



# Tarfala Research Station automatic weather station, 1993

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# 1 Instrumentation

The TRS met station consisted of the following instruments during 1993

Sensor	Serial number	Remark
Pt100		in Stevenson screen
T/Rh		at 2 m
Young Wind Monitor		at 3 m
LiCor Li-200SB pyranometer		at 2 m
CS Q-7 net radiometer		at 2 m
Tipping bucket precipitation gauge		at 2 m
CR21X data logger		

## 2 Notes on the station data

- NOTE 3-hr sampling of data during winter, 1-hr sampling during summer.
- No daily output.
- Original logger files are missing and existing data files are based on processed data.
- The wind direction data suffers from issues. In September and October values seem to be locked around 0/360°. From early November, the direction sensor appears to be malfunctioning. This behaviour continues into 1994.

## 3 Data coverage

- Data breaks of all sensors from  
1993-02-16 03:00:00 to 1993-02-16 06:00:00  
1993-03-11 15:00:00 to 1993-04-08 15:00:00
- wind data missing from  
1993-01-03 18:00:00  
1993-01-04 06:00:00  
1993-01-06 15:00:00  
1993-01-07 03:00:00  
1993-01-07 15:00:00  
1993-01-09 06:00:00  
1993-01-09 09:00:00  
1993-02-04 21:00:00  
1993-02-06 06:00:00  
1993-02-16 03:00:00 to 1993-02-16 06:00:00  
1993-02-16 12:00:00 to 1993-03-11 12:00:00  
1993-03-11 15:00:00 to 1993-04-08 15:00:00  
1993-06-14 03:00:00 to 1993-06-14 05:00:00  
1993-09-19 15:00:00 to 1993-09-19 17:00:00
- Relative humidity data is missing from  
1993-01-03 18:00:00  
1993-01-03 21:00:00  
1993-01-04 06:00:00  
1993-01-07 00:00:00  
1993-01-07 12:00:00  
1993-01-09 09:00:00  
1993-02-16 03:00:00 to 1993-02-16 06:00:00  
1993-03-11 15:00:00 to 1993-04-08 15:00:00

- Radiation data (mostly net radiation) is missing from  
1993-02-07 18:00:00  
1993-02-08 18:00:00 to 1993-02-08 21:00:00  
1993-02-16 00:00:00 to 1993-04-08 15:00:00  
1993-03-11 15:00:00 to 1993-04-08 15:00:00
- Precipitation data missing from  
1993-02-07 18:00:00  
1993-02-08 18:00:00  
1993-02-08 21:00:00  
1993-02-16 03:00:00 to 1993-04-08 15:00:00  
1993-03-11 15:00:00 to 1993-04-08 15:00:00
- Temperature data missing from  
1993-01-06 21:00:00  
1993-01-07 03:00:00  
1993-01-08 00:00:00  
1993-01-09 15:00:00  
1993-02-04 00:00:00  
1993-02-08 12:00:00  
1993-02-16 03:00:00 to 1993-02-16 06:00:00  
1993-03-11 15:00:00 to 1993-04-08 15:00:00

## 4 Notes on data storage

Example data line for hourly data:

1993,185,1300,5.292,5.308,91.7,0.781,0.61,15.95,37.97,123.8,76.8,2.08,3.84

Column	Example data	Description
01:	1993	Year
02:	185	Day of Year
03:	1300	Hour-minute (hhmm)
04:	5.292	2 Pt100 T in Stevenson screen)
05:	5.308	3 T in Young screen
06:	91.7	4 Rh in Young screen
07:	0.781	5 Mean horizontal wind speed
08:	0.61	6 Resultant mean wind speed
09:	15.95	7 resultant mean wind direction
10:	37.97	8 Standard deviation of wind direction
11:	123.8	9 Global radiation
12:	76.8	10 net radiation
13:	2.08	11 Precipitation
14:	3.84	12 Precipitation intensity

## 5 Data files and content

TRSmet1993.csv Raw data file

TRS\_met\_1993\_Precipitation.csv

Date-time, hourly totalized P

1993-01-01 03:00:00,0.00,0.00

TRS\_met\_1993\_Radiation.csv

Date-time, Global radiation, Net radiation

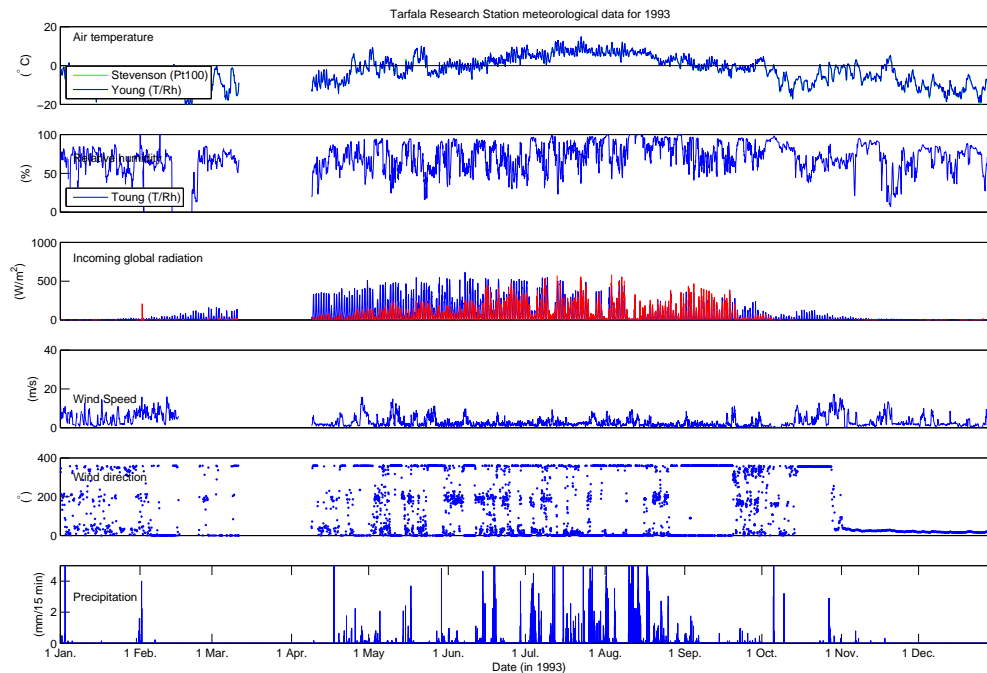


Figure 1. Summary of meteorological data from Tarfala Research Station automatic weather station 1993.

1992-01-01 03:00:00,1.3,-2.3

TRS\_met\_1993\_Relative\_humidity.csv

Date-time, hourly average Rh

1993-01-01 03:00:00,65.9

TRS\_met\_1993\_Temperature.csv

Date-time, hourly average T (Stevenson), hourly average T (Young)

1993-01-01 03:00:00,-1.86,-1.96

TRS\_met\_1993\_Wind.csv

Date-time, Mean horizontal wind speed, Resultant mean wind speed, resultant mean wind direction, Standard deviation of wind direction

1993-01-01 03:00:00,11.4,10.9,327.1,18.5

The data collected during 1993 is summarized the figure 1 and Table 1.

## Logger program

No documentation of the logger program exists for this year.

Table. 1. Monthly averages of meteorological parameters from the Tarfala Research Station automatic weather station 1993.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Average air temperature (Stevenson)												
(°C)	−8.8	−8.2	−8.9	−5.8	−0.6	1.6	6.9	5.2	−0.1	−5.4	−4.7	−12.1
<i>n</i>	243	219	92	178	711	743	743	767	743	271	247	255
Average air temperature												
(%)	−8.7	−8.2	−8.8	−5.7	−0.5	1.7	7.0	5.2	−0.0	−5.3	−4.6	−11.9
<i>n</i>	247	221	92	178	711	743	743	767	743	271	247	255
Average relative humidity												
(°C)	64.7	55.7	68.7	65.6	66.9	68.3	76.5	86.7	74.5	72.8	64.7	69.9
<i>n</i>	241	221	92	178	711	743	743	767	743	271	247	255
Positive degree sum												
(°C)	3	1	0	−193	1044	1641	5188	4039	677	111	71	0
<i>n</i>	3	4	0	23	302	518	743	751	340	44	41	0
Average incoming global radiation												
(W m <sup>−2</sup> )	2.8	13.4	25.3	120.4	144.6	160.5	104.5	60.5	55.7	17.9	4.6	1.7
<i>n</i>	245	220	92	178	711	743	743	767	743	271	247	255
Global incoming energy sum												
(W m <sup>−2</sup> )	—	—	2327	—	102778	119262	77629	46417	41384	4838	1146	437
<i>n</i>	—	—	92	—	711	743	743	767	743	271	247	255
Average net radiation												
(W m <sup>−2</sup> )	−2907	−1592	−508	2728	33311	64071	54503	47000	28653	−3361	−5125	−2027
<i>n</i>	244	220	92	178	710	742	671	754	734	271	247	255
Totalized precipitation												
(mm)	71.04	418.54	0.00	80.64	155.52	303.36	919.68	1017.60	130.56	42.24	19.20	0.00
<i>n</i>	247	126	0	178	711	743	743	767	743	271	247	255
Average wind speed												
(m s <sup>−1</sup> )	4.5	7.5	—	3.3	3.5	2.2	2.5	2.3	1.9	4.2	3.7	2.2
<i>n</i>	243	128	—	178	711	740	743	767	740	271	247	255