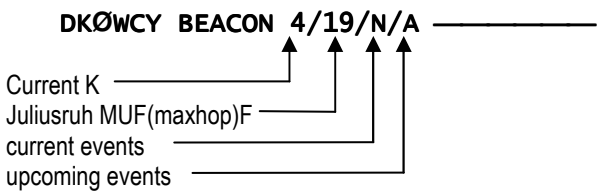
CW-Id

Between data transmissions (datagrams) a CW identification is transmitted:



Current and upcoming events are expressed by these letters:

A	aurora
F	shortwave fadeout (SWF, Sudden Ionospheric Disturbance)
I	solar shockwave (disturbes the geomagnetic field/K index increase)
M	geomagnetic storm
N	no event
P	polar cap absorption (PCA)
Z	beacon maintenance in progress, expect reduced power output and/or interrupted operation

A letter appearing more than once denotes a particularly strong event. If no event is currently taking place or is expected the letter **N** is transmitted.

If aurora is under way the continuous carried signal terminating the CW-id changes to a series of dots.

Missing data show up as **na** (meaning *not available*).

The following sections show examples of datagrams and explain the transmitted figures.

* For internal purposes the 30m schedule (delayed by 5 minutes) is also transmitted via DRA5 on 5195 kHz.

Digimode Datagram (RTTY/PSK31)

```
ZCZC

Events:   none
Warnings: aurora

Solar and geomagnetic indices observed on 06
Jun:
  Sunspot number      36   36   36
  Solar flux          78   78   78
  SSNe                14   14   14
  Boulder A           18   18   18
  Kiel A              25   25   25
  Mean SSN for May  14.3 14.3 14.3

Solar Conditions:
  Solar wind speed   635  635  635 km/s
  Solar wind density   3    3    3 cm-3
  Solar wind temp     77   77   77 kK
  IMF Bz component    +1   +1   +1 nT
  Xray flux           B8   B8   B8
  24h xray maximum    M3   M3   M3 at 0924UT
  24h flare activity  1M 2C

Geomagnetic Conditions:
  3-hour Kiel k        4    4    4 at 1800UT
  current Kiel k    4.19 4.19 4.19 at 1852UT

Ionospheric Conditions:
  Ruegen fof2        6.2  6.2  6.2 MHz
  hf2                 na   na   na km
  hf                 220  220  220 km
  max hop at 5 deg  2367 2367 2367 km
  MUF(max hop)F     19.3 19.3 19.3 MHz
  MUF(1000)F         9.7  9.7  9.7 MHz
  current SSNe      17.4 17.4 17.4

Forecast valid for 07 Jun:
  Solar activity     eruptive
  Magnetic field     quiet

NNNN
```

CW Datagram

```
INFO
CONDS 07 JUN 1840 UT =
MAG  KIEL K 3 3  KCUR 4.19 4.19 =
IONO RUEGEN FOF2 6.2 6.2  MUF 19 19
     MAXHOP 2367 2367  MUF1K 10 10 =
SUN  WIND 635 635  DENSITY 3 3  BZ P1 P1
     XRAY B8 B8  FLARE 1M 2C ==

FORECAST 07 JUN =
SUN ERUPTIVE  MAG QUIET

INDEX 06 JUN =
R 36 36  SSNE 14 14  FLUX 78 78
BOULDER A 10 10  KIEL A 12 12
+
```


What The Figures Mean

Abbreviations used in the CW datagram are printed in square brackets.

A Index:

Expresses the degree of disturbance of the geomagnetic field for a whole day and is made up of the eight K indices of that same day. Has a range from 0 to 400; a value below 40 denotes a quiet day.

Bz:

Component of the →interplanetary magnetic field. Negative values make aurora more likely. In the CW datagram *P* stands for values >= 0 and *N* for values <0.

Current k *[KCUR]*:

Is determined according to the →*K Index* but does not stick to its tight three hour period. Instead current K uses the measurements of the recent 180 minutes. This way disturbances of the geomagnetic field may be detected much earlier.

Event:

An event currently under way (see section „CW-Id“ for details).

Flare:

A violent explosion in the Sun's atmosphere producing a burst of radiation. Is sometimes seen in the visible spectrum, but for radio propagation a flare's x-ray radiation is much more important. To classify a flare's flux the same notation is used as for the →Xray Flux (e.g. a „M7-Flare“)

Flux: →Solar Flux

fof2:

The frequency of a radio signal which is just bent back towards Earth's surface when transmitted at right angle into the ionosphere's F layer. Signals of higher frequency penetrate the ionosphere and escape into space. A signal entering the ionosphere in an oblique angle is still bent back even it has a much higher frequency (→MUF).

hf2, hf:

Virtual height of a ionosphere layer. The greater this number the greater the →hop distance. The F layer must be split up into a F1 and F2 layer for a hf2 value to be available, otherwise just hf is given.

Hop Distance:

Distance on Earth's surface between two encounters of a radio signal which is bent down from the ionosphere. It depends on the vertical radiation angle and the height of the ionospheric layer (→hf). When propagation happens via E layer (and the vertical radiation angle is 0°) the maximum hop distance is 1500-2000 km, via F layer more than 3000 km may be achieved (→max hop).

Interplanetary Magnetic Field (IMF):

The magnetic field outside of Earth's magnetosphere. It is dominated by the Sun and is heavily related to the →solar wind. The IMF changes according to solar wind variations (direction, speed, particle density, temperature). If it is directed "southward" (→Bz) a connection to the geomagnetic field may be established which leads to a massive influx of charged particles into Earth's polar regions. This may trigger an aurora event.

K-Index:

Describes the degree of disturbance of the geomagnetic field. It is determined every three hours from the maximum difference of two measured values for the magnetic field strength. DKØWCY receives its measurements from a magnetometer operated at the beacon's QTH (also published on the DKØWCY web site). The K index is quasi-logarithmic and runs from 1 (very quiet) to 9 (extremely disturbed). It depends on the magnetometer's geomagnetic location. High values deteriorate shortwave propagation mainly on radio paths touching the polar regions. In Central Europe aurora is likely to occur if K is 5 or greater.

Kiel K: →K-Index

Magnetic Field *[MAG]*:

Prediction of the expected level of disturbance of the geomagnetic field:

- quiet: (K<=3)
- active: (moderatly disturbed) (K=4, A>20)
- minor storm (K=5, A>30)
- major storm (K=6, A>50)
- severe storm (K=7, A>100)
- storm in progress (K=4, A>30)

max hop (distance):

Maximum →hop distance via F layer which is achievable under current conditions. As a vertical radiation angle of 0° is not realistic DKØWCY uses a vertical radiation angle of 5° when calculating this distance.

Mean SSN

Mean →Sunspot Number of the past month as published by SIDC in Bruxelles. Propagation forecasting software often requires this value as an input parameter to its calculations.

MUF(hop distance)F, MUF(1000)F *[MUF, MUF1K]*

Maximum frequency which is bent back from the ionosphere's F layer for the given →hop distance (e.g. MUF(1000)F resp. MUF1K for a hop distance of 1000 km). MUF values for the →max hop distance as given in the datagrams and CW id assume a vertical radiation angle of 5°.

Polar Cap Absorption (Polkappenabsorption) *[PCA]*:

Absorption of shortwave radio signals crossing Earth's polar areas. It is caused by heavy particle radiation from the Sun (mostly Protons) and may last for several days. Makes DX areas on the pacific rim inaccessible for operators located in Europe.

Solar Wind Density *[DENSITY]*:

Particle density of the →Solar Wind in particles per cm^3. A value of about 2 is nominal; higher densities ease the influx of particles into polar regions.

Solar Wind Temp *[TEMP]*:

Temperature of the →Solar Wind given in kK (1000 Kelvin). Normally around 30 (=30000K); significantly higher values are often caused by a coronal hole.

Solar Wind Speed *[WIND]*:

Current speed of the →Solar Wind in km/s. Nominal values are around 300; the wind speed may go up to about 1000 km/s.

Solar Flux:

Intensity of the Sun's radio emission on 10.7 cm (2800 MHz). It is expressed in solar flux units (s.f.u.) in a range between 65 and 300 and is a direct measure of solar activity.

Solar Wind:

A flux of electrically charged particles emitted from the Sun and mainly consisting of protons, electrons and helium nuclei. It deforms the geomagnetic field (→K index). Charged particles from the solar wind may enter into polar regions causing disruptions of radio signals and aurora. High solar wind speed (> 600 km/s) together with a "southward" directed →interplanetary magnetic field (→Bz) promote these effects.

Shortwave Fadeout (SWF, Sudden Ionospheric Disturbance):

Heavy ionisation of the D layer caused by an x-ray burst. Within minutes this may lead to a breakdown of shortwave communication on the sunlit part of the globe. Depending on the degree of ionisation this event may last from about 20 minutes to 8 hours.

SSNe:

Solar activity is not very well reflected by the →sunspot number on short term because it is also influenced by other parameters. SSNe is determined once per hour by NWRA, Inc. from the actually measured fof2 values. It is therefore better suited as input parameter to propagation prediction software (see http://www.nwra-az.com/spawx/ssne24.html.)

Sunspot Number (R, SSN):

Measure for the number of visible sunspots calculated from the number of individual spots and the number of spot groups. It roughly correlates to solar activity which is better expressed by →solar flux or →SSNe.

Xray Flux *[XRAY]*:

The Sun is constantly emitting x-ray radiation. Its intensity is classified into classes A, B, C, M and X, where each class means a tenfold intensity compared to the neighboring lower class. The class is accompanied by a numerical value, e.g. "B7" meaning $7 \cdot 10^{-7}$ W/m^2 or „M5" meaning $5 \cdot 10^{-5}$ W/m^2. Eruptions of class M or higher usually influence shortwave propagation.

Solar Activity *[SUNACT]*:

Prediction of the expected solar activity:

- quiet: probability of C class flares <50%
- eruptive: probability of C class flares >=50%
- active: M class flares expected
- major flares exp X class flares expected

Warning:

Expected event (see section "CW-id" for details).

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DKØWCY Reference Card

Effective from 01-Jul-2007

DKØWCY is a radio beacon operated by the amateur radio service. It is broadcasting radio propagation news around the clock. The beacon's QTH is between Kiel and Flensburg in the very north of Germany (Locator JO44VQ).

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Beacon Operator: Emil Johannsen, DK4LI,
Hamm 4, D-24392 Scheggerott, Germany
Kontakt: dk4vw@darc.de

QSL: via DARC QSL bureau oder beacon operator
Find more at: http://www.dk0wcy.de

Transmission Schedule

CW RTTY PSK31 (BPSK) CW-Id