

Pre-processing report

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1 Introduction

In this report are present the missing values, values with format errors and suspicious values of the meteorological data recorded by the medical-surgical school of Porto during the nineteenth century.

2 Missing values or values with format errors

Sheet of December 1881 is without records.

2.1 Atmospheric pressure

2.1.1 Atmospheric pressure at 9h

Day	Value
1863-09-02	754..48
1867-02-05	7-62.89
1867-04-08	76..22
1871-12-29	754..57
1882-01-23	762,.07
1882-01-24	763,.65
1882-01-25	763,.95

2.1.2 Atmospheric pressure at 12h

Day	Value
1862-12-24	764..03
1889-05-18	754 ,59

2.1.3 Atmospheric pressure at 15h

Day	Value
1860-12-16	754..02
1860-12-18	744..98
1862-07-24	75.3.71
1862-11-11	754..93
1863-08-11	754..65
1868-02-10	764.14.

Day	Value
1890-11-13	,758,36
1891-04-15	758,,37

2.1.4 Average atmospheric pressure

Day	Value
1867-05-19	754..46
1869-02-27	767.17.

2.2 Temperature

2.2.1 Temperature in the shade at 9h

Day	Value
1878-01-11	4..4
1884-01-07	11,4,
1888-03-16	10 ,3

2.2.2 Temperature in the sunlight at 12h

Day	Value
1862-03-30	14..8
1869-06-12	18..5
1887-08-27	,5,4

2.2.3 Temperature in the shade at 12h

Day	Value
1864-08-16	2 2.4
1873-01-15	14..1

2.2.4 Temperature in the sunlight at 15h

Day	Value
1863-04-25	2.6.0
1884-03-23	20,,0

2.2.5 Temperature in the shade at 15h

Day	Value
1864-07-24	24..2

2.2.6 Maximum temperature

Day	Value
1862-12-22	14..1

2.2.7 Minimum temperature

Day	Value
1870-01-26	0.-4
1870-01-27	0.-4

2.2.8 Average temperature

Day	Value
1864-12-21	13.8.

2.3 Vapor pressure

2.3.1 Vapor pressure at 9h

Day	Value
1861-08-17	14..54
1883-07-04	14,17,
1889-04-28	8 ,18
1889-04-30	6,7 1

2.3.2 Vapor pressure at 12h

Day	Value
1866-03-31	14..75
1880-09-19	14..67
1883-02-20	9,14,
1894-11-16	10,,7

2.4 Relative humidity

2.4.1 Relative humidity at 9h

Day	Value
1862-03-08	8 7

2.5 Precipitation

Day	Value
1897-01-01	NA

Day	Value
-----	-------

2.6 Ozone

Day	Value
1863-06-30	4.0
1865-08-02	4.5
1884-01-29	7.0,

2.7 Wind

Between December 1860 and December 1864 there are no records on wind speed.

2.7.1 Absolute wind speed

Day	Value
1867-08-25	34..24
1867-12-01	NA
1867-12-02	NA
1867-12-03	NA
1867-12-04	NA
1867-12-05	NA
1867-12-06	NA
1867-12-07	NA
1867-12-08	NA
1867-12-09	NA
1867-12-10	NA
1867-12-11	NA
1867-12-12	NA
1867-12-13	NA
1867-12-14	NA
1867-12-15	NA
1867-12-16	NA
1867-12-17	NA
1867-12-18	NA
1867-12-19	NA
1867-12-20	NA
1867-12-21	NA
1867-12-22	NA
1867-12-23	NA
1867-12-24	NA
1867-12-25	NA
1867-12-26	NA
1867-12-27	NA
1867-12-28	NA
1867-12-29	NA
1867-12-30	NA
1867-12-31	NA
1868-01-01	NA
1868-01-02	NA
1868-01-03	NA

Day	Value
1868-01-04	NA
1868-01-05	NA
1868-01-06	NA
1868-01-07	NA
1868-01-08	NA
1868-01-09	NA
1868-01-10	NA
1868-01-11	NA
1868-01-12	NA
1868-01-13	NA
1868-01-14	NA
1868-01-15	NA
1868-01-16	NA
1868-01-17	NA
1868-01-18	NA
1868-01-19	NA
1868-01-20	NA
1868-01-21	NA
1868-01-22	NA
1868-01-23	NA
1868-01-24	NA
1868-01-25	NA
1868-01-26	NA
1868-01-27	NA
1868-01-28	NA
1868-01-29	NA
1868-01-30	NA
1868-01-31	NA
1868-02-01	NA
1868-02-02	NA
1868-02-03	NA
1868-02-04	NA
1868-02-05	NA
1868-02-06	NA
1868-02-07	NA
1868-02-08	NA
1868-02-09	NA
1868-02-10	NA
1868-02-11	NA
1868-02-12	NA
1868-02-13	NA
1868-02-14	NA
1868-02-15	NA
1868-02-16	NA
1868-02-17	NA
1868-02-18	NA
1868-02-19	NA
1868-02-20	NA
1868-02-21	NA
1868-02-22	NA
1868-02-23	NA
1868-02-24	NA

Day	Value
1868-02-25	NA
1868-02-26	NA
1868-02-27	NA
1868-02-28	NA
1868-02-29	NA
1868-03-01	-
1868-03-02	-
1868-03-03	-
1868-03-04	-
1891-07-01	NA
1891-07-02	NA
1891-07-03	NA
1891-07-04	NA
1891-07-05	NA
1891-07-06	NA
1891-07-07	NA
1891-07-08	NA
1891-07-09	NA
1891-07-10	NA
1891-07-11	NA
1891-07-12	NA
1891-07-13	NA
1891-07-14	NA
1891-07-15	NA
1891-07-16	NA
1891-07-17	NA
1891-07-18	NA
1891-07-19	NA
1891-07-20	NA
1891-07-21	NA
1891-07-22	NA
1891-07-23	NA
1891-07-24	NA
1891-07-25	NA
1891-07-26	NA
1891-07-27	NA
1891-07-28	NA
1891-07-29	NA
1891-07-30	NA
1891-07-31	NA
1893-01-17	2,17,9
1893-03-01	2,65,4

2.7.2 Wind hourly speed

Day	Value
1867-12-01	NA
1867-12-02	NA
1867-12-03	NA
1867-12-04	NA
1867-12-05	NA

Day	Value
1867-12-06	NA
1867-12-07	NA
1867-12-08	NA
1867-12-09	NA
1867-12-10	NA
1867-12-11	NA
1867-12-12	NA
1867-12-13	NA
1867-12-14	NA
1867-12-15	NA
1867-12-16	NA
1867-12-17	NA
1867-12-18	NA
1867-12-19	NA
1867-12-20	NA
1867-12-21	NA
1867-12-22	NA
1867-12-23	NA
1867-12-24	NA
1867-12-25	NA
1867-12-26	NA
1867-12-27	NA
1867-12-28	NA
1867-12-29	NA
1867-12-30	NA
1867-12-31	NA
1868-01-01	NA
1868-01-02	NA
1868-01-03	NA
1868-01-04	NA
1868-01-05	NA
1868-01-06	NA
1868-01-07	NA
1868-01-08	NA
1868-01-09	NA
1868-01-10	NA
1868-01-11	NA
1868-01-12	NA
1868-01-13	NA
1868-01-14	NA
1868-01-15	NA
1868-01-16	NA
1868-01-17	NA
1868-01-18	NA
1868-01-19	NA
1868-01-20	NA
1868-01-21	NA
1868-01-22	NA
1868-01-23	NA
1868-01-24	NA
1868-01-25	NA
1868-01-26	NA

Day	Value
1868-01-27	NA
1868-01-28	NA
1868-01-29	NA
1868-01-30	NA
1868-01-31	NA
1868-02-01	NA
1868-02-02	NA
1868-02-03	NA
1868-02-04	NA
1868-02-05	NA
1868-02-06	NA
1868-02-07	NA
1868-02-08	NA
1868-02-09	NA
1868-02-10	NA
1868-02-11	NA
1868-02-12	NA
1868-02-13	NA
1868-02-14	NA
1868-02-15	NA
1868-02-16	NA
1868-02-17	NA
1868-02-18	NA
1868-02-19	NA
1868-02-20	NA
1868-02-21	NA
1868-02-22	NA
1868-02-23	NA
1868-02-24	NA
1868-02-25	NA
1868-02-26	NA
1868-02-27	NA
1868-02-28	NA
1868-02-29	NA
1868-03-01	-
1868-03-02	-
1868-03-03	-
1868-03-04	-
1891-07-01	NA
1891-07-02	NA
1891-07-03	NA
1891-07-04	NA
1891-07-05	NA
1891-07-06	NA
1891-07-07	NA
1891-07-08	NA
1891-07-09	NA
1891-07-10	NA
1891-07-11	NA
1891-07-12	NA
1891-07-13	NA
1891-07-14	NA

Day	Value
1891-07-15	NA
1891-07-16	NA
1891-07-17	NA
1891-07-18	NA
1891-07-19	NA
1891-07-20	NA
1891-07-21	NA
1891-07-22	NA
1891-07-23	NA
1891-07-24	NA
1891-07-25	NA
1891-07-26	NA
1891-07-27	NA
1891-07-28	NA
1891-07-29	NA
1891-07-30	NA
1891-07-31	NA

3 Suspicious values

3.1 Temperature

3.1.1 Maximum temperature

Days with values less than 0 and greater than 41

Day	Value
1862-08-15	234
1862-08-25	232
1867-04-16	296
1879-12-22	145

3.1.2 Minimum temperature

Days with values less than -10 and greater than 30

Day	Value
1872-06-18	61.2
1876-06-05	134.0
1877-02-10	62.0
1877-04-06	83.0

3.1.3 Average temperature

Days with values less than 0 and greater than 33

Day	Value
1878-11-15	95
1880-04-21	122

Days when the average recorded temperature differs by more than 0.2 from the mean between maximum and minimum

Day	Value	Maximum	Minimum	Supposed.value
1862-11-22	8.1	3.0	3.0	3.0
1863-02-27	12.8	17.3	7.2	12.2
1863-03-18	11.6	15.1	6.1	10.6
1863-04-22	17.7	21.3	12.4	16.9
1863-05-13	18.6	20.2	15.0	17.6
1863-06-12	15.1	18.2	11.0	14.6
1864-04-10	18.5	23.0	13.1	18.1
1864-07-03	24.3	26.3	16.4	21.4
1864-08-13	22.2	24.3	18.2	21.2
1864-08-18	22.3	23.4	19.2	21.3
1865-02-19	8.8	13.2	4.0	8.6
1865-04-07	16.8	21.4	11.2	16.3
1865-06-29	22.9	26.4	17.4	21.9
1865-08-09	21.1	25.2	7.0	16.1
1865-10-19	15.6	18.3	12.0	15.2
1865-11-03	18.8	17.3	10.4	13.9

Day	Value	Maximum	Minimum	Supposed.value
1865-12-11	13.3	16.3	8.4	12.4
1866-04-04	11.6	17.0	5.2	11.1
1866-06-02	15.6	18.3	12.0	15.2
1866-07-04	18.6	22.0	14.3	18.1
1866-07-09	25.6	31.0	19.3	25.1
1867-01-13	8.8	12.2	5.1	8.6
1867-03-16	14.5	17.1	11.0	14.1
1867-04-11	17.9	22.4	12.3	17.4
1867-04-28	18.6	17.0	10.3	13.7
1867-07-27	18.8	23.2	13.4	18.3
1867-08-11	23.8	24.3	16.4	20.4
1867-09-02	19.7	23.3	15.2	19.2
1867-10-14	23.3	22.3	14.3	18.3
1867-11-16	13.5	15.0	11.0	13.0
1868-01-04	6.7	10.1	1.3	5.7
1868-01-24	14.1	14.2	4.0	9.1
1868-01-29	15.8	15.3	6.4	10.9
1868-08-16	18.6	22.4	14.0	18.2
1868-12-16	19.0	16.0	12.0	14.0
1869-02-19	13.2	13.4	3.1	8.2
1869-12-27	5.7	8.4	2.1	5.2
1870-03-16	11.7	16.3	6.1	11.2
1870-04-16	21.5	27.1	13.6	20.4
1870-09-15	21.5	26.0	16.0	21.0
1871-01-27	4.9	9.1	-0.8	4.1
1871-09-01	21.6	25.2	16.1	20.6
1872-04-10	22.6	28.1	15.1	21.6
1874-09-12	19.6	24.4	14.1	19.2
1874-12-29	4.8	9.4	-0.2	4.6
1875-01-20	9.0	11.4	4.4	7.9
1875-05-30	17.4	23.1	11.0	17.1
1876-12-14	14.6	12.1	7.2	9.7
1877-11-15	14.3	9.0	9.6	9.3
1878-03-15	18.6	21.0	12.2	16.6
1878-04-28	19.4	25.1	13.0	19.1
1878-07-30	22.1	27.4	15.8	21.6
1878-11-15	95.0	13.3	5.8	9.6
1879-05-28	15.5	16.8	10.2	13.5
1879-10-23	19.0	23.8	12.2	18.0
1880-03-17	15.0	19.5	6.6	13.1
1880-04-21	122.0	18.4	6.0	12.2
1880-10-06	24.8	18.8	10.8	14.8
1881-02-21	10.9	13.8	7.0	10.4
1881-10-21	14.5	17.0	11.3	14.2
1881-11-20	15.5	17.6	9.4	13.5
1881-11-21	15.1	17.0	9.3	13.2
1881-11-22	15.6	17.0	10.2	13.6
1883-05-25	16.1	16.8	13.4	15.1
1884-05-20	14.4	20.2	8.0	14.1
1884-08-21	21.4	21.0	14.8	17.9
1884-11-30	16.5	16.2	6.8	11.5
1884-12-10	12.2	14.2	0.2	7.2

Day	Value	Maximum	Minimum	Supposed.value
1885-01-08	10.6	9.7	1.5	5.6
1885-01-16	3.8	6.7	0.0	3.4
1885-04-29	11.1	13.4	6.8	10.1
1885-12-25	11.1	12.2	2.0	7.1
1886-08-23	28.8	22.4	15.2	18.8
1886-08-24	28.3	22.6	14.0	18.3
1886-08-25	29.8	26.2	13.4	19.8
1886-11-06	13.3	14.5	11.2	12.8
1887-02-12	9.4	10.4	-0.1	5.2
1887-02-13	9.0	11.0	-0.2	5.4
1887-03-18	13.2	10.0	6.4	8.2
1887-08-10	27.4	27.4	19.4	23.4
1887-09-30	11.7	12.5	8.0	10.2
1888-01-22	10.0	13.8	5.2	9.5
1888-02-29	7.9	10.0	3.8	6.9
1888-06-24	18.8	22.8	13.8	18.3
1889-09-17	32.9	28.4	19.4	23.9
1890-02-17	9.3	10.8	3.8	7.3
1890-10-29	12.8	17.8	5.0	11.4
1890-10-30	14.6	19.0	7.8	13.4
1890-12-18	13.7	13.0	4.4	8.7
1892-02-28	14.5	12.2	6.8	9.5
1892-12-03	7.7	13.0	1.0	7.0
1893-05-26	24.9	21.8	18.0	19.9
1893-09-22	17.8	20.0	13.6	16.8
1883-10-22	25.0	27.2	13.8	20.5
1893-12-26	15.0	15.8	7.2	11.5
1895-04-14	18.5	22.2	13.0	17.6
1895-11-13	18.3	20.2	15.4	17.8
1895-11-24	15.3	16.4	11.2	13.8
1895-12-13	15.0	19.2	9.8	14.5
1895-12-16	14.9	12.8	7.0	9.9

3.1.4 Maximum temperature <= Minimum temperature

Days in which the maximum temperature is less than or equal to the minimum temperature.

Day	Maximum	Minimum
1862-11-22	3.0	3.0
1866-12-23	14.0	15.1
1871-07-28	26.0	27.4
1872-06-18	24.1	61.2
1876-06-05	22.0	134.0
1877-02-10	15.4	62.0
1877-04-06	15.4	83.0
1877-11-15	9.0	9.6
1884-12-12	15.6	18.4

3.1.5 Temperature in the sunlight at 9h

Days with values less than 0 and greater than 50

Day	Value
1861-05-14	109.7
1866-11-01	230.0
1867-09-11	185.0
1870-01-27	142.0
1872-10-26	61.0
1882-06-02	208.8

3.1.6 Temperature in the shade at 9h

Days with values less than -10 and greater than 40

Day	Value
1867-11-09	117.4
1869-03-04	121.0

3.1.7 Temperature in the sunlight at 12h

Days with values less than 0 and greater than 50

Day	Value
1864-11-30	217.0
1884-01-26	125.6
1894-02-20	147.0

3.1.8 Temperature in the shade at 12h

Days with values less than -10 and greater than 40

Day	Value
1884-04-23	43.4

3.1.9 Temperature in the sunlight at 15h

Days with values less than 0 and greater than 50

Day	Value
1863-03-06	135
1867-03-17	130
1871-01-05	117
1871-12-06	70
1872-01-26	107

3.1.10 Temperature in the shade at 15h

Days with values less than -10 and greater than 40

Day	Value
1861-09-14	221.0
1863-02-28	161.0
1866-09-05	222.1
1870-07-31	234.0

3.2 Atmospheric pressure

Days with values less than 700 and greater than 800

3.2.1 Atmospheric pressure at 9h

Day	Value
1861-03-04	64.45
1861-10-22	756098.00
1865-08-12	552.62
1872-02-25	858.02
1881-08-06	7560.03
1890-06-06	462.01
1892-07-03	75509.00

3.2.2 Atmospheric pressure at 12h

Day	Value
1861-03-07	76520.00
1861-07-03	754076.00
1861-09-10	75.35
1871-05-03	75.14
1880-05-27	959.15
1880-07-09	52.64
1882-05-13	75.06
1888-02-03	75.48

3.2.3 Atmospheric pressure at 15h

Day	Value
1861-10-25	7852.600
1863-08-10	75.619
1864-02-27	346.580
1864-04-06	855.650
1864-06-11	75.240
1865-05-11	952.700
1865-10-10	949.800
1868-01-22	857.700
1869-02-08	461.700
1876-03-24	843.300
1878-11-27	43.790
1878-12-15	457.460
1879-04-16	75.860

Day	Value
1883-01-29	458.520
1888-08-02	7560.130
1895-04-13	74.360

3.2.4 Average atmospheric pressure

Day	Value
1861-01-17	75.95
1861-04-03	751085.00
1865-02-26	661.27
1868-03-26	557.28
1868-10-31	961.94
1874-04-20	75.63
1877-10-20	558.30
1883-11-07	72.37
1886-06-13	158.16

Days that the average atmospheric pressure differs from averaging the values of 3 daily over 1

Day	Value	Suppose.value
1860-12-25	747.72	740.73
1860-12-28	757.77	754.77
1861-01-18	757.82	754.82
1861-03-04	763.81	530.48
1861-03-23	757.53	747.53
1861-04-03	751085.00	751.09
1861-09-10	755.16	528.49
1861-12-18	756.59	754.59
1862-06-11	752.51	745.85
1862-09-04	754.84	751.84
1862-09-14	757.38	751.39
1863-01-11	758.79	755.46
1863-02-09	759.91	758.58
1863-08-10	756.62	529.76
1863-10-17	758.97	755.64
1863-11-23	758.85	752.85
1864-02-27	746.76	613.43
1864-05-07	746.38	744.04
1864-06-04	761.35	751.35
1864-06-11	755.29	528.96
1864-06-26	759.93	754.93
1865-02-14	757.10	747.10
1865-02-15	757.29	747.29
1865-03-23	755.06	748.39
1865-05-08	746.68	744.35
1865-05-15	757.82	750.82
1865-05-24	757.23	754.90
1865-08-12	754.33	687.67
1865-12-21	765.13	761.71

Day	Value	Suppose.value
1866-01-07	762.21	760.21
1866-08-24	757.29	754.96
1866-09-26	756.54	754.21
1866-10-10	756.68	750.01
1867-02-09	763.20	759.87
1867-03-06	743.09	741.43
1867-05-17	752.91	749.58
1867-05-18	753.13	750.13
1867-06-02	759.20	757.20
1867-07-12	758.32	756.32
1867-10-10	759.94	757.47
1867-10-14	747.49	745.15
1867-12-09	757.94	747.94
1867-12-15	763.63	762.30
1868-01-05	758.38	752.38
1868-01-18	763.09	753.75
1868-03-09	751.97	750.64
1868-06-17	754.48	753.14
1868-08-21	758.15	756.82
1868-09-19	756.52	746.52
1868-10-31	961.94	761.94
1869-02-07	762.51	761.18
1869-02-08	762.37	662.37
1869-08-29	755.35	753.35
1870-02-01	768.38	762.38
1870-04-21	759.42	757.76
1870-10-07	755.30	752.30
1870-11-25	747.07	744.74
1871-01-31	755.61	753.61
1871-05-03	754.47	527.80
1873-01-17	764.16	761.50
1873-06-05	753.33	750.67
1873-08-27	764.08	757.41
1873-11-01	760.65	750.65
1874-04-11	753.09	738.09
1875-03-31	756.28	754.95
1876-01-11	756.19	754.99
1876-11-05	758.99	755.66
1877-02-24	757.47	755.14
1877-04-18	750.88	747.55
1877-05-31	751.21	747.88
1877-07-25	760.18	756.85
1878-02-18	764.83	763.50
1878-02-19	765.23	763.90
1878-03-06	765.96	762.63
1878-11-09	760.81	757.48
1878-11-27	743.26	509.93
1878-12-15	757.63	657.63
1878-12-25	756.44	746.44
1879-01-02	765.05	761.72
1879-04-11	756.59	753.26
1879-04-16	753.31	527.31

Day	Value	Suppose.value
1879-05-22	758.63	754.63
1880-07-09	752.46	519.13
1881-02-20	750.71	747.38
1882-05-13	754.92	528.26
1883-01-29	760.58	660.58
1883-02-06	755.61	752.28
1885-06-06	760.07	756.08
1885-07-26	756.39	753.06
1885-11-29	763.37	760.04
1886-03-29	763.48	760.15
1886-07-16	759.97	756.64
1888-02-03	755.37	528.71
1888-04-01	746.26	744.95
1888-05-04	762.72	759.39
1888-12-28	754.68	745.68
1889-07-22	760.07	756.07
1889-11-18	761.66	758.33
1890-06-06	761.57	661.57
1890-12-30	753.47	743.47
1891-01-16	761.64	758.31
1891-03-31	757.50	751.50
1895-03-01	757.84	747.84
1895-04-13	744.23	520.90
1895-11-03	756.45	752.79
1897-01-25	762.10	752.10
1897-01-26	761.88	751.88
1897-04-13	751.69	750.10
1897-04-14	759.41	756.87
1897-04-24	745.38	743.71
1897-04-26	746.03	744.36
1897-04-27	749.63	748.44
1897-04-28	755.07	753.65

3.3 Vapor pressure

Days with values less than 1 and greater than 35

3.3.1 Vapor pressure at 9h

Day	Value
1862-10-21	70.81
1862-10-30	954.00
1866-12-01	761.00
1867-09-03	132.25
1876-09-19	41.56

3.3.2 Vapor pressure at 12h

Day	Value
1861-03-11	7698.0

Day	Value
1895-03-11	71.7

3.3.3 Vapor pressure at 15h

Day	Value
1862-10-23	111.56
1890-09-11	123.89

3.4 Relative humidity

Days with values less than 0 and greater than 100

3.4.1 Relative humidity at 9h

Day	Value
1863-02-28	737
1864-04-30	618
1877-09-09	880

3.4.2 Relative humidity at 12h

Day	Value
1887-08-28	781

3.4.3 Relative humidity at 15h

Day

3.5 Precipitation

Days with values less than 0 and greater than 100

Day	Value
1865-10-21	113.6
1876-10-12	140.4
1888-11-11	104.2

3.6 Ozone

Days with values less than 0 and greater than 20

Day	Value
1878-01-10	25
1878-01-12	35

Day	Value
1878-12-23	21
1884-03-03	25

3.7 Wind speed

3.7.1 Absolute wind speed

Days with values less than 0 and greater than 1000

Day	Value
1867-02-16	1502.24
1887-04-28	1418.80
1897-09-15	2121.20

3.7.2 Hourly wind speed

Days with values less than 0 and greater than 40

Day	Value
1867-02-16	62.6
1879-03-06	46.0
1883-04-08	49.8
1893-11-15	63.3

3.7.3 Absolute wind speed < Hourly wind speed

Days in which the absolute wind speed is less than the hourly wind speed.

Day	Hourly	Absolute
1867-02-14	8.0	3.68
1870-01-13	0.4	0.10