# A joint dataset of atmospheric electricity

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- Data sources
- Joint dataset
- Data structure

# Data Sources

## 1. WDC

World

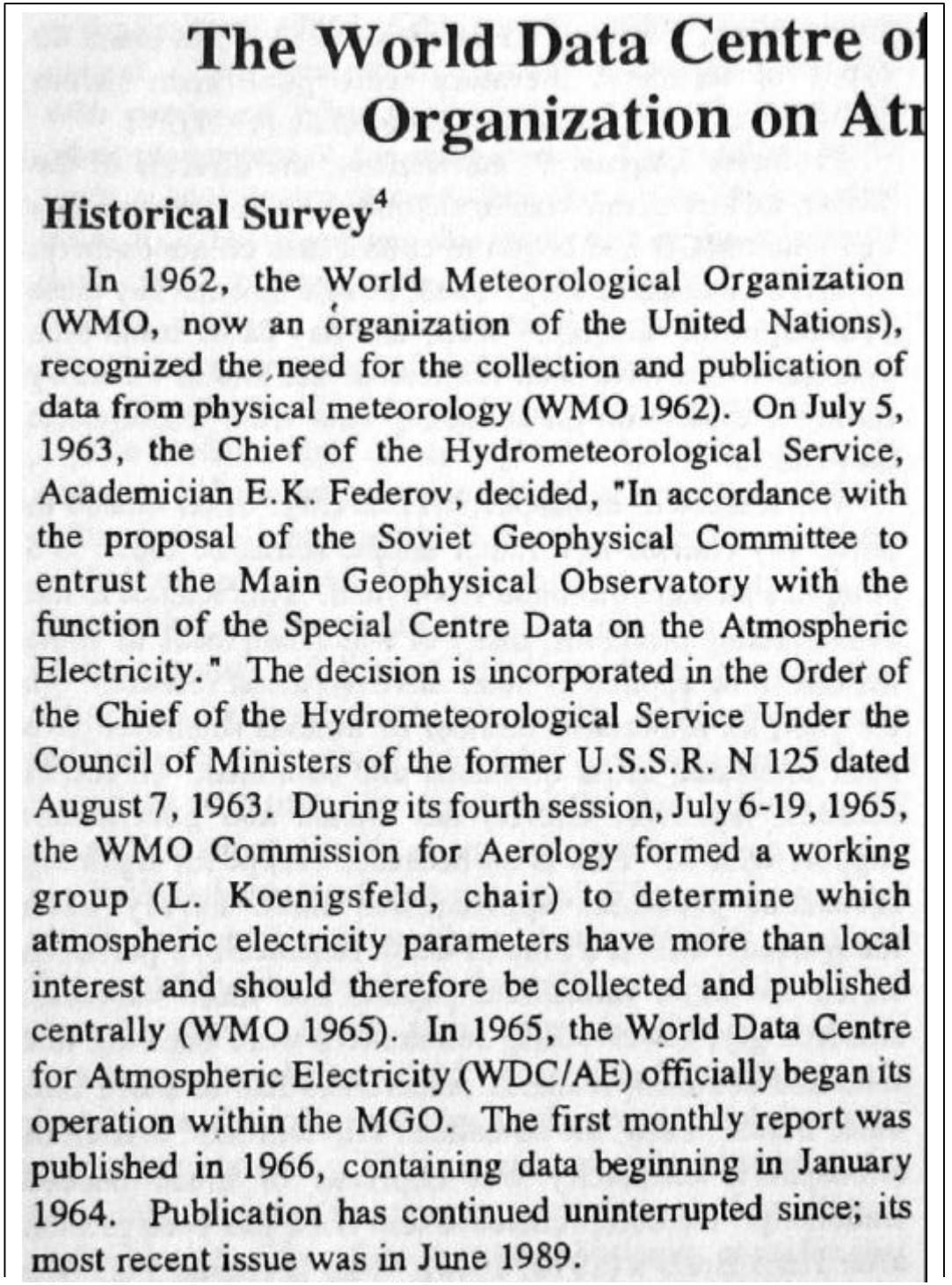
Data

Centre

for

Atmospheric

Electricity



The World Data Centre of
Organization on Atr

**Historical Survey**[4]

In 1962, the World Meteorological Organization (WMO, now an organization of the United Nations), recognized the need for the collection and publication of data from physical meteorology (WMO 1962). On July 5, 1963, the Chief of the Hydrometeorological Service, Academician E.K. Federov, decided, "In accordance with the proposal of the Soviet Geophysical Committee to entrust the Main Geophysical Observatory with the function of the Special Centre Data on the Atmospheric Electricity." The decision is incorporated in the Order of the Chief of the Hydrometeorological Service Under the Council of Ministers of the former U.S.S.R. N 125 dated August 7, 1963. During its fourth session, July 6-19, 1965, the WMO Commission for Aerology formed a working group (L. Koenigsfeld, chair) to determine which atmospheric electricity parameters have more than local interest and should therefore be collected and published centrally (WMO 1965). In 1965, the World Data Centre for Atmospheric Electricity (WDC/AE) officially began its operation within the MGO. The first monthly report was published in 1966, containing data beginning in January 1964. Publication has continued uninterrupted since; its most recent issue was in June 1989.

USSR STATE COMMITTEE FOR HYDROMETEOROLOGY AND CONTROL OF NATURAL ENVIRONMENT

ГОСУДАРСТВЕННЫЙ КОМИТЕТ СССР ПО ГИДРОМЕТЕОРОЛОГИИ И КОНТРОЛЮ ПРИРОДНОЙ СРЕДЫ

A.I. VOEIKOV MAIN GEOPHYSICAL OBSERVATORY

ГЛАВНАЯ ГЕОФИЗИЧЕСКАЯ ОБСЕРВАТОРИЯ ИМЕНИ А.И. ВОЕЙКОВА

# RESULTS OF GROUND OBSERVATIONS OF ATMOSPHERIC ELECTRICITY (THE WORLD NETWORK)

## PREFACE

The present publication is carried out by the Hydrometeorological Service of the USSR (A.I. Voeikov Main Geophysical Observatory) for the purpose of fulfilling the resolutions of the World Meteorological Organization with regard to the centralized publication of results of observations made at the world network of stations .

The monthly publication contains hourly means of the potential gradient of the electric field in the atmosphere, the positive and negative conductivity of the air and the density of air-earth current in the atmosphere.

The appropriate data of observations of atmospheric phenomena are given in the monthly publication with the purpose to choose the quiet and disturbed values of atmospheric electric elements, to make an analysis and investigation of different relations.

The observational material is placed in the monthly by elements and within one element according to the geographical latitude of the station (from north to south).

For convenience in use an alphabetical list of the station is given in the monthly with indication of their synoptic index, coordinates, height over sea level and the methods for measurements which were used for carrying out of observations.

The results of observations for publication are addressed to:

Prof. E.P. Borisenkov
Director
A.I. Voeikov Main Geophysical Observatory
Karbysheva 7, Leningrad 194018
USSR

DUSHETI ДУШЕТИ

| Date / Дата | Hours / Часы | | | | | | | | | | | | | | | | | | | | | | | | Means / Среднее |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| 1 | 10 | 12 | 14 | 15 | 15 | 10 | 10 | 12 | 14 | 15 | 19 | 21 | 19 | 20 | 17 | 18 | 21 | 15 | 22 | 25 | 25 | 24 | 24 | 21 | 17 |
| 2 | 21 | 21 | 21 | 21 | 15 | 12 | 11 | 14 | 15 | 14 | 14 | 20 | 11 | 11 | 9 | 9 | 10 | 12 | 11 | 15 | 19 | 18 | 17 | 17 | 15 |
| 3 | 17 | 17 | 18 | 18 | 15 | 12 | 12 | 14 | 15 | 18 | 19 | 15 | 15 | 15 | 10 | 11 | 10 | 14 | 14 | 17 | 15 | 14 | 20 | 23 | 15 |
| 4 | 20 | 21 | 22 | 20 | 21 | 15 | 12 | 11 | 11 | 17 | 20 | 20 | 21 | 22 | 19 | 20 | 17 | 17 | 14 | 20 | 23 | 21 | 22 | 25 | 19 |
| 5 | 27 | 24 | 23 | 22 | - | 11 | 19 | 21 | 19 | 22 | 22 | 20 | 18 | 17 | 18 | 17 | 17 | 17 | 17 | 18 | 19 | 17 | 17 | 20 | 19 |
| 6 | 22 | 27 | 25 | 27 | 24 | 23 | 20 | 20 | 22 | 19 | 22 | 23 | 19 | 21 | 19 | 19 | 20 | 23 | 23 | 20 | 24 | 21 | 23 | 22 | 22 |
| 7 | 21 | 23 | 25 | 26 | 21 | 23 | 19 | 12 | 14 | 15 | 12 | 25 | 29 | 25 | 22 | 27 | 28 | 31 | 25 | 22 | 24 | 25 | 27 | 22 | 23 |
| 8 | 24 | 25 | 23 | 23 | 21 | - | - | - | - | - | - | - | - | 21 | 14 | 18 | - | 19 | 18 | 17 | 19 | 19 | 20 | 20 | 20 |
| 9 | 20 | 20 | 21 | 21 | 20 | - | - | 25 | 30 | 27 | 17 | 20 | 21 | 19 | 19 | 22 | 20 | 20 | 25 | 25 | 28 | 27 | 25 | 28 | 23 |
| 10 | 22 | 20 | 20 | 20 | 27 | 28 | 25 | 28 | 20 | 10 | 14 | 12 | 19 | 10 | 11 | 20 | 30 | 21 | 20 | 23 | 22 | 18 | 21 | 27 | 20 |
| 11 | 31 | 29 | 22 | 18 | 17 | - | 15 | 17 | 18 | 21 | 19 | 20 | 20 | 18 | 17 | 18 | 20 | 23 | 25 | 37 | 27 | 30 | 25 | 23 | 22 |
| 12 | 27 | 23 | 21 | 20 | 17 | 18 | 19 | 19 | 18 | 19 | 22 | 25 | 22 | 18 | 19 | 17 | 23 | 19 | 21 | 24 | 25 | 23 | 28 | 24 | 21 |
| 13 | 25 | 29 | 25 | 25 | 24 | 20 | 18 | 18 | 14 | 19 | 22 | 23 | 19 | 21 | 19 | 14 | 14 | 14 | 17 | 20 | 22 | 22 | 23 | 22 | 20 |
| 14 | 23 | 23 | 25 | 24 | 22 | 19 | 22 | 19 | 20 | 27 | 30 | 22 | 23 | 23 | 24 | 21 | 25 | 22 | 23 | 24 | 24 | 25 | 27 | 24 | 23 |
| 15 | 24 | 25 | 27 | 23 | - | 21 | 21 | 22 | 28 | 31 | 40 | 40 | 41 | 24 | 32 | 28 | 15 | 17 | 18 | 18 | 19 | 19 | 21 | 24 | 25 |
| 16 | 23 | 24 | 24 | 23 | 21 | 18 | 17 | 18 | 21 | 30 | 21 | 17 | 19 | 18 | 17 | 19 | 20 | 17 | 18 | 18 | 20 | 21 | 21 | 20 | 20 |
| 17 | 18 | 17 | 15 | 12 | 14 | 14 | 12 | 17 | 19 | 21 | 23 | 25 | 29 | 31 | 27 | 24 | 24 | 22 | 21 | 22 | 24 | 25 | 23 | 24 | 21 |
| 18 | 25 | 25 | 24 | 23 | 17 | 17 | 21 | 24 | 25 | 29 | 25 | 20 | 29 | 28 | 23 | 20 | 18 | 20 | 24 | 21 | 22 | 27 | 24 | 24 | 23 |
| 19 | 25 | 27 | 28 | 25 | 22 | 19 | 23 | 22 | 20 | 23 | 22 | 25 | 24 | 19 | 19 | 18 | 18 | 18 | 21 | 21 | 20 | 21 | 21 | 22 | 22 |
| 20 | 23 | 24 | 25 | 27 | 17 | - | 23 | 27 | 24 | 25 | 24 | 25 | 23 | 19 | 24 | 9 | 19 | 22 | 23 | 22 | 25 | 24 | 24 | 22 | 23 |
| 21 | 23 | 23 | 20 | 20 | 18 | 17 | 21 | 16 | 20 | 24 | 31 | 20 | 20 | 23 | 24 | 22 | 18 | 19 | 16 | 17 | 18 | 16 | 17 | 19 | 20 |
| 22 | 23 | 21 | 23 | 20 | 14 | 14 | 17 | 12 | 12 | 15 | 22 | 18 | 14 | 12 | 17 | 17 | 17 | 18 | 18 | 15 | 15 | 17 | 20 | 24 | 17 |
| 23 | 28 | 30 | 30 | 25 | 17 | 22 | 32 | 34 | 24 | 21 | 18 | 10 | 11 | 10 | 12 | 11 | 11 | 17 | 17 | 15 | 17 | 18 | 20 | 22 | 20 |
| 24 | 21 | 24 | 23 | 23 | 17 | 18 | 17 | 20 | 11 | 14 | 14 | 12 | 11 | 12 | 12 | 18 | 14 | 12 | 12 | 11 | 11 | 11 | 19 | 24 | 16 |
| 25 | 27 | 31 | 30 | 30 | 24 | 24 | 24 | 25 | 21 | 21 | 21 | 22 | 21 | 24 | 24 | 21 | 21 | 22 | 24 | 27 | 29 | 31 | 31 | 31 | 25 |
| 26 | 33 | 32 | 32 | 31 | - | 22 | 20 | 22 | 18 | 23 | 22 | 24 | 19 | 21 | 21 | 19 | 21 | 23 | 23 | 24 | 25 | 24 | 24 | 28 | 24 |
| 27 | 27 | 24 | 24 | 27 | 23 | 27 | 22 | 22 | 20 | 23 | 21 | 22 | 21 | 35 | 27 | 28 | 29 | 23 | 22 | 23 | 20 | 23 | 28 | 25 | 24 |
| 28 | 25 | 22 | 23 | 28 | 18 | 17 | 20 | 23 | 23 | 28 | 25 | 21 | 21 | 14 | 14 | 17 | 15 | 21 | 17 | 17 | 20 | 22 | 22 | 23 | 21 |
| 29 | 21 | 20 | 20 | 21 | 18 | 14 | 12 | 14 | 12 | 11 | 15 | 19 | 14 | 15 | 17 | 17 | 23 | 22 | 21 | 22 | 22 | 23 | 22 | 22 | 18 |
| 30 | 22 | 21 | 21 | 20 | - | 15 | 18 | 21 | 19 | 28 | 28 | 18 | 14 | 18 | 12 | 10 | 10 | 15 | 17 | 15 | 17 | 18 | 19 | 15 | 18 |
| 31 | 14 | 15 | 18 | 19 | 16 | 14 | 12 | 20 | 22 | 22 | 21 | 12 | 11 | 10 | 11 | 11 | 9 | 14 | 17 | 17 | 17 | 18 | 20 | 20 | 16 |
| Means / Среднее A | 23 | 23 | 23 | 22 | 19 | 18 | 18 | 20 | 19 | 21 | 21 | 21 | 20 | 19 | 18 | 18 | 19 | 19 | 19 | 20 | 21 | 21 | 22 | 23 | 20 |
| Means / Среднее N | - | - | - | - | - | 14 | 21 | 23 | - | - | - | - | - | - | 14 | 14 | 13 | 17 | 18 | 17 | 20 | 20 | 21 | - | 18 |

# ALPHABETICAL LIST OF STATIONS

| Station | Country | Latitude | Longitude |
|---|---|---|---|
| Aachen | FRG | 50 47'N | 6 06'E |
| Auckland | New Zealand | 36 51'S | 174 46'E |
| Athens | Greece | 37 58'N | 23 43'E |
| B-Elan | RF | 46 55'N | 142 44'E |
| Brest | France | 48 27'N | 4 25'E |
| Budapest | Hungary | 47 26'N | 19 11'E |
| Dourbes | Belgium | 50 06'N | 4 36'E |
| Eskdalemuir | UK | 55 19'N | 3 12'W |
| Dusheti | Georgia | 42 05'N | 44 42'E |
| Helsinki | Finland | 60 20'N | 24 58'E |
| Irkutsk | RF | 52 16'N | 104 19'E |
| Kakioka | Japan | 36 14'N | 140 11'E |
| Kara-Dag | Ukraine | 44 54'N | 35 12'E |
| Kew | Uk | 51 28'N | 0 19'W |
| Kiev | Ukraine | 50 27'N | 30 30'E |
| Kirov | RF | 58 36'N | 49 40'E |
| Lisbon | Portugal | 38 46'N | 9 09'W |
| Lerwick | UK | 60 08'N | 1 11'W |
| Macherata | Italy | 43 17'N | 13 27'E |
| Memambetsu | Japan | 43 55'N | 144 12'E |
| Montreal | Canada | 45 30'N | 73 37'W |
| Murmansk | RF | 68 57'N | 33 03'E |
| Nivot Ridge | USA | 40 04'N | 105 37'W |
| Odessa | RF | 46 22'N | 30 38'E |

| | | | | | |
|---|---|---|---|---|---|
| **Porto** | **Portugal** | **41** | **18'N** | **8** | **36'W** |
| **Potsdam** | **Germany** | **52** | **23'N** | **13** | **04'E** |
| **Sacushima** | **Japan** | **34** | **43'N** | **137** | **03'E** |
| **Soccoro** | **USA** | **34** | **04'N** | **106** | **55'W** |
| **Swider** | **Poland** | **52** | **07'N** | **21** | **15'E** |
| **Tashkent** | **Uzbekistan** | **41** | **16'N** | **69** | **16'E** |
| **Toronto** | **Canada** | **43** | **48'N** | **79** | **33'W** |
| **Uccle** | **Belgium** | **50** | **48'N** | **04** | **21'E** |
| **University Park** | **USA** | **40** | **48'N** | **77** | **52'W** |
| **Venice** | **Italy** | **45** | **26'N** | **12** | **19'E** |
| **Verkhnee Dubrovo** | **RF** | **56** | **48'N** | **60** | **38'E** |
| **Voeikovo** | **RF** | **59** | **58'N** | **30** | **18'E** |
| **Yuzhno-Sakhalinsk** | **RF** | **46** | **57'N** | **142** | **43'E** |

# ОПИСАНИЕ СИМВОЛЬНОГО ФАЙЛА ПО АТМОСФЕРНОМУ ЭЛЕКТРИЧЕСТВУ

RECFM = F LRECL = 61

**Файл содержит 744 записи (данные за один месяц)**

| | | | | | | |
|---|---|---|---|---|---|---|
| запись 1 | запись 2 | запись 3 | запись 4 | запись 5 | ..... | запись 744 |

структура записи

| N | Наименование информации | Длина в байтах | Примечания |
|---|---|---|---|
| 1 | Номер станции из списка | 2 | 1 байт - 1 знак |
| 2 | Год | 2 | |
| 3 | Месяц | 2 | |
| 4 | Дата | 2 | |
| 5 | Время (гринвичское) | 2 | |
| 6 | Градиент потенциала электрического поля атмосферы | 5 | |
| 7 | Положительная электрическая проводимость воздуха | 3 | |
| 8 | Отрицательная электрическая проводимость воздуха | 3 | |
| 9 | Характеристика данных | 2 | |
| 10 | Количество облачности (балл) | 2 | * |
| 11 | Количество облачности нижнего яруса (балл) | 2 | * |
| 12 | Формы облачности | | * |
| 13 | 1 | 1 | * |
| 14 | 2 | 1 | * |
| 15 | 3 | 1 | * |
| 16 | 4 | 1 | * |
| 17 | 5 | 1 | * |
| 18 | Направление ветра | 3 | * |
| 19 | Скорость ветра | 2 | * |
| 20 | Шифр основного атмосферного явления | 2 | |
| 21 | Количество явлений (может быть игнорировать?) | 2 | |

Комментарии

1. Поля данных в записи разделены пробелами.
2. * - метеоданные записаны в соответствующие срокам наблюдений часы, время гринвичское. В остальные часы заполняются нули.
3. Градиент потенциала в даВ/м, проводимость в фСм/м.
4. Характеристика данных: 48 - переход через ноль в течение часа в исходной записи градиента потенциала, 96 - отсутствие данных, 64 - нормальные значения (данные, полученные в условиях хорошей погоды, см. ежемесячные сборники данных), 00 - данные без дополнительной характеристики 48, 96, 64).
5. Из атмосферных явлений выбирается самое влияющее на данные наблюдений.

## *MGO old format:*

```
01 75 06 01 01    15 008 000 00 00 00 0 0 0 0 0 000 00 00 00
01 75 06 01 02    14 008 000 00 00 00 0 0 0 0 0 000 00 00 00
01 75 06 01 03    10 008 000 00 00 00 0 0 0 0 0 000 00 00 00
01 75 06 01 04    12 008 000 00 00 00 0 0 0 0 0 000 00 00 00
01 75 06 01 05    15 008 000 00 00 00 0 0 0 0 0 000 00 00 00
01 75 06 01 06    16 009 000 00 00 00 0 0 0 0 0 000 00 00 00
01 75 06 01 07    16 000 000 00 00 00 0 0 0 0 0 000 00 00 00
01 75 06 01 08    14 009 009 00 00 00 0 0 0 0 0 000 00 00 00
01 75 06 01 09    11 009 009 48 00 00 0 0 0 0 0 000 00 00 00
01 75 06 01 10     3 008 010 48 00 00 0 0 0 0 0 000 00 00 00
01 75 06 01 11    25 009 009 00 00 00 0 0 0 0 0 000 00 00 00
01 75 06 01 12    14 008 008 48 00 00 0 0 0 0 0 000 00 00 00
01 75 06 01 13    15 008 008 48 00 00 0 0 0 0 0 000 00 00 00
```

## *YaOD:*

```
599307086 1 1 1     9  4  40099999999999999999
599307086 1 1 2     7  4  30099999999999999999
599307086 1 1 3    13  6  30099999999999999999
599307086 1 1 4    10  7  44899999999999999999
599307086 1 1 5    15  5  40099999999999999999
599307086 1 1 6    15  5  30099999999999999999
599307086 1 1 7     7  9  64899999999999999999
599307086 1 1 8    14  7  30099999999999999999
599307086 1 1 9    16  6  30099999999999999999
599307086 1 110    16  5  40099999999999999999
599307086 1 111    12  4  30099999999999999999
599307086 1 112    12 12  34899999999999999999
599307086 1 113    12 11  44899999999999999999
```

# 2. Wank Peak

Director of the Fraunhofer Institute of Atmospheric Environment at Garmisch-Partenkirchen Dr. R. Reiter (1920–1998) carried out long-term continuous measurements of atmospheric electric quantities on Wank Peak in the Bavarian Alps. The measurements were automatically recorded and written onto computer magnetic tapes for the period of 1 August 1972 to 31 December 1983. Afterwards, the data were preserved, arranged, written onto CD-ROM, and distributed by director of Max Planck Institute for Aeronomy (Katlenburg-Lindau) Prof. K. Schlegel.

**Erläuterungen bei Walter Carnuth, Walchsing**

Die einzelnen Größen, soweit nicht selbsterklärend:

| | |
|---|---|
| T: | Temperatur [°C] |
| RF: | relative Feuchte [%] |
| E: | Wasserdampfdruck [hPa] |
| SF: | spezifische Feuchte {g/kg] |
| TH: | potentielle Temperatur |
| THE: | äquipotentielle Temperatur |
| WG: | Windgeschwindigkeit [m/s] |
| WR: | Windrichtung [Grad] |
| SD: | Sonnenscheindauer [h] |
| GS: | Globalstrahlung [cal/cm$^2$·h] |
| HS: | Himmelsstrahlung [dito] (Globalstrahlung mit Schattenring) |
| UV: | UV-B [$10^{-3}$ cal/cm$^2$·h] |
| F: | luftelektr. Potentialgradient (Feldstärke) [V/m] |
| DU: | Anzahl der Nulldurchgänge von F pro Stunde |
| I: | luftelektr. Ausgleichs- oder Vertikalstrom [$10^{-12}$ A/m$^2$] |
| **N+:** | **pos. Kleinionendichte [cm$^{-3}$]** |
| **N-:** | **neg. Kleinionendichte [cm$^{-3}$]** |
| **L+:** | **pos. Luftleifähigkeit [$10^{-14}$ W$^{-1}$·cm$^{-1}$]** |
| **L-:** | **neg. Luftleifähigkeit [$10^{-14}$ W$^{-1}$·cm$^{-1}$]** |
| **K1, K2, K3** | **Aitkenkerne [$10^3$cm$^{-3}$] s.u.!** |
| M1, M2: | Exponent der Größenverteilung der Kerne (s.u.!) |
| MM: | Mittel aus M1 und M2 |
| RL: | Raumladung [$10^{-12}$ As/m$^3$] |
| ISP: | Spitzenstrom [$10^{-12}$ A/m$^2$] |
| **NOX:** | **Stickoxide [ppb]** |

# An extract from the original Wank data:

```
WANK. 06.12.77
STUNDENWERTE:
T
-00.4 -01.0 -02.2 -02.9 -01.8 -01.7 -00.1 +00.2 +00.7 +00.1 -00.1 -00.4
-00.4 -00.1 +00.5 -00.2 -00.5 -01.2 -02.0 -02.1 -02.3 -02.7 -02.8 -03.0
RF
 21.5  21.8  24.2  26.2  22.4  24.0  20.7  22.8  29.8  36.1  41.1  43.8
 45.9  49.4  47.6  50.6  52.8  58.6  61.2  63.7  76.1  83.8  88.1  89.5
E
1.275 1.238 1.257 1.292 1.199 1.294 1.255 1.413 1.915 2.221 2.492 2.599
2.723 2.996 3.015 3.046 3.110 3.279 3.228 3.335 3.926 4.197 4.379 4.383
SF
0.983 0.954 0.969 0.996 0.924 0.997 0.967 1.089 1.476 1.712 1.921 2.003
2.100 2.310 2.325 2.349 2.398 2.528 2.489 2.572 3.027 3.236 3.377 3.380
TH
289.9 289.3 288.0 287.3 288.5 288.6 290.3 290.6 291.1 290.5 290.3 289.9
289.9 290.3 290.9 290.2 289.8 289.1 288.2 288.1 287.9 287.5 287.4 287.2
THE
292.6 291.9 290.6 290.0 290.9 291.2 292.9 293.5 295.1 295.1 295.4 295.3
295.6 296.5 297.1 296.5 296.3 295.9 294.9 295.0 296.0 296.2 296.4 296.2
WG
 01.6  04.7  07.6  05.2  03.2  04.1  03.2  04.1  06.7  06.6  05.8  07.1
 03.2  03.5  03.7  04.4  05.5  07.2  02.4  03.2  04.0  04.4  04.6  05.2
WR
  150   220   240   240   220   220   200   180   200   200   220   220
  220   200   220   220   240   310   090   090   220   220   220   220
  SSE    SW   WSW   WSW    SW    SW   SSW     S   SSW   SSW    SW    SW
   SW   SSW    SW    SW   WSW    NW     E     E    SW    SW    SW    SW
```

# Harrison R.G. (2004) Long-range correlations in measurements of the global atmospheric electric circuit. *J. Atmos. Solar-Terrestrial Physics* 66, 1127-1133.

Measurements of global atmospheric electric circuit parameters have been made at different observing stations over long periods. Mountain stations are of particular interest because of their relatively low aerosol pollution environment. Some of the observations made by Dr Reinhold Reiter in the Bavarian Alps have been made available to the SPECIAL scientific community. The observation site was on Mount Wank (1780m, 47°30'N, 11°09'E), close to Garmisch-Partenkirchen, and the data set spans 1st August 1972 to 31st December 1983.

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# 3. Marsta

The Marsta Observatory (59°56'N, 17°35'W) is located in rural area 10 km north of Uppsala, Sweden. The surroundings are a very flat farming field. Nearest forest is located more than 1 km from the observatory, which provides undisturbed micro-meteorological conditions.

A modified atmospheric electrical station of the Kasemir-Dolezalek construction (Dolezalek, 1962) is continuously operating at the Marsta Observatory. The routinely recorded parameters are:

- the electric field, by radioactive collector and by field mill, notation $E$,
- positive and negative polar conductivities of air $\lambda_+$ and $\lambda_-$ ,
- the space charge density.

In addition, the vertical current density is derived as $j = E\,(\lambda_+ + \lambda_-)$
The meteorological data are:

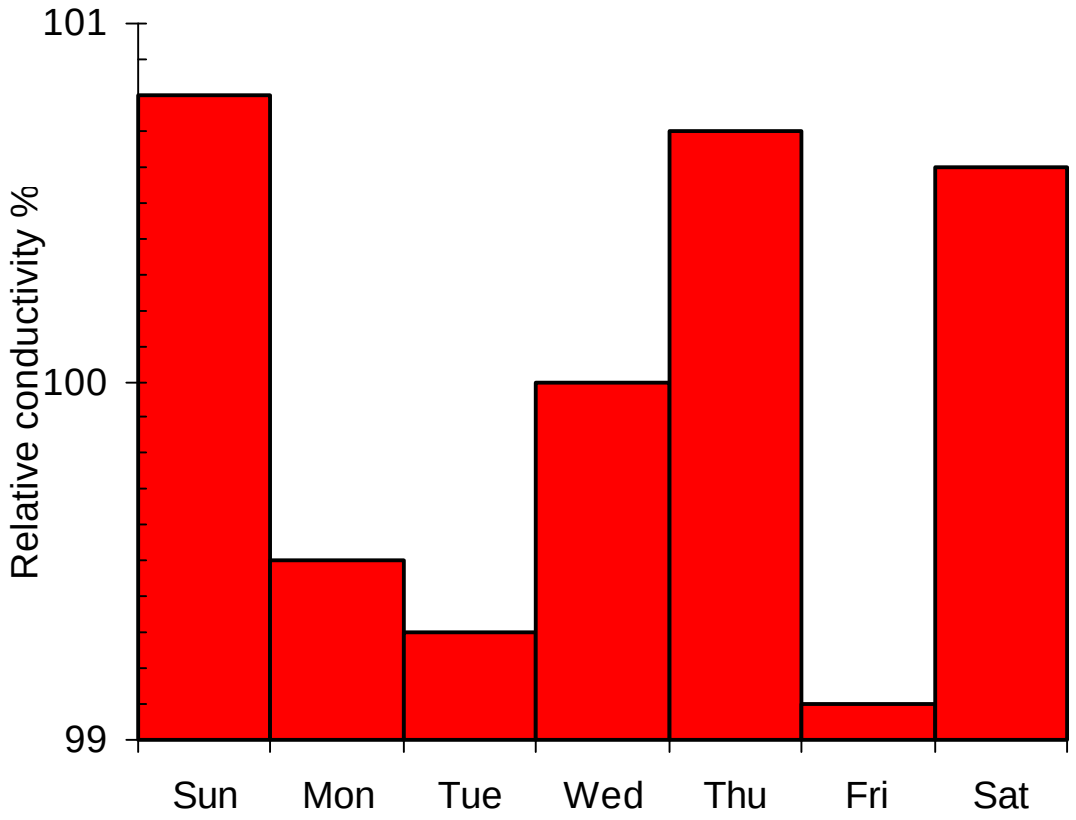
- air temperatures on 0.8 and 10 m,
- wind direction on 10 m,
- wind velocities on 0.8 and 10 m,
- air pressure,
- relative humidity.

Additionally, Richardson number is included as a derived quantity.

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|---|---|
| Wind velocity | ---------- | ----09X99X99 | 9XX975XX98-- | --5767756778 | 79899XX9XX99 | X99XX9999X9- |
| Wind direction | ---------- | ----09X99X99 | 9XX975XX98-- | --5767756778 | 79899XX9XX99 | X99XX9999X9- |
| Temperature | ---------- | ----09X99X99 | 9XX975XX98-- | --6889876999 | 89999XX9XX9X | X99XX9999X9- |
| Air pressure | ---------- | ----09X99X99 | 9XX975XX98-- | --6889876778 | 79899XX9XX99 | X99XX9999X9- |
| Abs. humidity | ---------- | ----095790-- | ----45X188-- | ---------- | -----299X6-- | ----69974--- |
| Rel. humidity | | --------3999 | XXXX9XX987XX | XXXXX998XX1- | ---------- | ---------- |
| E (f-mill) | ----1898687X | 97789998998X | 98X9988X9999 | XXXXX895XXXX | 8X998X16X899 | 99X98799XXXX |
| E (collector) | -69998886879 | 97789998998X | 989888899999 | X99X9885XXXX | 899989169899 | 9999878999XX |
| Pos. conduct. | -6X975865779 | 977879889989 | 98X998875787 | 99X897958889 | 798768147889 | 99996689999X |
| Neg. conduct. | -7X99878677X | 97789988998X | 98X998889997 | 89XX989599X9 | 8X9889157789 | 99X987898XXX |
| Space charge | -6999887686X | 956899989989 | 879898899988 | 978998959999 | 898989169889 | 99998789999X |

# Effect of local and global factors of atmospheric electric variations at Marsta

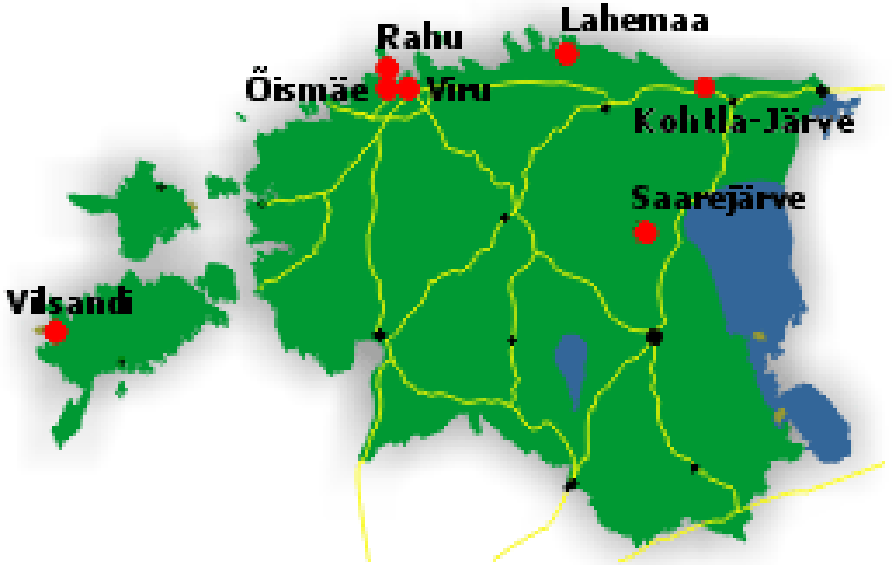
Effect of local anthropogenic air pollution on the atmospheric electrical climate is estimated according to Sheftel et al. (1994a) by analyzing the dependence of air electric conductivity on the day of the week. The value of Sheftel index in Marsta is 1.01. The values of the index calculated by Sheftel for different atmospheric electric stations are considerable higher and vary from 1.02 for Irkutsk (near Baikal see, Russia), 1988, until 1.38 for Swider (near Warszawa, Poland), 1988.




Day-of-the-week variation of air conductivity at Marsta 1993–1998.

# 4. Estonian EuroAirnet

*http://air-climate.eionet.eu.int/databases/EuroAirnet/docs/EE/estonia_EAN_station2000.xls.*




| var | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|
| VIRS2 | -156864 | 998688-9-699 | 999979999998 | 89999999X9X9 | 998898999799 | 9X99599 |
| VIRNO | -268964 | 999997-6-799 | 999979999599 | 9999987967X9 | 997998999889 | 7X99599 |
| VIRN2 | -237864 | 989997-6-799 | 999979999589 | 999997796799 | 997998999759 | 7X99599 |
| VIRNX | -268864 | 999997-6-799 | 999979999599 | 999998796799 | 997998999759 | 7X99599 |
| VIRO3 | ------- | ---------- | -----8999999 | 9999X979X999 | 99899899979- | --22199 |
| VIRCO | -167864 | 999998-9-799 | 999979999988 | 99999999X9X9 | 998998999799 | 8X99599 |
| LAHO3 | 4999897 | ----1------- | ---------- | ----7X7X4399 | 7---X21998X9 | 8698999 |
| LAHWD | ------- | ---------- | ---------- | -28357594399 | 7---X21999XX | 8698X99 |
| LAHWS | ------- | ---------- | ---------- | -2948X7X4399 | 7---X21999XX | 8698X99 |
| SAAS2 | ------- | ---------- | ---------- | ---------- | 999524569766 | 3--804- |
| SAANO | ------- | ---------- | ---------- | ---------- | 999687969321 | 3--804- |
| SAAN2 | ------- | ---------- | ---------- | ----------14 | 999687969976 | 3--804- |
| SAANX | ------- | ---------- | ---------- | ----------14 | 999687969976 | 3--804- |
| SAAO3 | ------- | ---------- | ---------- | ----------15 | 99975-563275 | ---804- |
| VILS2 | 52-5897 | 1262877--199 | 9999996----- | ---------- | -----4888889 | 98X9X9- |
| VILNO | ------- | ---2978--799 | 9999996----- | ---------- | XXXXXX99XX6X | 98X9X9- |
| VILN2 | ------- | ---2878--799 | 9999996----- | ---------- | XXXXXX99XX6X | 98X9X9- |
| VILNX | ------- | ---2978--799 | 9999996----- | ---------- | XXXXXX99XX6X | 98X9X9- |
| VILO3 | 9219897 | 1--2539--899 | 9997596----- | 989X62988589 | 999999999999 | 989999- |
| VILWD | ------- | ---------- | 99X99X6----- | ---------- | ---------- | ------- |
| VILWS | ------- | ---------- | 9999996----- | ---------- | ---------- | ------- |

# Joint dataset

## ATMEL1 as 20041230 Format: DataDiurna

Stations: 13 Quantities: 51 Variables: 158 Diurnal series: 456 105 Bytes: 42 922 325

| Station | Latitude | Longitude | Altitude | |
|---|---|---|---|---|
| Vo | 59.97 | 30.3 | 72 | Voeikovo near St. Petersburg (former Leningrad) |
| Irk | 52.27 | 104.32 | 467 | Irkutsk near Baikal See |
| Dush | 42.08 | 44.7 | 910 | Dusheti near Tbilisi |
| Ural | 56.8 | 60.63 | 237 | Verhnee Dubrovo near Jekaterinenburg (former Sverdlovsk) |
| Ode | 46.48 | 30.63 | 42 | Odessa |
| Sakh | 46.95 | 142.72 | 22 | South-Sakhalinsk (Japanese name Toyohara) |
| Tash | 41.27 | 69.27 | 477 | Tashkent |
| Wank | 47.5 | 11.15 | 1780 | R.Reiter's station near Garmish-Partenkirchen |
| Marsta | 59.93 | 17.58 | 10 | Marsta Meteorological Observatory (University of Uppsala) |
| Viru | 59.436 | 24.757 | 10 | City centre of Tallinn (Estonia) |
| Saare | 58.55 | 26.38 | 40 | EMEP station Saarejärve in Estonia |
| Lahe | 59.53 | 25.88 | 5 | EMEP station Lahemaa in Estonia |
| Vils | 58.39 | 21.84 | 5 | EMEP station Vilsandi in Estonia |

| Quantity | Unit | |
|---|---|---|
| Cl-low | 1 | Lower clouds MGO code (ATMEL1-MGO.doc) |
| Cl-mid | 1 | Middle clouds MGO code (ATMEL1-MGO.doc) |
| Cl-nim | 1 | Stratonimbus and fractonimbus MGO code (ATMEL1-MGO.doc) |
| Cl-R | 1 | Reinhold Reiter index of clouds (wolkenk. ATMEL1-WANK.doc) |
| Cl-str | 1 | Stratus and stratocumulus MGO code (ATMEL1-MGO.doc) |
| Cl-tot | 1 | Total cloudiness MGO code (ATMEL1-MGO.doc) |
| Cl-upp | 1 | Upper clouds MGO code (ATMEL1-MGO.doc) |
| Cl-ver | 1 | Vertical clouds MGO code (ATMEL1-MGO.doc) |
| C-MGO | 1 | MGO AE and weather code 0 = no marks 1 = fair weather 2 = alternating field |
| CNR1:cm-3 | 1/cm3 | Concentration of Aitken nuclei, Rich counter without filter (ATMEL1-WANK.doc) |
| CNR2:cm-3 | 1/cm3 | Concentration of Aitken nuclei, Rich counter with neutral filter |
| CNR3:cm-3 | 1/cm3 | Concentration of Aitken nuclei, Rich counter with charged filter |
| CO:mg/m3 | mg/m3 | Concentration of CO |
| E:inv/h | 1/hour | Inversions of electric field per hour (ATMEL1-WANK.doc) |
| E:V/m | V/m | Ground level vertical electric field |
| Eflct:V/m | V/m | Fluctuation of electric field (ATMEL1-MARSTA.doc) |
| H2O:g/kg | g/kg | Absolute humidity |
| j:pA/m2 | pA/m2 | Air-earth vertical current density |
| jp:pA/m2 | pA/m2 | Air-earth vertical point current density (ATMEL1-WANK.doc) |
| L:fS/m | fS/m | Total conductivity of air |
| L-:fS/m | fS/m | Negative conductivity of air |
| L+:fS/m | fS/m | Positive conductivity of air |
| NC-:cm-3 | 1/cm3 | Concentration of negative cluster ions (Z > 0.5 cm2/Vs) |
| NC+:cm-3 | 1/cm3 | Concentration of positive cluster ions (Z > 0.5 cm2/Vs) |
| NO:ug/m3 | ug/m3 | Concentration of NO |
| NO2:ug/m3 | ug/m3 | Concentration of NO2 |

| Quantity | Unit | |
|---|---|---|
| NOX:ug/m3 | ug/m3 | Concentration of NOx (1 ppb is converted to 1,8 ug/cm3, ATMEL1-WANK.doc) |
| O3:ug/m3 | ug/m3 | Concentration of O3 |
| p:mb | millibar | Air pressure near the station |
| Ph-code | 1 | Translated MGO code of dominating atmospheric |
| Ph-int | 1 | MGO code of intensity of dominating atmospheric phenomenon |
| Rad:W/m2 | W/m2 | Global radiation sun+sky (ATMEL1-WANK.doc) |
| RH% | % | Relative humidity |
| Ri | 1 | Richardson number (ATMEL1-MARSTA.doc) |
| SC:pC/m3 | pC/m3 | Space charge density (1 pC/m3 = 6.24 e/cm3) |
| Sky:W/m2 | W/m2 | Sky radiation (ATMEL1-WANK.doc) |
| SO2:ug/m3 | ug/m3 | Concentration of SO2 |
| Sun% | % | Relative duration of sunshine (ATMEL1-WANK.doc) |
| T:C | Celsius | Air temperature near the station |
| T08:C | Celsius | Air temperature at height of 0.8 m |
| T10:C | Celsius | Air temperature at height of 10 m |
| Tepot:K | Kelvin | Equipotential temperature (ATMEL1-WANK.doc) |
| Tgr:K/m | K/m | Gradient of temperature (ATMEL1-MARSTA.doc) |
| Tpot:K | Kelvin | Potential temperature (ATMEL1-WANK.doc) |
| UV:mW/m2 | mW/m2 | UV radiation (ATMEL1-WANK.doc) |
| Wflct:m/s | m/s | Wind fluctuation (ATMEL1-MARSTA.doc) |
| Wind:deg | deg | Wind direction |
| Wind:m/s | m/s | Wind velocity at standard height |
| Wind08:m/s | m/s | Wind velocity at height of 0.8 m |
| Wind10:m/s | m/s | Wind velocity at height of 10 m |
| Vis:km | km | Visibility (ATMEL1-WANK.doc) |

| Station | Quantity | From | To | Days | Min | Ave | Max | Sigma |
|---|---|---|---|---|---|---|---|---|
| Irk | Cl-low | 19890101 | 19970331 | 2646 | 0 | 2.2 | 13 | 3.4 |
| Ode | Cl-low | 19890101 | 19940831 | 2038 | 0 | 3.3 | 13 | 4.0 |
| Sakh | Cl-low | 19890101 | 19940630 | 1914 | 0 | 5.6 | 13 | 4.2 |
| Tash | Cl-low | 19890101 | 19951231 | 2556 | 0 | 2.4 | 13 | 3.6 |
| Ural | Cl-low | 19890101 | 19961210 | 2839 | 0 | 3.7 | 13 | 4.1 |
| Vo | Cl-low | 19890101 | 19970331 | 2900 | 0 | 5.6 | 13 | 4.4 |
| Irk | Cl-mid | 19890101 | 19970331 | 2646 | 0 | 1.4 | 8 | 2.2 |
| Ode | Cl-mid | 19890101 | 19940831 | 2031 | 0 | 1.7 | 8 | 2.7 |
| Sakh | Cl-mid | 19890101 | 19940630 | 1914 | 0 | 2.8 | 8 | 3.4 |
| Tash | Cl-mid | 19890101 | 19951231 | 2556 | 0 | 1.0 | 8 | 2.0 |
| Ural | Cl-mid | 19890101 | 19961210 | 2839 | 0 | 2.3 | 8 | 3.0 |
| Vo | Cl-mid | 19890101 | 19970331 | 2899 | 0 | 3.0 | 8 | 3.4 |
| Irk | Cl-nim | 19890101 | 19970331 | 2646 | 0 | 0.3 | 8 | 1.1 |
| Ode | Cl-nim | 19890101 | 19940831 | 2031 | 0 | 0.1 | 6 | 0.6 |
| Sakh | Cl-nim | 19890101 | 19940630 | 1914 | 0 | 0.3 | 8 | 1.2 |
| Tash | Cl-nim | 19890101 | 19951231 | 2556 | 0 | 0.1 | 6 | 0.4 |
| Ural | Cl-nim | 19890101 | 19961210 | 2839 | 0 | 0.3 | 6 | 0.9 |
| Vo | Cl-nim | 19890101 | 19970331 | 2899 | 0 | 0.5 | 6 | 1.1 |
| Wank | Cl-R | 19810613 | 19831231 | 551 | 10 | 821.7 | 6000 | 863.7 |
| Irk | Cl-str | 19890101 | 19970331 | 2646 | 0 | 0.2 | 8 | 0.8 |
| Ode | Cl-str | 19890101 | 19940831 | 2031 | 0 | 0.5 | 6 | 0.8 |
| Sakh | Cl-str | 19890101 | 19940630 | 1914 | 0 | 0.4 | 8 | 1.2 |
| Tash | Cl-str | 19890101 | 19951231 | 2556 | 0 | 0.5 | 4 | 0.8 |
| Ural | Cl-str | 19890101 | 19961210 | 2839 | 0 | 0.4 | 5 | 0.7 |
| Vo | Cl-str | 19890101 | 19970331 | 2899 | 0 | 1.0 | 5 | 0.9 |
| Irk | Cl-tot | 19890101 | 19970331 | 2646 | 0 | 7.3 | 13 | 3.6 |
| Ode | Cl-tot | 19890101 | 19940831 | 2038 | 0 | 6.7 | 13 | 3.8 |

| Station | Quantity | From | To | Days | Min | Ave | Max | Sigma |
|---|---|---|---|---|---|---|---|---|
| Sakh | Cl-tot | 19890101 | 19940630 | 1914 | 0 | 7.1 | 13 | 3.8 |
| Tash | Cl-tot | 19890101 | 19951231 | 2556 | 0 | 5.5 | 13 | 4.8 |
| Ural | Cl-tot | 19890101 | 19961210 | 2839 | 0 | 7.6 | 13 | 3.5 |
| Vo | Cl-tot | 19890101 | 19970331 | 2900 | 0 | 8.5 | 13 | 3.3 |
| Irk | Cl-upp | 19890101 | 19970331 | 2646 | 0 | 2.9 | 8 | 3.0 |
| Ode | Cl-upp | 19890101 | 19940831 | 2031 | 0 | 2.7 | 8 | 3.3 |
| Sakh | Cl-upp | 19890101 | 19940630 | 1914 | 0 | 3.2 | 8 | 3.5 |
| Tash | Cl-upp | 19890101 | 19951231 | 2556 | 0 | 1.6 | 8 | 2.7 |
| Ural | Cl-upp | 19890101 | 19961210 | 2839 | 0 | 3.5 | 8 | 3.4 |
| Vo | Cl-upp | 19890101 | 19970331 | 2899 | 0 | 3.9 | 8 | 3.5 |
| Irk | Cl-ver | 19890101 | 19970331 | 2646 | 0 | 0.6 | 8 | 1.1 |
| Ode | Cl-ver | 19890101 | 19940831 | 2031 | 0 | 0.4 | 4 | 0.7 |
| Sakh | Cl-ver | 19890101 | 19940630 | 1914 | 0 | 1.4 | 8 | 1.3 |
| Tash | Cl-ver | 19890101 | 19951231 | 2556 | 0 | 0.3 | 4 | 0.7 |
| Ural | Cl-ver | 19890101 | 19961210 | 2839 | 0 | 0.6 | 4 | 0.9 |
| Vo | Cl-ver | 19890101 | 19970331 | 2899 | 0 | 0.5 | 4 | 0.8 |
| Dush | C-MGO | 19670101 | 19801231 | 5114 | 0 | 0.2 | 2 | 0.6 |
| Irk | C-MGO | 19890101 | 19970331 | 2646 | 0 | 0.4 | 2 | 0.7 |
| Ode | C-MGO | 19890101 | 19940831 | 2038 | 0 | 0.4 | 2 | 0.7 |
| Sakh | C-MGO | 19890101 | 19940630 | 1914 | 0 | 0.6 | 2 | 0.9 |
| Tash | C-MGO | 19890101 | 19951231 | 2556 | 0 | 0.6 | 2 | 0.7 |
| Ural | C-MGO | 19740101 | 19961231 | 7973 | 0 | 0.3 | 2 | 0.7 |
| Vo | C-MGO | 19660101 | 19970331 | 10936 | 0 | 0.3 | 2 | 0.7 |
| Wank | CNR1:cm-3 | 19720801 | 19831231 | 3997 | 0 | 1625.7 | 32740 | 1845.0 |
| Wank | CNR2:cm-3 | 19720801 | 19831231 | 3981 | 0 | 986.1 | 57900 | 1225.7 |
| Wank | CNR3:cm-3 | 19720801 | 19831231 | 3806 | 0 | 648.3 | 38200 | 876.4 |
| Viru | CO:mg/m3 | 19940725 | 19990731 | 1699 | 0.0 | 1.28 | 13.4 | 1.10 |

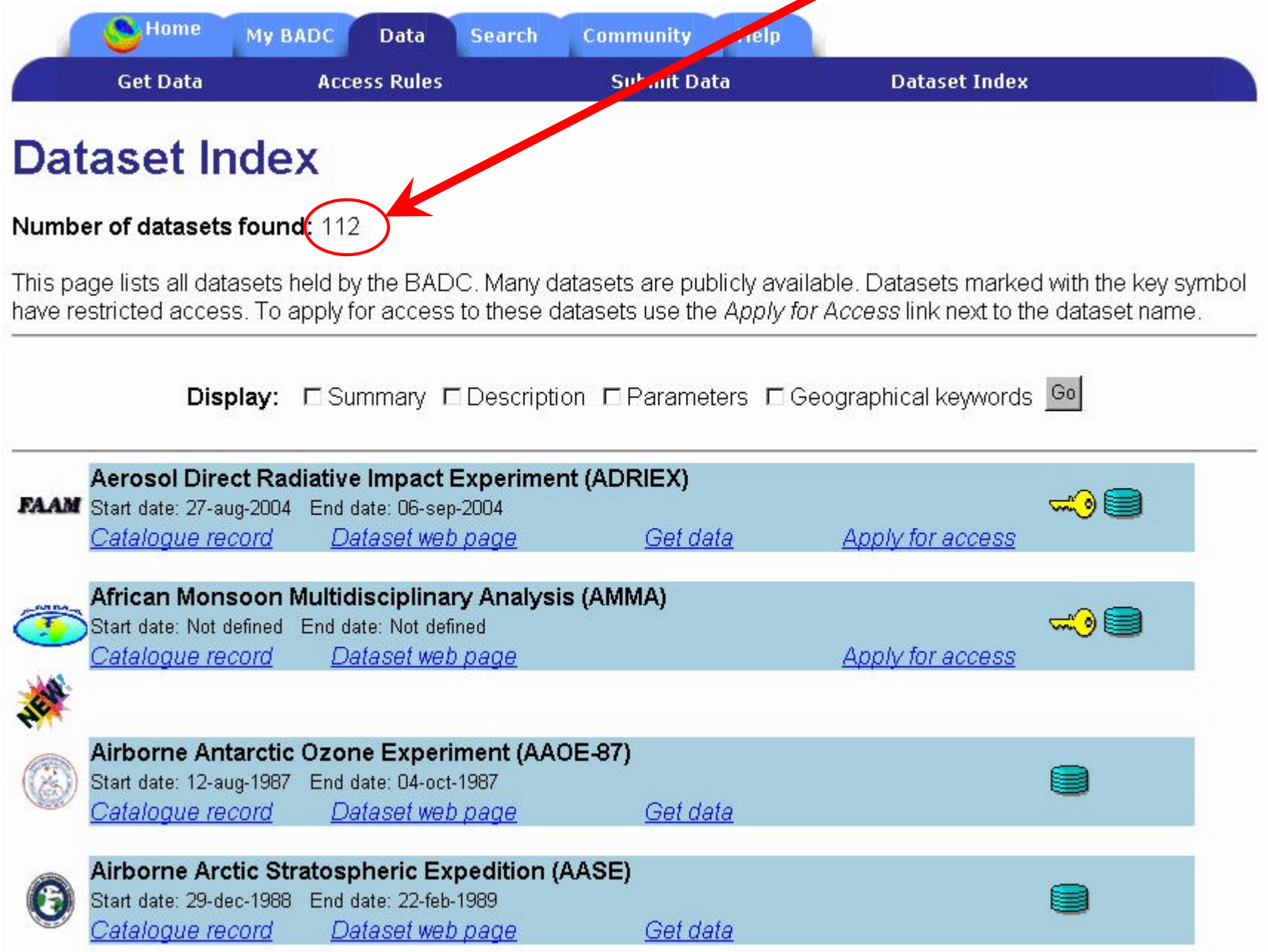
| Station | Quantity | From | To | Days | Min | Ave | Max | Sigma |
|---|---|---|---|---|---|---|---|---|
| Wank | E:inv/h | 19720801 | 19831231 | 3946 | 0 | 1.0 | 90 | 5.8 |
| Dush | E:V/m | 19670101 | 19801231 | 5099 | -350 | 8.6 | 300 | 15.5 |
| Irk | E:V/m | 19890101 | 19970331 | 2573 | -45 | 7.4 | 84 | 6.9 |
| Marsta | E:V/m | 19930203 | 19981203 | 2003 | -2351 | 51.1 | 312 | 142.1 |
| Ode | E:V/m | 19890101 | 19940831 | 1970 | -456 | 24.3 | 504 | 26.1 |
| Sakh | E:V/m | 19890101 | 19940630 | 1862 | -295 | 14.9 | 684 | 24.1 |
| Tash | E:V/m | 19890101 | 19951224 | 2540 | -66 | 5.9 | 87 | 6.0 |
| Ural | E:V/m | 19740101 | 19961210 | 7405 | -272 | 14.0 | 412 | 17.7 |
| Wank | E:V/m | 19720801 | 19831231 | 4049 | -414 | 77.6 | 799 | 76.0 |
| Vo | E:V/m | 19660101 | 19970331 | 10795 | -327 | 12.9 | 583 | 19.4 |
| Marsta | Eflct:V/m | 19930205 | 19981203 | 1826 | 0 | 8.2 | 106 | 9.7 |
| Marsta | H2O:g/kg | 19940531 | 19980923 | 948 | 0.62 | 6.376 | 16.52 | 2.594 |
| Wank | H2O:g/kg | 19720801 | 19831231 | 4074 | 0.00 | 4.544 | 16.91 | 2.318 |
| Marsta | j:pA/m2 | 19930204 | 19981130 | 1759 | -123.90 | 2.436 | 16.26 | 5.570 |
| Wank | j:pA/m2 | 19720801 | 19831231 | 3933 | -10.60 | 0.880 | 64.60 | 2.942 |
| Wank | jp:pA/m2 | 19740103 | 19820704 | 2005 | -5.01 | 0.091 | 9.90 | 0.881 |
| Dush | L-:fS/m | 19670101 | 19801231 | 4963 | 1.0 | 18.28 | 50.0 | 7.39 |
| Irk | L-:fS/m | 19890101 | 19970331 | 2565 | 1.0 | 4.01 | 27.0 | 2.47 |
| Marsta | L-:fS/m | 19930204 | 19981130 | 1818 | 3.5 | 23.62 | 83.4 | 13.01 |
| Ode | L-:fS/m | 19890204 | 19940831 | 1956 | 1.0 | 5.30 | 60.0 | 2.57 |
| Sakh | L-:fS/m | 19890101 | 19910815 | 804 | 1.0 | 4.23 | 27.0 | 3.15 |
| Ural | L-:fS/m | 19740101 | 19951001 | 7051 | 1.0 | 7.50 | 67.0 | 3.79 |
| Wank | L-:fS/m | 19730724 | 19831130 | 3489 | 0.0 | 6.60 | 54.8 | 4.28 |
| Vo | L-:fS/m | 19660103 | 19970331 | 10416 | 1.0 | 6.93 | 44.0 | 3.56 |
| Dush | L+:fS/m | 19670101 | 19801231 | 4971 | 1.0 | 18.47 | 50.0 | 7.08 |
| Irk | L+:fS/m | 19890101 | 19970331 | 2565 | 1.0 | 4.28 | 28.0 | 2.46 |
| Marsta | L+:fS/m | 19930203 | 19981203 | 1848 | 3.5 | 23.06 | 44.2 | 7.41 |

| Station | Quantity | From | To | Days | Min | Ave | Max | Sigma |
|---|---|---|---|---|---|---|---|---|
| Ode | L+:fS/m | 19890204 | 19940831 | 1957 | 1.0 | 5.70 | 25.0 | 2.33 |
| Sakh | L+:fS/m | 19890101 | 19910815 | 804 | 1.0 | 4.52 | 24.0 | 2.96 |
| Ural | L+:fS/m | 19740101 | 19951001 | 7018 | 1.0 | 7.96 | 98.0 | 3.98 |
| Wank | L+:fS/m | 19730724 | 19831130 | 3404 | 0.0 | 8.55 | 66.0 | 5.01 |
| Vo | L+:fS/m | 19660102 | 19970331 | 10460 | 1.0 | 7.60 | 63.0 | 3.79 |
| Wank | NC-:cm-3 | 19720801 | 19831231 | 3747 | 0 | 183.3 | 2111 | 129.4 |
| Wank | NC+:cm-3 | 19720801 | 19831231 | 3795 | 0 | 341.7 | 2381 | 193.4 |
| Saare | NO:ug/m3 | 19971231 | 19990620 | 362 | 0.0 | 0.16 | 18.3 | 0.36 |
| Vils | NO:ug/m3 | 19950418 | 19990630 | 927 | 0.0 | 0.30 | 22.1 | 0.94 |
| Viru | NO:ug/m3 | 19940725 | 19990731 | 1643 | 0.0 | 36.24 | 508.0 | 36.22 |
| Saare | NO2:ug/m3 | 19971122 | 19990620 | 399 | 0.0 | 2.42 | 56.0 | 3.16 |
| Vils | NO2:ug/m3 | 19950418 | 19990630 | 926 | 0.0 | 3.27 | 46.3 | 2.84 |
| Viru | NO2:ug/m3 | 19940725 | 19990731 | 1620 | 0.0 | 38.43 | 519.0 | 24.40 |
| Saare | NOX:ug/m3 | 19971122 | 19990620 | 399 | 0.0 | 2.59 | 37.2 | 3.19 |
| Wank | NOX:ug/m3 | 19740308 | 19830729 | 1170 | 0.0 | 1.87 | 30.3 | 1.71 |
| Vils | NOX:ug/m3 | 19950418 | 19990630 | 926 | 0.0 | 3.70 | 47.3 | 3.37 |
| Viru | NOX:ug/m3 | 19940725 | 19990731 | 1633 | 0.0 | 92.06 | 953.0 | 71.44 |
| Lahe | O3:ug/m3 | 19940615 | 19990731 | 807 | 0.0 | 55.54 | 212.0 | 25.73 |
| Saare | O3:ug/m3 | 19971112 | 19990620 | 296 | 4.7 | 59.61 | 150.7 | 24.33 |
| Vils | O3:ug/m3 | 19940528 | 19990630 | 1374 | 6.0 | 71.54 | 166.0 | 22.85 |
| Viru | O3:ug/m3 | 19960605 | 19990731 | 973 | 1.1 | 29.28 | 122.2 | 17.60 |
| Marsta | p:mb | 19940531 | 19981130 | 1457 | 953.2 | 1006.70 | 1044.4 | 12.47 |
| Dush | Ph-code | 19670101 | 19801231 | 5114 | 0 | 0.0 | 0 | 0.0 |
| Irk | Ph-code | 19890101 | 19970331 | 2646 | 0 | 2.3 | 19 | 4.4 |
| Ode | Ph-code | 19890101 | 19940831 | 2038 | 0 | 1.8 | 19 | 3.6 |
| Sakh | Ph-code | 19890101 | 19940630 | 1914 | 0 | 4.7 | 18 | 5.8 |
| Tash | Ph-code | 19890101 | 19951231 | 2556 | 0 | 1.5 | 19 | 3.6 |

| Station | Quantity | From | To | Days | Min | Ave | Max | Sigma |
|---|---|---|---|---|---|---|---|---|
| Ural | Ph-code | 19740101 | 19961231 | 7973 | 0 | 1.5 | 19 | 4.3 |
| Vo | Ph-code | 19660101 | 19970331 | 10936 | 0 | 1.1 | 20 | 3.2 |
| Dush | Ph-int | 19670101 | 19801231 | 5114 | 0 | 0.0 | 0 | 0.0 |
| Irk | Ph-int | 19890101 | 19970331 | 2646 | 0 | 0.6 | 7 | 0.8 |
| Ode | Ph-int | 19890101 | 19940831 | 2038 | 0 | 0.4 | 7 | 0.8 |
| Sakh | Ph-int | 19890101 | 19940630 | 1914 | 0 | 1.0 | 7 | 1.0 |
| Tash | Ph-int | 19890101 | 19951231 | 2556 | 0 | 0.4 | 7 | 0.6 |
| Ural | Ph-int | 19740101 | 19961231 | 7973 | 0 | 0.2 | 6 | 0.6 |
| Vo | Ph-int | 19660101 | 19970331 | 10936 | 0 | 0.3 | 10 | 0.7 |
| Wank | Rad:W/m2 | 19720801 | 19831231 | 4169 | 0 | 167.6 | 1375 | 253.9 |
| Marsta | RH% | 19940531 | 19980923 | 1121 | 21.5 | 82.20 | 100.0 | 18.26 |
| Wank | RH% | 19720801 | 19831231 | 4075 | 0.0 | 73.42 | 100.0 | 20.47 |
| Marsta | Ri | 19940531 | 19981130 | 1406 | -100.00 | 2.860 | 100.00 | 16.298 |
| Marsta | SC:pC/m3 | 19930204 | 19981130 | 1793 | -12.5 | 7.21 | 26.4 | 6.59 |
| Wank | SC:pC/m3 | 19730724 | 19831231 | 3099 | -6.1 | 0.18 | 9.8 | 0.33 |
| Wank | Sky:W/m2 | 19770205 | 19831231 | 2516 | 0 | 78.0 | 749 | 118.2 |
| Saare | SO2:ug/m3 | 19971231 | 19990620 | 331 | 0.0 | 1.58 | 84.8 | 3.61 |
| Vils | SO2:ug/m3 | 19940528 | 19990630 | 947 | 0.0 | 1.84 | 59.0 | 3.87 |
| Viru | SO2:ug/m3 | 19940726 | 19990731 | 1675 | 0.0 | 5.86 | 104.1 | 6.12 |
| Wank | Sun% | 19730729 | 19831231 | 3532 | 0 | 21.1 | 100 | 37.2 |
| Wank | T:C | 19720801 | 19831231 | 4163 | -23.4 | 3.14 | 44.1 | 7.14 |
| Marsta | T08:C | 19940531 | 19981130 | 1469 | -21.91 | 7.159 | 32.59 | 8.522 |
| Marsta | T10:C | 19940531 | 19981130 | 1464 | -17.23 | 7.761 | 31.74 | 8.160 |
| Wank | Tepot:K | 19730703 | 19831231 | 3734 | 271.3 | 304.49 | 353.0 | 12.79 |
| Marsta | Tgr:K/m | 19940531 | 19981130 | 1464 | -0.222 | 0.0619 | 0.986 | 0.1417 |
| Wank | Tpot:K | 19730703 | 19831231 | 3823 | 267.7 | 292.25 | 316.9 | 7.35 |
| Wank | UV:mW/m2 | 19740307 | 19831231 | 3563 | 0.00 | 1.835 | 21.25 | 3.180 |

| Station | Quantity | From | To | Days | Min | Ave | Max | Sigma |
|---|---|---|---|---|---|---|---|---|
| Marsta | Wflct:m/s | 19940531 | 19981130 | 1441 | 0.00 | 0.438 | 3.92 | 0.270 |
| Irk | Wind:deg | 19890101 | 19970331 | 2646 | 0 | 178.8 | 360 | 98.7 |
| Lahe | Wind:deg | 19970218 | 19990731 | 666 | 0 | 181.6 | 359 | 87.1 |
| Marsta | Wind:deg | 19940531 | 19981130 | 1441 | 0 | 187.9 | 359 | 100.4 |
| Ode | Wind:deg | 19890101 | 19940831 | 2038 | 0 | 205.0 | 360 | 102.0 |
| Sakh | Wind:deg | 19890101 | 19940630 | 1914 | 0 | 213.4 | 360 | 121.1 |
| Tash | Wind:deg | 19890101 | 19951231 | 2556 | 0 | 167.7 | 360 | 96.4 |
| Ural | Wind:deg | 19890101 | 19961210 | 2839 | 0 | 201.3 | 360 | 85.7 |
| Wank | Wind:deg | 19720801 | 19831231 | 4116 | 0 | 202.0 | 360 | 90.3 |
| Vils | Wind:deg | 19951231 | 19960720 | 203 | 2 | 167.6 | 356 | 92.5 |
| Vo | Wind:deg | 19890101 | 19970331 | 2900 | 0 | 191.3 | 360 | 93.2 |
| Irk | Wind:m/s | 19890101 | 19970331 | 2646 | 0.0 | 1.98 | 12.0 | 1.18 |
| Lahe | Wind:m/s | 19970219 | 19990731 | 667 | 0.0 | 2.31 | 10.6 | 1.53 |
| Ode | Wind:m/s | 19890101 | 19940831 | 2038 | 0.0 | 2.87 | 14.0 | 1.70 |
| Sakh | Wind:m/s | 19890101 | 19940630 | 1914 | 0.0 | 2.66 | 13.0 | 1.89 |
| Tash | Wind:m/s | 19890101 | 19951231 | 2556 | 0.0 | 1.42 | 12.0 | 0.80 |
| Ural | Wind:m/s | 19890101 | 19961210 | 2839 | 0.0 | 2.16 | 12.0 | 1.16 |
| Wank | Wind:m/s | 19720801 | 19831231 | 4150 | 0.6 | 4.11 | 21.0 | 2.14 |
| Vils | Wind:m/s | 19951231 | 19960720 | 203 | 0.0 | 4.04 | 15.5 | 2.44 |
| Vo | Wind:m/s | 19890101 | 19970331 | 2900 | 0.0 | 2.68 | 12.0 | 1.44 |
| Marsta | Wind08:m/s | 19940531 | 19981130 | 1409 | 0.04 | 2.115 | 10.34 | 1.583 |
| Marsta | Wind10:m/s | 19940531 | 19981130 | 1441 | 0.06 | 3.594 | 15.24 | 2.237 |
| Wank | Vis:km | 19750109 | 19831231 | 3132 | 0.40 | 31.424 | 99.00 | 26.911 |

# Data Structure



# NASA AMES, database or diary?

```
 1) 40 1001
 2) Ryan Margaret
 3) IE01L, Met Eireann, Glasnevin Hill, Dublin 9, Ireland, +353-1-8064227
 4) Ryan Margaret
 5) EMEP(insert)
 6) 1 1
 7) 2001 01 01   2002 08 01
 8) 1
 9) Days from the file reference point (start_time)
10)3
11)1 1 1
12)999 99.999 9.999
13)end_time, days from the file reference point
14)value, mg/l
15)numflag, no unit, max 3 flags (of 3 digits each) coded into the decimals
16)0
17)23
18)Data definition:                  EBAS_1
19)Set type code:                   TU
20)Regime:                          IMG
21)Station code:                    IE0001R
22)Platform code:                   IE0001S
23)Startdate:                       20010101
24)Timeref:                         10_00
25)Revision date:                   20020801
26)Component:                       magnesium
27)Unit:                            mg/l
28)Matrix:                          precip
```

```
29)Period code:                    1y
30)Resolution code:                1d
31)Laboratory code:                IE01L
32)Instrument type:                bulk_sampler
33)Instrument name:                orig_1
34)Method ref:                     IE01L_ic1_bd
35)Ext. lab. code:                 NA
36)Ext. meth. ref:                 NA
37)Add. qualifier:                 NA
38)File name:                      TU.IMG.IE0001R...
39)File name ext:                  .IE01L.bulk_co...
40)start_time   end_time     value         numflag
       0            1        1.133         0.000
       1            2        3.050         0.000
       2            3        0.326         0.000
       3            4        99.999        0.783
       4            5        0.510         0.000
       5            6        1.355         0.000
       6            7        2.286         0.000
       7            8        0.273         0.000
       8            9        99.999        0.890
       9            10       99.999        0.890
       ...
       ...
```

**NB: Numeration 1...40) must be omitted in the real data file!**

# Why MS ACCESS is not popular in environmental research?

# DIARY

```
WANK. 06.12.77
STUNDENWERTE:
T
-00.4 -01.0 -02.2 -02.9 -01.8 -01.7 -00.1 +00.2 +00.7 +00.1 -00.1 -00.4
-00.4 -00.1 +00.5 -00.2 -00.5 -01.2 -02.0 -02.1 -02.3 -02.7 -02.8 -03.0
RF
 21.5  21.8  24.2  26.2  22.4  24.0  20.7  22.8  29.8  36.1  41.1  43.8
 45.9  49.4  47.6  50.6  52.8  58.6  61.2  63.7  76.1  83.8  88.1  89.5
....
```

**WANK STUNDENWERTE:**

**06.12.77,T,-00.4,-01.0,-02.2,-02.9,-01.8,-01.7,-00.1,+00.2,+00.7,+00.1,-00.1,-00.4,-00.4,-00.1,+00.5,-00.2,-00.5,-01.2,-02.0,-02.1,-02.3,-02.7,-02.8,-03.0**

**06.12.77,RF,21.5,21.8,24.2,26.2,22.4,24.0,20.7,22.8,29.8,36.1,41.1,43.8,45.9,49.4,47.6,50.6,52.8,58.6,61.2,63.7,76.1,83.8,88.1,89.5**

**06.12.77,E,1.275,1.238,1.257,1.292,1.199,1.294,1.255,1.413,1.915,2.221,2.492,2.599,2.723,2.996,3.015,3.046,3.110,3.279,3.228,3.335,3.926,4.197,4.379,4.383**

*Advantages of diary:*

- prepared for routine environmental measurements
- saved as immediately readable text
- data manager will be available as freeware

# DataDiurna format

## Structure of a diary

DDD,ATMEL1,20041230

19950615,Tash,Cl-mid,h0,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,0,0,0,0,0,0,1,1

19950615,Tash,Wind:deg,h0,87,103,120,133,147,160,203,247,290,193,97,0,0,0,0,30,60,90,90,90,90,90,90,...

19950615,Tash,Wind:m/s,h0,1,2,2,2,1,1,1,1,1,1,0,0,0,0,0,0,1,1,1,1,1,1,1,1

19950615,Marsta,RH%,h0,100.0,100.0,100.0,100.0,100.0,99.6,98.4,98.9,98.2,94.6,86.6,80.6,76.1,71.9,63.3,...

19950615,Marsta,E:V/m,h0,10,-2,46,72,67,66,-1,164,91,61,59,98,93,93,76,76,84,73,72,76,88,51,42,37

19950615,Marsta,L+:fS/m,h0,23.1,22.9,23.9,24.8,24.5,24.4,24.1,24.2,24.7,25.7,29.0,26.9,24.1,24.1,24.1,21....

19950615,Marsta,L-:fS/m,h0,13.3,13.8,14.0,15.7,19.5,19.1,20.0,20.6,25.2,24.5,22.9,20.0,19.5,19.6,20.6,18.9...

19950615,Marsta,SC:pC/m3,h0,3.7,1.3,-0.5,-0.5,-0.5,1.8,-1.0,-0.6,-0.3,-0.3,4.3,8.2,8.8,9.1,8.5,9.8,10.7,10.7,....

19950615,Marsta,j:pA/m2,h0,0.36,-0.07,1.74,2.92,2.95,2.87,-0.04,7.35,4.54,3.06,3.06,4.60,4.05,4.06,3.40,3....

19950615,Viru,SO2:ug/m3,h0,3.7,2.9,2.5,2,2.6,3.8,6.1,7.5,7.7,6.7,5.7,5.2,5,2.7,2.1,3.5,3.5,5,3,1.5,1.3,1,0.9,1...

19950615,Vils,NO2:ug/m3,h0,4.1,4.2,4.3,3.1,4.1,9999,0.8,2.1,9999,1.4,3.4,1.8,0.4,0.7,1.1,1.6,1.1,1.7,2.9,2.4...

19950615,Vils,NOX:ug/m3,h0,4.3,4.5,4.5,3.5,4.5,9999,1.1,2.5,9999,1.8,4.3,2.2,0.6,1.1,1.5,2.2,1.4,2.2,3.4,2.8...

# Structure of descriptions

DDS,ATMEL1,20041223
Vo,59.97,30.3,72,Voeikovo near St. Petersburg (former Leningrad)
Irk,52.27,104.32,467,Irkutsk near Baikal See
Dush,42.08,44.7,910,Dusheti near Tbilisi
Ural,56.8,60.63,237,Verhnee Dubrovo near Jekaterinenburg (former Sverdlovsk)
Ode,46.48,30.63,42,Odessa

*stationlabel,latitude,longitude,altitude[,explanations]*

DDQ,ATMEL1,20041223
T:C,Celsius,1,-90,90,99,Air temperature near the station
T08:C,Celsius,2,-90,90,99,Air temperature at height of 0.8 m
T10:C,Celsius,2,-90,90,99,Air temperature at height of 10 m
Tgr:K/m,K/m,3,-2,2,9,Gradient of temperature (ATMEL1-MARSTA.doc)
Tpot:K,Kelvin,1,180,360,999,Potential temperature (ATMEL1-WANK.doc)
Tepot:K,Kelvin,1,180,360,999,Equipotential temperature (ATMEL1-WANK.doc)
p:mb,millibar,1,100,1200,9999,Air pressure near the station
RH%,%,1,0,100,999,Relative humidity

*quantitylabel,unit,decimals,lowconstraint,highconstraint,missing[,explanations]*

DDR,ATMEL1,20041228
h0,24,1800,Average during full hour, first period 00:00-01:00
hw,24,0Average during full hour, first period 23:30-00:30

*regimelabel,valuesperday,reference[,explanations]*

# DataDiurna manager

## Data adaptation

*Numerical values*: 1.23 = 00.123E01 = 123+001 = +001,23  etc.

*Time presentation*:

**20040512,17.17,23,-17,...**
**2004-05-12 17:10:00 23,-17,...**
**120504/1710)23,-17,...**
**...**

*Time zone and data synchronization*

## Data import

**Table ® Diary**

## Data export

**Diary ® Diary**

**Diary ® Table**