

National Climatic Data Center

DATA DOCUMENTATION

FOR

DATASET 9658 (DSI-9658)

Palmer Drought Data

January 5, 2004

National Climatic Data Center
151 Patton Ave.
Asheville, NC 28801-5001 USA

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Table of Contents

<u>Topic</u>	<u>Page Number</u>
1. Abstract.....	3
2. Element Names and Definitions:	3
3. Start Date.....	7
4. Stop Date.....	7
5. Coverage.....	7
6. How to order data.....	7
7. Archiving Data Center.	7
8. Technical Contact.....	7
9. Known Uncorrected Problems.....	7
10. Quality Statement.....	7
11. Essential Companion Data Sets.....	7
12. References.....	7

1. **Abstract:** The major parameters contained in the Historical Drought Data File are Palmer Drought Severity Index (PDSI), Palmer Hydrological Drought Index (PHDI), Palmer Moisture and Abnormality Index (Z), and the temperature, precipitation input values for each division.

The Historical Drought Data (HDD) set contains indices indicating the severity of a wet or dry spell. This data set is related to the Historical Palmer Drought Severity Indices (PDSI) currently residing in the NCDC digital library. The HDD differs from the Palmer Drought Indices in the following ways.

1) Initially, the PDSI calculations require several months to several years to accurately reflect the moisture climate. Upon reviewing the PDI, it was found that pre-1931 data, for many divisions, were not used to allow the model sufficient time to accurately reflect the soil moisture by Jan 1931. The new HDD used six years of estimated (regression estimates) divisional data prior to 1931 to account for previous weather.

2) Newly created HDD were derived from a recently corrected (June 1983) digital file of divisional average temperatures and precipitation. The actual values of input temperatures and precipitation that were used in the old PDI data set are not generally known.

It should be noted that the 1965-1982 Palmer Drought Monthly Library Tape contains input temperature and precipitation values used to calculate the PDSI during these 18 years. More than a few erroneous values of temperature and precipitation have been detected on this data tape. (Apparently, many of them stem from the fact that late corrections of the divisional data were not incorporated into the data set).

3) The HDD set uses the period 1925-1982 to establish normal conditions whereas the PDI library data set used the base period 1931-1960. This has created some large discrepancies between the two data sources.

2. **Element Names and Definitions:**

"PMONTH" is a Monthly update procedure developed by Mr. Wayne Palmer, a former meteorologist in EDIS. This program was designed to compute a monthly severity index (X). Each month an X1, X2, X3 is computed and as a drought or wet spell is established, the program assigns one of these values as the drought Severity Index for the month. If a weather pattern has not been established pattern, the current month and all unassigned indices for previous months are filled in.

The Monthly Drought Study is an update procedure with each month dependent on the previous month. A tape is built and saved each month for processing next month's analysis. If there is no previous month, the current month can be run by keying parameter information into the card (or record) in positions 27-60 (see format below).

Palmer Drought Analysis

STA: Station Number
YR: Year
Mo: Month 01 = January, 02 = February. etc.

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P: Monthly precipitation
 T: Monthly mean temperature
 SP: Available moisture in the soil at the start of a month
 SS: Amount of available moisture in the surface soil at the end of a month
 SU: Amount of available moisture in the underlying soil at the end of a month
 PE: Monthly potential evapotranspiration (Thorntwaite)
 PL: Monthly potential moisture less
 PR: Potential recharge; at the start of a month this is the number of inches required to bring the soil to field capacity
 R: Monthly recharge; net gain in the surface and underlying soil
 L: Monthly moisture loss from the surface and underlying soil
 ET: Monthly evapotranspiration
 RO: Monthly runoff
 ALPHA: Coefficient of evaporation (computed for the 30 year period 1931-1960)
 BETA: Coefficient of moisture recharge (computed for the 30 year period 1931-1960)
 GAMMA: Coefficient of runoff (computed for the 30 year period 1931-1960)
 DELTA: Coefficient of moisture depletion (computed for the 30 year period 1931-1960)
 KAPPA: Climatic characteristic (computed for the 30 year period 1931-1960)
 CET: The estimated monthly evapotranspiration
 CR: The estimated monthly soil moisture recharge
 CRO: The estimated monthly runoff
 CL: The estimated monthly soil moisture loss
 CP: The estimated monthly precipitation
 CD: The moisture departure for a particular month
 Z: The moisture anomaly index for a particular month
 UD: Amount of dryness effective in ending a wet spell
 UW: Amount of wetness effective in ending a drought
 V: The accumulated value of UD or UW
 ZE: Moisture anomaly required to end a "weather spell" in a single month
 PROB: Percentage probability that a spell has ended
 X1: Severity index for a wet spell that is becoming established
 X2: Severity index for a drought that is becoming established
 X3: Severity index for any wet spell or any drought that has become definitely established
 X: The index of drought (or wet spell) severity; temporarily unassigned when $0 < \text{PROB} < 100$

Position	Element	Definition
1-4	STA	State-Division
5-6	YR	Year
7-8	MO	Month
9-13	T	Temperature
14-18	P	Precipitation
27-30	SS	Available moisture in surface soil
31-35	SU	Available moisture in underlying soil
36-40	V	Accumulated value of UD or UW
41-44	PROB	Percentage probability that weather spell has ended
45-49	X1	Severity index for a wet spell becoming established
50-54	X2	Severity index for drought becoming established
55-59	X3	Severity index for a wet spell or drought that has become established
60		Accept information from positions 27-59
61		Past data available on drive 6

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Monthly Master Tape Format

Position	Element
1-4	State-Division
5-12	Water Capacity for Division Minus 1 (Inches)
13-20	Coefficient Dependent on Heat Index
21-28	Heat Index
29-36	Negative Tangent of Station Latitude
37-44	Alpha Coefficient for January
45-52	Beta Coefficient for January
53-60	Gamma Coefficient for January
61-68	Delta Coefficient for January
69-76	Kappa Coefficient for January
77-84	Alpha Coefficient for February
85-92	Beta Coefficient for February
93-100	Gamma Coefficient for February
101-109	Delta Coefficient for February
110-118	Kappa Coefficient for February
119-126	Alpha Coefficient for March
127-134	Beta Coefficient for March
135-142	Gamma Coefficient for March
143-150	Delta Coefficient for March
151-158	Kappa Coefficient for March
159-166	Alpha Coefficient for April
167-174	Beta Coefficient for April
175-182	Gamma Coefficient for April
183-190	Delta Coefficient for April
191-198	Kappa Coefficient for April
199-206	Alpha Coefficient for May
207-214	Beta Coefficient for May
215-222	Gamma Coefficient for May
223-230	Delta Coefficient for May
231-238	Kappa Coefficient for May
239-244	Alpha Coefficient for June
245-252	Beta Coefficient for June
253-260	Gamma Coefficient for June
261-268	Delta Coefficient for June
269-276	Kappa Coefficient for June
277-284	Alpha Coefficient for July
285-292	Beta Coefficient for July
293-300	Gamma Coefficient for July
301-308	Delta Coefficient for July
309-316	Kappa Coefficient for July
317-324	Alpha Coefficient for August
325-332	Beta Coefficient for August
333-340	Beta Coefficient for August
341-348	Delta Coefficient for August
349-356	Kappa Coefficient for August
357-364	Alpha Coefficient for September
365-372	Beta Coefficient for September
373-380	Gamma Coefficient for September
381-388	Delta Coefficient for September

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389-396	Kappa Coefficient for September
397-404	Alpha Coefficient for October
405-412	Beta Coefficient for October
413-420	Gamma Coefficient for October
421-428	Delta Coefficient for October
429-436	Kappa Coefficient for October
437-444	Alpha Coefficient for November
445-452	Beta Coefficient for November
453-460	Gamma Coefficient for November
461-468	Delta Coefficient for November
469-476	Kappa Coefficient for November
477-484	Alpha Coefficient for December
485-492	Beta Coefficient for December
493-500	Gamma Coefficient for December
501-508	Delta Coefficient for December
509-516	Kappa Coefficient for December

Monthly Drought Tape

Position	Element
1-4	State-Division
5-6	Year
7-8	Month
9-14	Precipitation (2 decimals)
15-20	Temperature (1 decimal)
21-27	SP (2 decimals)
28-34	UW
35-41	ZE
42-48	PE
49-55	PL
56-62	PR
63-69	R
70-76	L
77-83	ET
84-90	RO
91-97	Alpha (4 decimals)
98-104	Beta
105-111	Gamma
112-118	Delta
119-124	Kappa (3 decimals)
125-131	CET (2 decimals)
132-138	CR
139-145	CRO
146-152	CL
153-159	CP
160-166	CD
167-173	Z
174-180	SS
181-187	SU
188-194	V
195-199	PROB (1 decimal)
200-206	X1 (2 decimal)
207-213	X2
214-220	X3

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221-227	X
228-234	UD

3. **Start Date:** 19310101

4. **Stop Date:** 19901231

5. **Coverage:**

- a. Southernmost Latitude: 25.0S
- b. Northernmost Latitude: 50.0N
- c. Westernmost Longitude: -125.0W
- d. Easternmost Longitude: 65.0E

6. **How to Order Data:**

Ask NCDC's Climate Services about the cost of obtaining this data set.

Phone: 828-271-4800

FAX: 828-271-4876

E-mail: NCDC.Orders@noaa.gov

7. **Archiving Data Center:**

Archive Branch
National Climatic Data Center
151 Patton Avenue
Asheville, NC 28801

8. **Technical Contact:**

National Climatic Data Center
151 Patton Avenue
Asheville, NC 28801

9. **Known Uncorrected Problems:** None.

10. **Quality Statement:**

11. **Essential Companion Datasets:**

12. **References:**

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