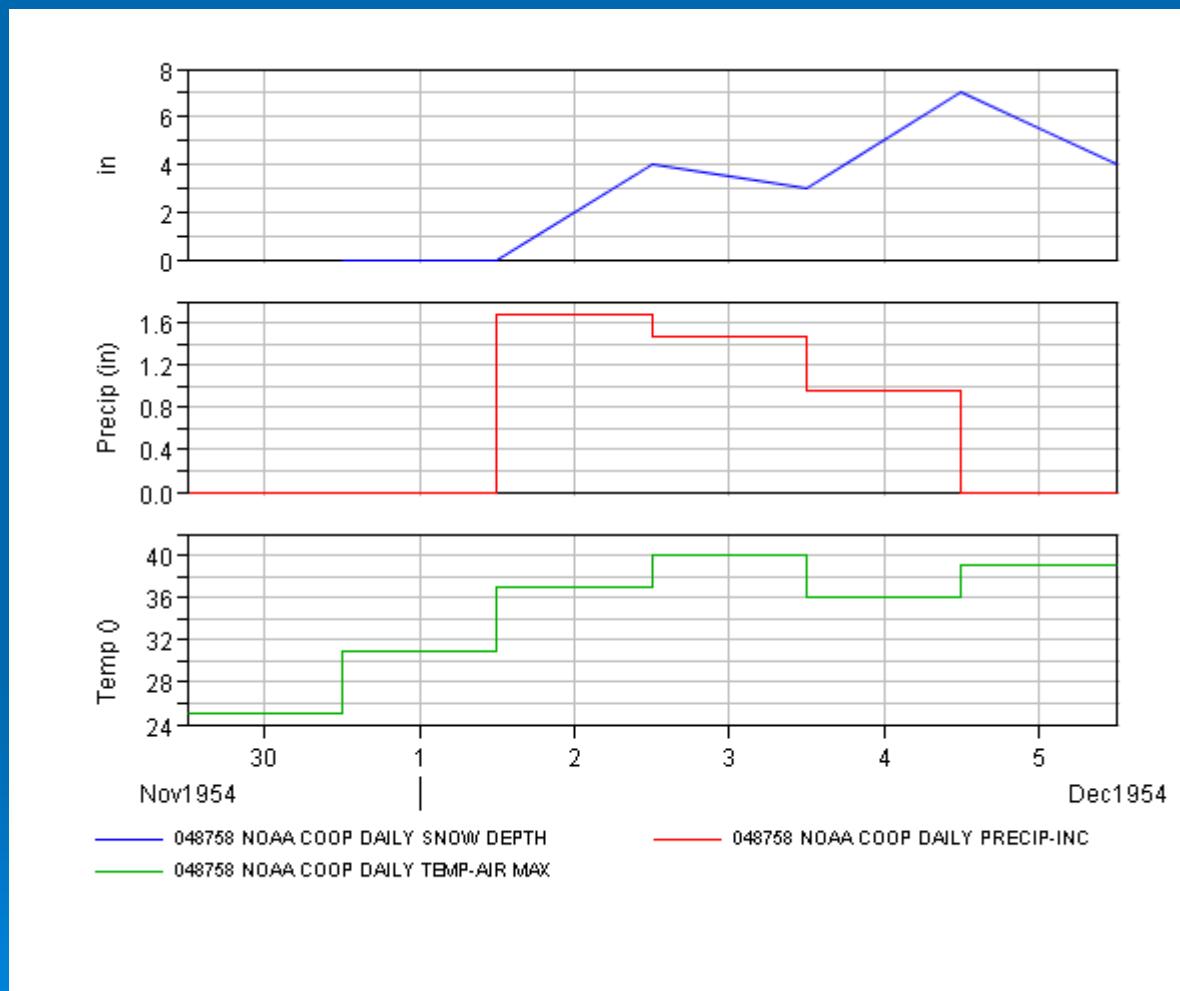
L-moment DDF Comparison



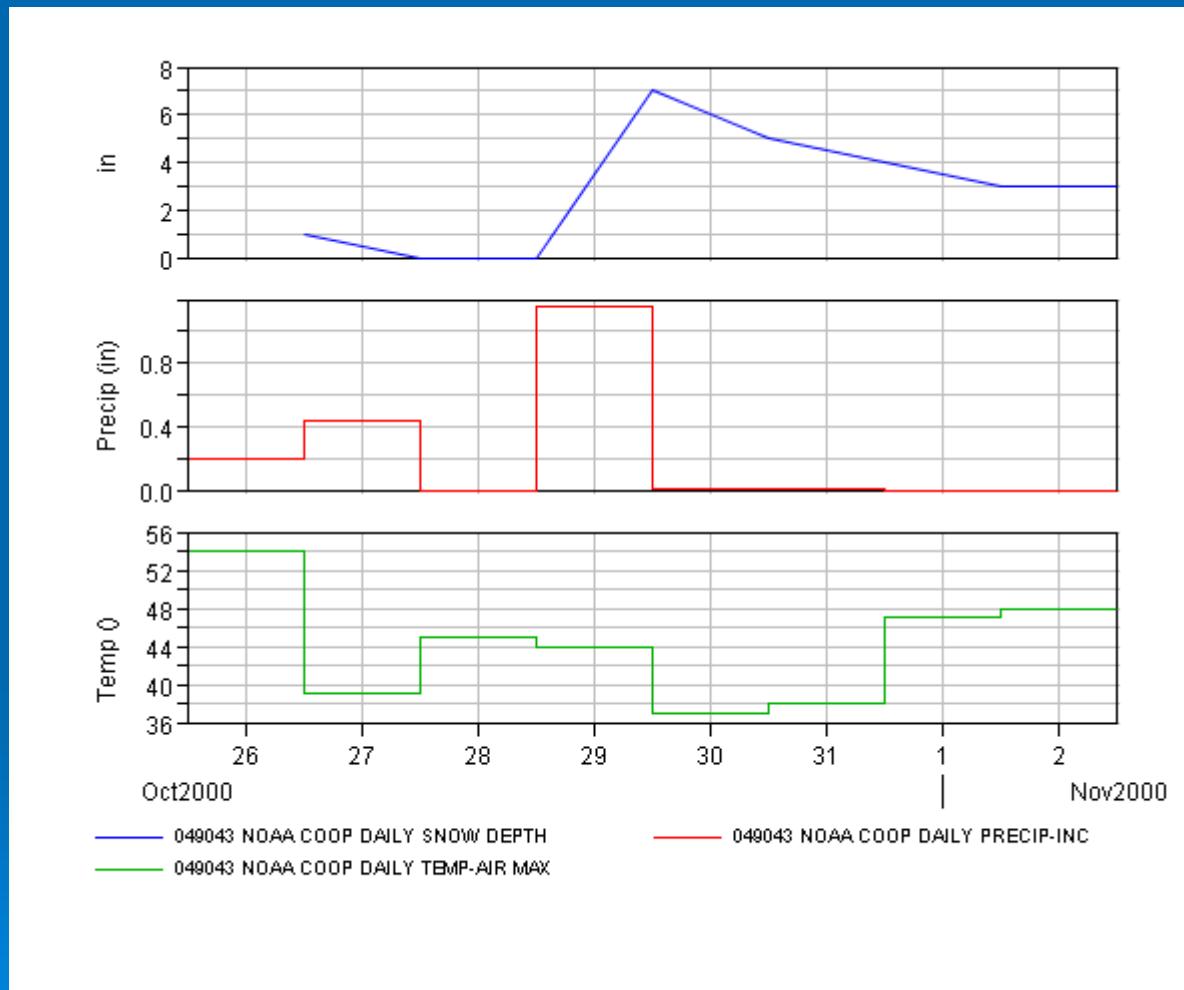
100yr 24hr DDF Comparison

SNOTEL gage	¹ NOAA14	² SNOTEL	³ difference
Echo Peak	8.27	9.16	0.11
Fallen Leaf	6.06	6.12	0.01
Hagan's Meadow	6.67	5.30	-0.21
Heavenly Valley	6.04	5.52	-0.09
Marlette Lake	6.65	5.12	-0.23
Rubicon #2	7.14	6.50	-0.09
Tahoe City Cross	6.68	5.50	-0.18
Ward Creek #3	10.49	10.39	-0.01
average			-0.09

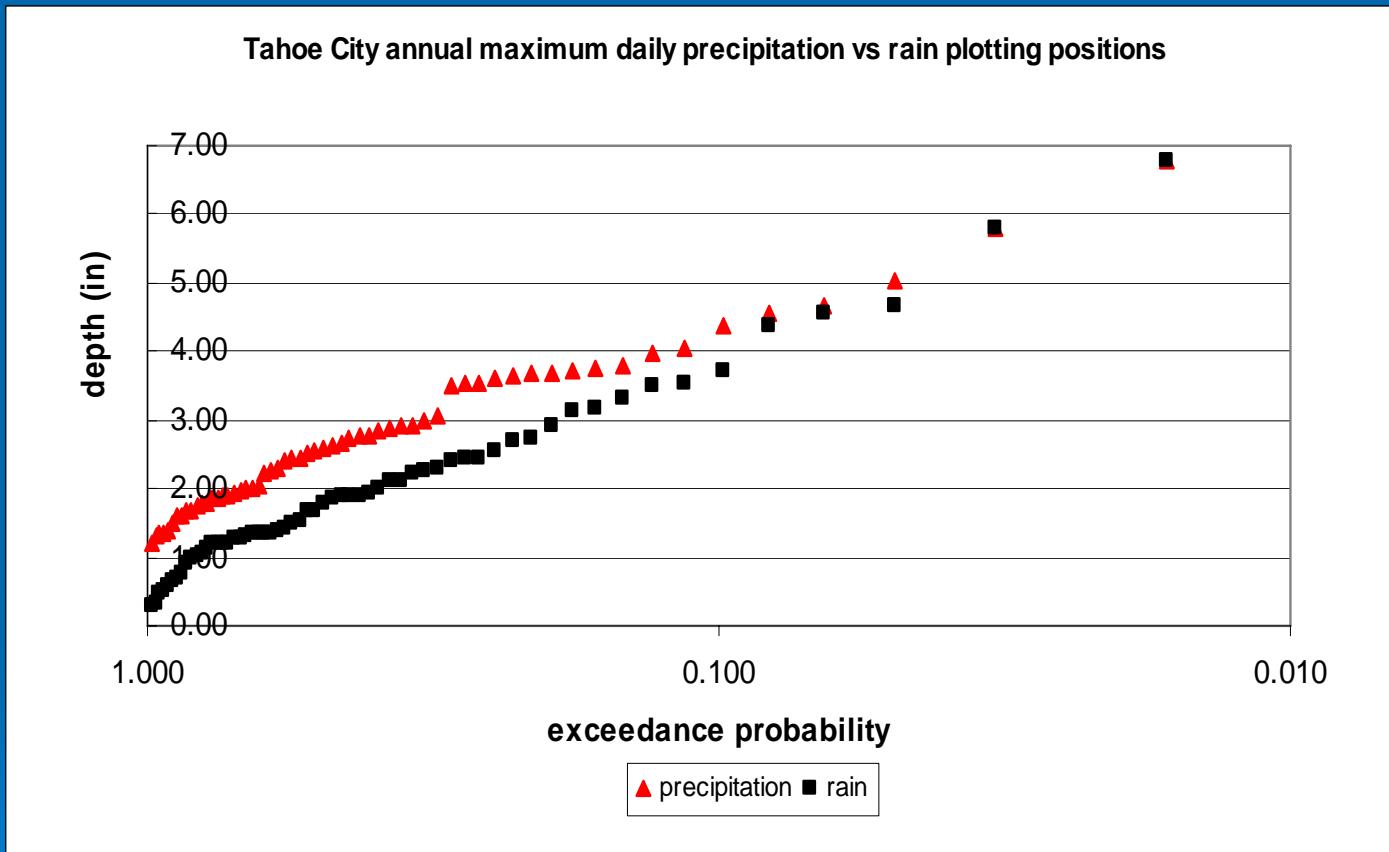
Precipitation Phase



Precipitation Phase (continued)



Precipitation vs Rainfall 24hr Frequencies



Precipitation vs Rainfall 24hr ratios

probability	Truckee RS	Tahoe City
0.01	1.00	1.00
0.10	0.85	0.87
0.20	0.80	0.78
0.50	0.70	0.66